GRUY FEDERAL, INC.

INVESTIGATION AND EVALUATION OF GEOPRESSURED-GEOTHERMAL WELLS

DETAILED REENTRY PROGNOSIS FOR GEOPRESSURE-GEOTHERMAL TESTING OF CLADYS McCALL NO. 1 WELL

GRUY FEDERAL, INC.
2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063

713/785-9200

APRIL 21, 1978

PREPARED FOR THE
DEPARTMENT OF ENERGY
DIVISION OF GEOTHERMAL ENERGY
UNDER CONTRACT EG-77-C-03-1528

DISCLAIMER

GRUY FEDERAL, INC.

CONSULTANTS IN ENERGY SYSTEMS

April 21, 1978

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Mr. Ronald T. Stearns
Engineering and Construction Division
DOE/Nevada Operations Office
P. O. Box 14100
Las Vegas, Nevada 89114

Dear Mr. Stearns:

Herewith Gruy Federal, Inc. is submitting a revised recommended testing procedure for the reentry of Gruy Federal, Inc. Geo^2 L-2, being the well drilled as Getty-Buttes, Gladys McCall No. 1.

At this time, L-2 is our recommendation for the initial Geo^2 test based on factors which are discussed in a separate letter of this date.

Very truly yours,

Richard J. Dobson
Vice President,
Special Programs

RJD:mw
Enclosures

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GRUY FEDERAL, INC.

GEOPRESSURED-GEOTHERMAL REENTRY PROSPECT L-3

EAST CRAB LAKE AREA

CAMERON PARISH, LOUISIANA

Introduction

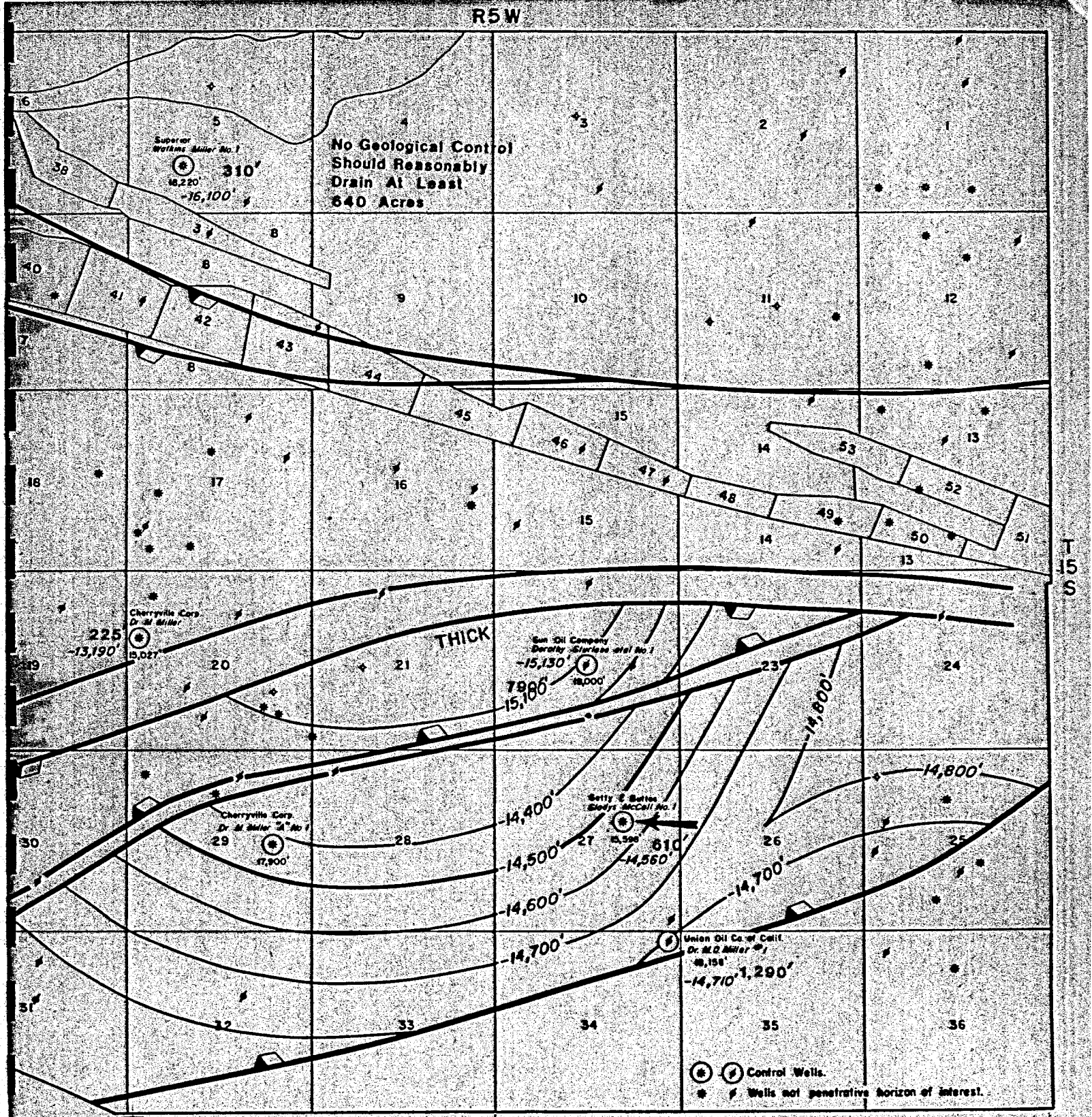
This Gruy Federal Type III-A geopressured-geothermal (Geo^2) prospect was drilled as the Getty Oil Company and Buttes Gas and Oil Company, No.1 Gladys McCall, API designation 17-023-20367, and is located in Section 27, Township 15S, Range 5W, Cameron Parish, Louisiana. The well is accessible over the original well levee approximately 2 1/2 miles south of Louisiana State Route 27; two bridges must be replaced. Buttes completed this well in January, 1970 as a shut-in gas well through perforations from 11,924 to 11,928 feet but was plugged and abandoned in April, 1970 without producing. The location is shown on the north central area of the USGS topographic sheet "Hog Bayou" in the Gruy Federal report "Investigation and Evaluation of Geopressured-Geothermal Wells, Prospective Test Wells in the Texas and Louisiana Gulf Coast", February 28, 1978.

Geology

The potential Geo^2 aquifers penetrated by this well are from 14,560 to 14,780 feet, from 14,930 to 14,970 feet and from 15,945 to 15,598 feet (TD) which are all Marginulina ascensionensis sands of lower Miocene age. No hydrocarbon saturation is evident on the resistivity log. During drilling operations through these sands, the mud weight was 17.0 pounds per gallon which would indicate that the static aquifer pressure would be approximately 13,500 psia (assuming 1,000 psi overbalance). The maximum recorded mud temperature during logging operations in this interval was 284° (140° C) which would indicate an aquifer temperature of 313° F (156° C) based upon correlation factors developed for South Louisiana by the AAPG.

Although a sonic log was run on the well, neither Getty nor Buttes were able to locate the copy of the log for us to compute porosities.* Thirty sidewall cores were recovered in the interval of interest, but no record of them could be located by the operator. A formation test of the interval

* Sonic log has been obtained and is being analyzed.



Designates Net Sand Penetrated at 300° Ft

GRUY FEDERAL, INC.
Houston, Texas

Crab Lake Field Area
Cameron Parish, Louisiana

STRUCTURE: TOP OF POROSITY AT FIRST GEO^2 SAND IN LOWER MIOCENE SECTION

from 14,558 to 14,565 feet recovered saltwater at a flowing bottom hole pressure of 4,000 psi.

No additional open hole logs can be run to evaluate the porosity of the Geo^2 sands because they are shielded by the 5-inch casing. The initial plan, however, is to test the 450 feet of sand at the bottom of the well. An accompanying structure map and a net sand thickness overlay indicate that this well is in a downthrown fault block and offers a large rock volume from which to test.

Mechanical Condition

The enclosed diagrammatic sketch illustrates both the current mechanical condition of the well and the proposed configuration for testing. The present condition of the well was obtained from the plugging and abandonment report filed with the Louisiana Department of Conservation and from the completion card published by "Petroleum Information Corporation" (Ira Rinehart's Oil Reports). It will be necessary to run 3,585 feet of 7-inch OD casing with a casing patch and tie into the existing 7-inch casing. In terms of tubular requirements, this is the least expensive well proposed by Gruy Federal.

Reentry Technique

A detailed reentry and recompletion prognosis is attached. In designing the equipment and specifying the procedures, the primary consideration was the safety of the operation and the experience of prudent operators who have successfully penetrated and produced from geopressured-geothermal gas reservoirs in the Louisiana Gulf Coast.

Casing Design - Since only a short tie back string of 7-inch OD casing is required, it was impractical to design a graded casing string. In order to accomodate the tensile load of hanging the casing in tension, P-110, 38 pound per foot, long tread and collar was specified.

Tubing Design - The tubing selected was a tapered string consisting of 2-7/8 inch, 8.70 pound per foot to run inside the 5-inch OD casing liner and 3-1/2 inch, 12.70 pound per foot, P-105, PH-6 Hydril threaded tubing.

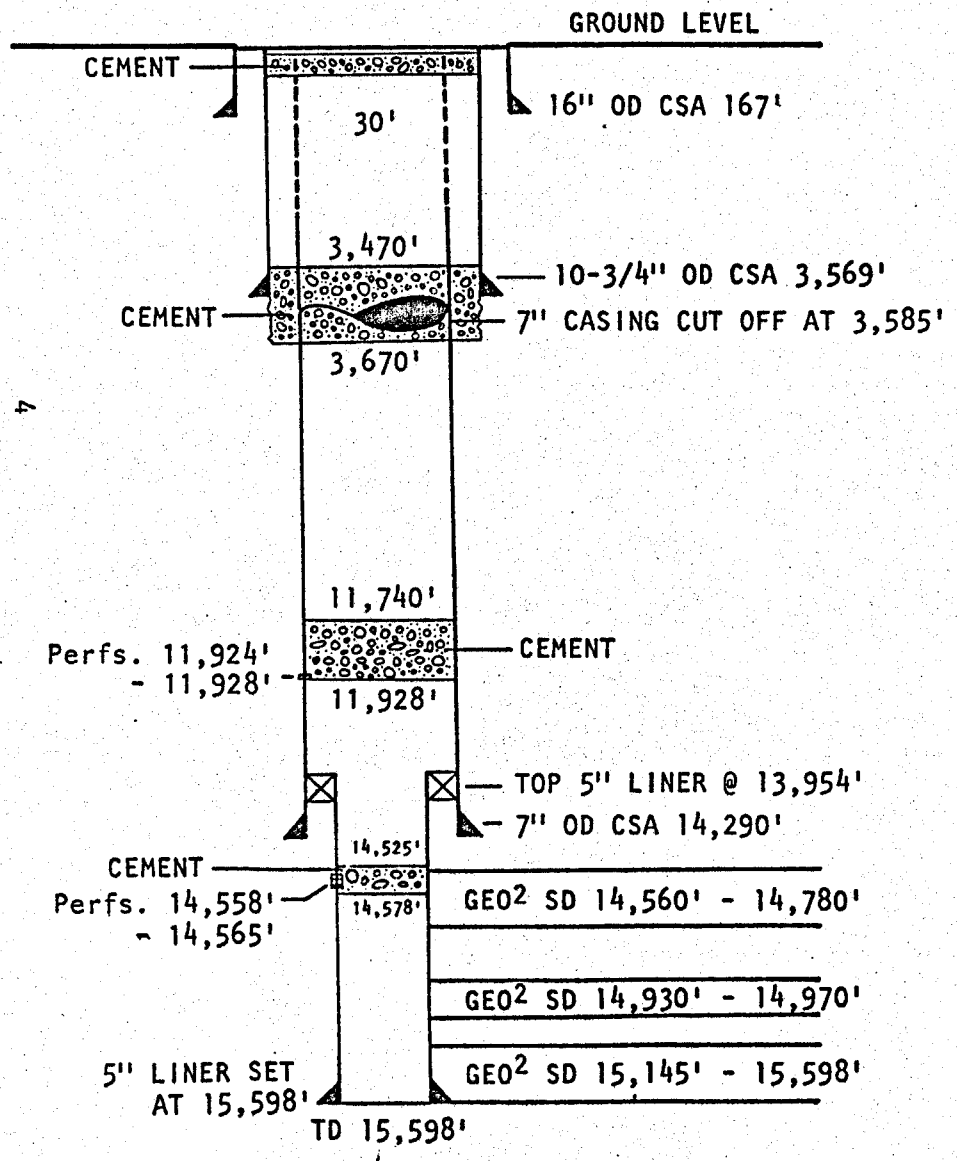
PROSPECT L-3

GETTY & BUTTES GAS & OIL CO.

GLADYS McCALL NO. 1

E. CRAB LAKE FIELD AREA

PRESENT STATUS



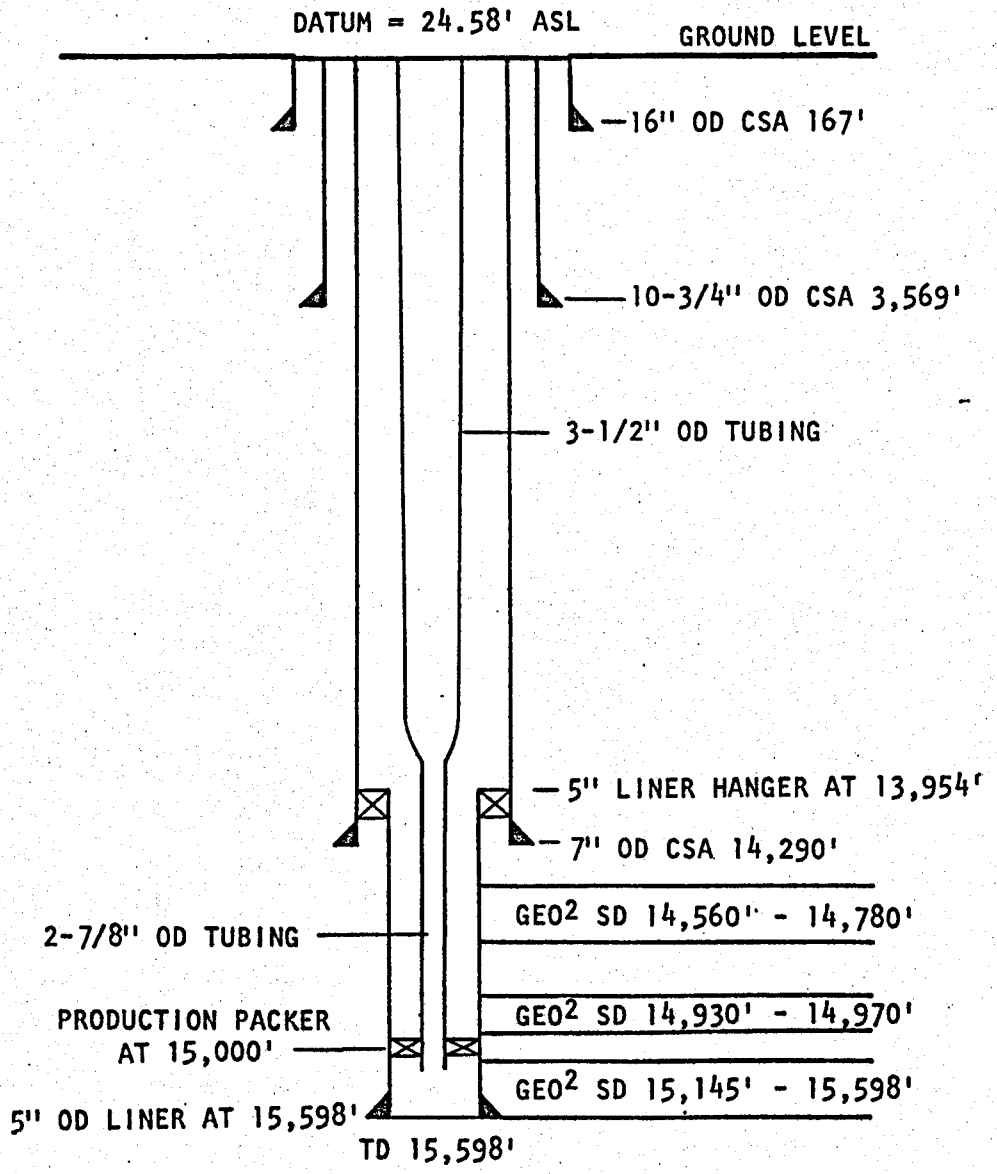
GETTY AND BUTTES GAS AND OIL CO.

GLADYS McCALL NO. 1

E. CRAB LAKE AREA

PROPOSED TEST CONFIGURATION

DATUM = 24.58' ASL



The 2-7/8 inch OD tubing is necessary to fit into the 5-inch OD liner and still allow clearance for the tubing gun to pass through the seal assembly and landing nipples. The portion of the tubing which seats in the packer will be equipped with a seal assembly to allow for approximately 10 feet of expansion and contraction during flowing and plugging operations. A landing nipple and a circulating valve will be placed above the seals to permit communication between the tubing and casing if it becomes necessary.

Blowout Preventers - The enclosed well prognosis sets out the necessary safeguard specifications and procedures for surface blowout prevention as they have been adopted and gathered by IADC, API and most prudent operators in the Geo^2 area. A diagrammatic sketch of the BOP hookup and choke manifold which we propose for use is also enclosed.

Logging - Because the sands of interest are already behind the 5-inch OD casing, open hole logs cannot be run. Cased hole logs; namely, the gamma ray, cement bond, and collar locator are desirable to establish the integrity of the cement and as a benchmark for perforating.

Perforating - The perforating will be accomplished with a 1-11/16 inch high-temperature, through tubing jet perforating gun with four shots per foot and zero phasing. When fired this jet creates a casing entry diameter of approximately 1/4-inch and an effective core penetration of approximately two inches beyond the cement sheath. Assuming 100 percent firing efficiency, this configuration should provide a productivity equal to 70 percent of the open hole productivity.

In selecting the fraction of the net sand to perforate, the perforated interval length was designed to achieve a productivity equal to 1/3 of the open hole productivity. In the Gladys McCall No. 1 well, this productivity can be accomplished by perforating approximately 110 feet.

Wellhead Design - The wellhead has been designed and a detailed sketch will follow in one of the additional submittals. The tree is rated to a working pressure of 15,000 psi and all valves have stainless steel vertical runs with packing and seals for high temperature fluids. The tree

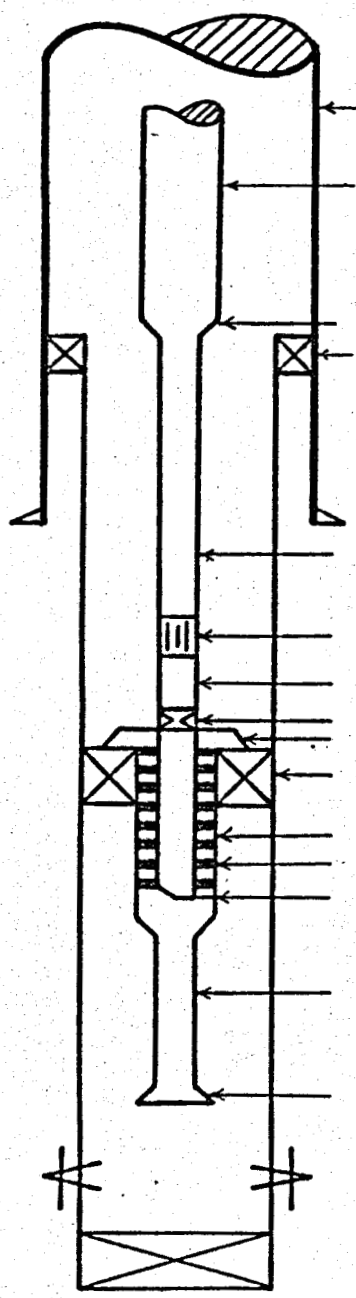
GETTY AND BUTTES GAS AND OIL CO.

GLADYS McCALL NO. 1

E. CRAB LAKE AREA

CAMERON PARISH, LOUISIANA

BOTTOM HOLE TUBING ASSEMBLY



1) 7" CASING

2) 3-1/2" 12.8# P-105 PH-6 TUBING - 2.764" I.D.; 2.639" DRIFT

3) 3-1/2" 12.8# CROSSOVER TO 2-7/8" 7.9# PH-6 TUBING

4) 5" 18# LINER - 4.276" I.D.; 4.151" DRIFT

5) 2-7/8" 7.9# PH-6 TUBING - 3.433" O.D.; 2.265" I.D.

6) 2-7/8" 7.9# "RA" SLEEVE - 2.188" I.D.

7) 2-7/8" 7.9# PH-6 ONE JOINT OF TUBING

8) 2-7/8" 7.9# PH-6 "RN" NIPPLE - 2.010" I.D.

9) PACKER LOCATOR MANDREL WITH 2-7/8" 7.9# PH-6 BOX

10) 5" 18# "WB" PERMANENT DRILLABLE PACKER - 2.55" I.D.

11) PACKER BORE EXTENSIONS - 16' LENGTH; 2.55" I.D.

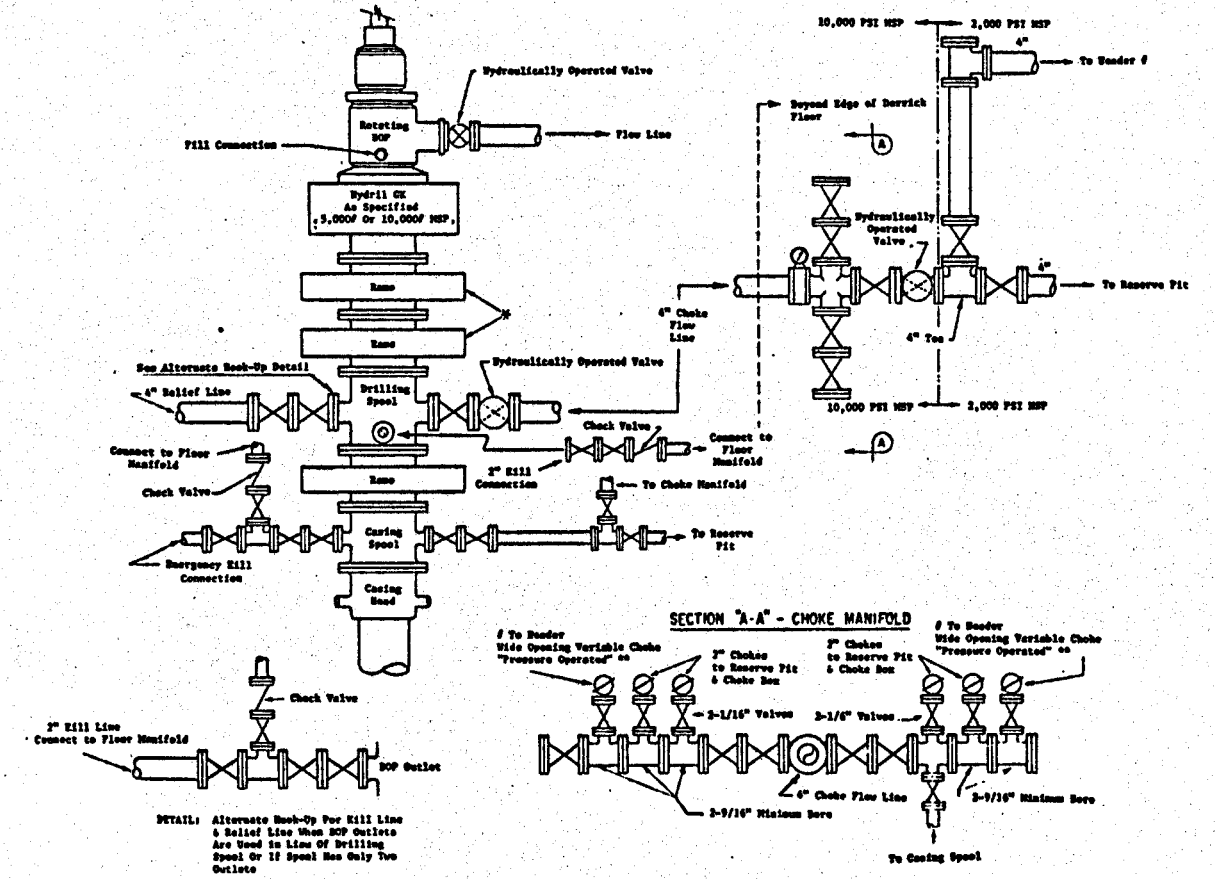
12) EXTRA SEALING UNITS - 16' LENGTH; 1.80" I.D.

13) MULE SHOE GUIDE

14) 2-3/8" 5.95# "CS" PUP JOINT - 6' LENGTH

15) RE-ENTRY GUIDE

BLOWOUT PREVENTER DESIGN



Minimum operating equipment for preventers will be as follows: (1) multiple pumps, driven by a continuous source of power, capable of fluid charging the total accumulator volume within twenty minutes; and (2) accumulators with a pre-charge of nitrogen at not less than 750 psi and capable of receiving a fluid charge from the (charging) pumps. Fluid charge volume shall be the amount required to increase accumulator pressure from nitrogen pre-charge pressure to rated pressure. Charging pumps are to be connected to the hydraulic operating system which is to be a closed system. When requested, an additional remote and equivalent source of power shall be available to operate the pumps. The pressurized fluid volume stored in the accumulators shall be sufficient to close all pressure operated devices simultaneously within 20 seconds with charging pumps shut down. Minimum accumulator pressure shall be 1500 psi initially and not less than 1200 psi when all preventors are closed.

The closing manifold and remote closing manifold (floor-mounted) will have a separate control for each pressure operated device. Each control will be labeled to designate which pressure device it controls and to show open and closed positions. A pressure reducer and regulator is to be provided for the Hydril GK. Hydraulic oil shall be used as the operating fluid. One-inch size seamless steel piping shall be used to connect the closing unit to the preventors. Piping is to be tested to maximum rated pump pressure. The choke manifold, the four-inch choke flowline and the four-inch relief line shall be supported by metal stands or reinforced concrete. The choke lines shall be anchored. No sharp bends or curves will be permitted in the choke flowline from the preventers to the pits. Header to have three way outlet: (1) to reserve pit, (2) to choke box, (3) to separator. Easy and safe access will be maintained to the choke manifold. If deemed necessary, walkways and stairways will be provided in and around choke manifold. All valves throughout the assembly shall be selected for operation in the presence of oil, gas and drilling fluids. Valves connected adjacent to the drilling spool and all ram-type preventers will be equipped with stem extensions, universal joints, if needed, and operating wheels which are to extend beyond edge of derrick substructure. Any other valves within the limits of the derrick substructure will be so equipped when requested.

consists of two 3-1/2 inch master gate valves and a 3-1/2 inch swab valve. Between the master gate valve and the swab valve is a double wing assembly to house the choke bodies. One wing will contain a positive choke and the other will contain an adjustable choke. Each wing will consist of a Hi-Lo safety valve and a conventional wing valve. This specific design limits the anticipated high pressures to the tree assembly, thus permitting lighter weight pipe for all surface pipes and fittings.

General Comments

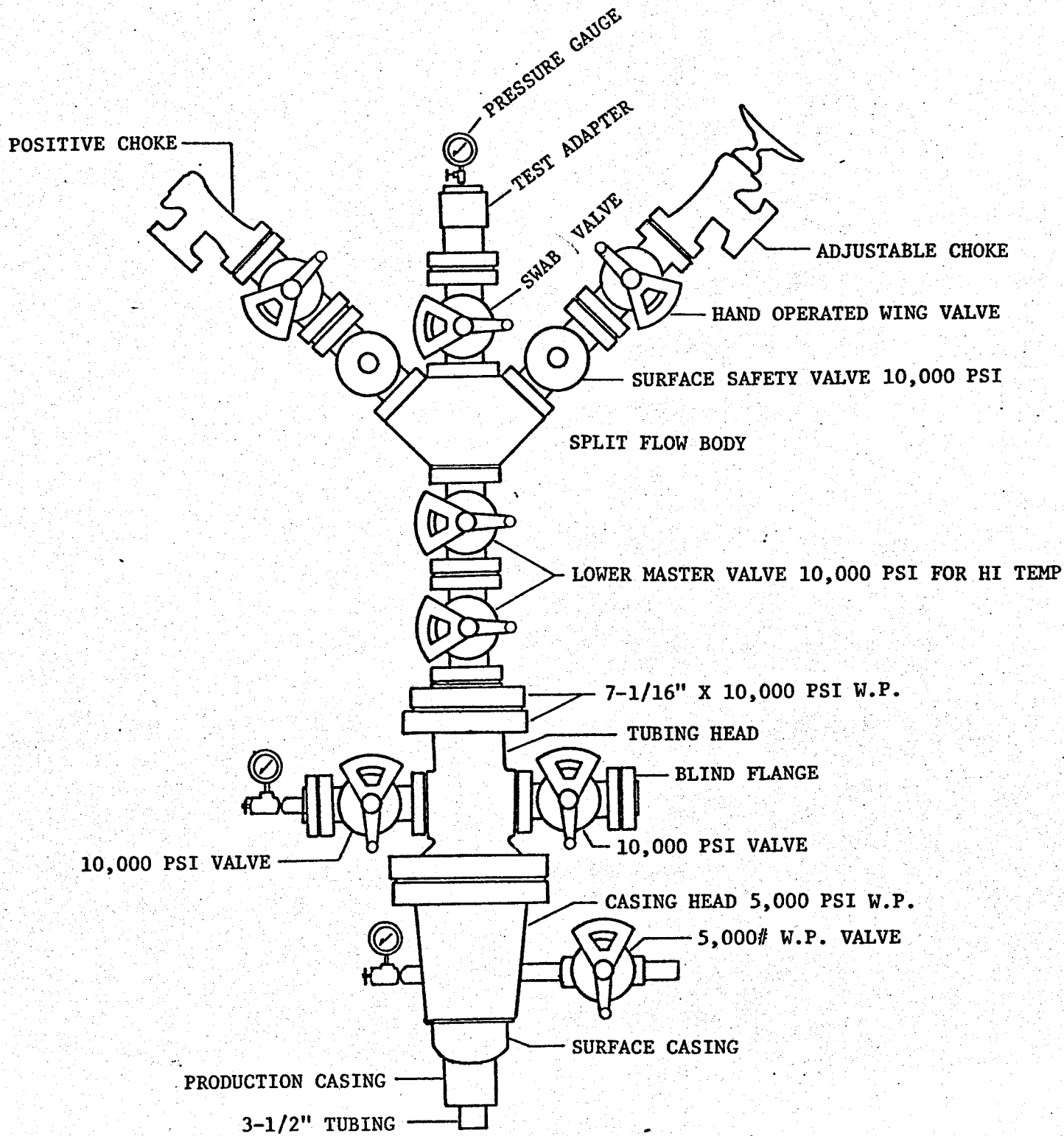
The No. 1 Gladys McCall well has been proposed as a Geo^2 test prospect for the following reasons:

(1) A known thick, hot and apparently permeable lower Miocene section exists.

(2) The land is presently unleased and the landowners have indicated a willingness to cooperate.

(3) The low cost of the tubular goods required to return the well to operational order.

GEO^2 CHRISTMAS TREE
TO BE ADAPTED FOR ALL REENTRY WELLS
BY GRUY FEDERAL, INC.



WELL PROGNOSIS
FOR
GLADYS McCALL NO. 1
EAST CRAB LAKE FIELD AREA

Work Day Schedule

1. Prepare location.
2. Dig out cellar, extend 10-3/4" casing to proper elevation and weld on casinghead.

1st 3. Move in and rig up drilling rig.

4th 4. Pick up 3-1/2" drill pipe and cement bit and drill out cement plug from surface to 30 feet.

5. Continue in hole with 3-1/2" drill pipe, drill collars and cement mill to 3,470 feet. Drill cement plug to top of 7" OD casing. Cut off at 3,585 feet.
6. Make trip and drill cement plug out of 7" casing to 3,670 feet then condition hole to cement plug at 11,740 feet.
7. Make trip and dress off top of 7" OD casing with casing mill.

5th 8. Run impression block and determine if 7" casing is cut off or if collar looking up and to make sure casing can be reentered.

9. If casing cannot be centralized and reentered, cease operations and replace cement plugs, If casing can be centralized and reentered proceed to Step 10.

6th 10. Based upon results of impression block make appropiate mechanical hookup to tie into 7" OD casing and run 3600' of 7" 38# P-110 LT & C casing to surface and cement same with sufficient cement to fill the annular space to the surface.

7th 11. Nipple up 7" casing and install blowout preventers and test blowout preventers to 7,500 psi. If casing patch leaks, repair same by squeeze cementing.

12. Go in hole with 3-1/2" drill pipe, drill collars and bit to top of cement plug at 11,740 feet.

8th 13. Condition and increase mud weight to 170 #/gal. Then drill out cement plug from 11,740 feet to 11,928 feet. Continue in hole to top of 5" liner at 13,954 feet and condition mud.

Work Day Schedule		
	11th	14. Make trip and add 1700' of 2-3/8" drill pipe on bottom, continue in hole conditioning mud inside the 5" OD liner maintaining 17 #/gallon mud. Drill out cement from 14,525' to 14,578'. Then condition mud to top of float collar on 5" OD liner at approximately 15,975 feet.
	13th	15. Make trip and test 7" OD casing from top of 5" liner at 13,954 feet to surface with 7,500 psi pressure. If casing leaks develop, then locate and squeeze off leak with cement. Repeat until 7 " OD casing will test to 7,500 psi.
	15th	16. Run casing cement bond log from total depth to 13,950 feet.
		17. Block squeeze with cement, if necessary, and drill out cement.
	17th	18. Lay down drill pipe and pick up 13,900 feet of 3-1/2" OD 12.70 #/foot P-105 PH6 hydril tubing and 600' of 2-7/8" OD work string. Condition hole to plug back total depth of approximately 15,575 feet and displace mud from hole with 10.0 #/gal. $CaCl_2$ water. Test for leaks in casing string for one hour. If OK pull out of hole and remove the 600' of 2-7/8" OD tubing work string.
	19th	19. Rig up wireline unit and set production packer at 15,000 feet.
		20. Make up bottom hole completion equipment as shown on enclosed diagramatic sketch and go in hole with completion tubing. Test each joint of tubing to 10,000 psi while going in hole. Space out tubing and test packer to 6500 psi differential from bottom and to 5000 psi on top.
		21. Hang tubing with wrap around hanger and nipple up christmas tree.
	20th	22. Release drilling rig and rig down.
	23rd	23. Move rig out.
	24th	24. Operations on Geo^2 well suspended while disposal well being drilled.
	37th	25. Move in and rig up wireline lubricator on well and test lubrication. Perforate the electric log interval from 15,250 feet to 15,360 feet with 4 shots per foot with through tubing perforating gun. This will require 3 trips with tubing gun. After initial gun is fired observe increased surface pressure for leak off of static fluid

Test 7" before drlg out the plug @ 14,525'

~~Perf~~ zone 2 intervals 14,360' begin @ perfs at 14558-65

in casing to make sure there are no leaks in tubing or packing then rig down wireline unit.

GENERAL PROCEDURE FOR BLOWOUT PREVENTION:

1. Use BOP Design as attached. The minimum assembly will consist of 3 preventors. The bottom and middle preventers may be Cameron QRC, Cameron Type F or Shaffer Hydraulic Single, and the upper preventer will be Hydril GK. Double preventers or space savers may be used if approved by the company supervisor. An accumulator with a closing unit is required. Accumlator reservoir pressure shall be sufficient to close all preventers simultaneously in 20 seconds with the charging pumps closed down. Minimum accumulator pressure shall be 1500 psi initially and not less than 1200 psi when all preventers are closed.

2. When nippling up production casing, test BOP's and choke manifold to 7500 psi with cold water, or as specified by the company representative. BOP's will be tested at least once each day thereafter when working in open hole and once each week otherwise.

3. Have a full opening safety valve and Gray inside BOP with drill pipe connections on the rig floor.

4. Have extra pipe rams on location at all times while drilling or completing.

5. Locate all choke manifolds, lines and valves at the side of and away from the substructure. Adequately support and tie down the choke assembly.

ESTIMATED REENTRY COST
for
GLADYS McCALL NO. 1
EAST CRAB LAKE AREA

Activity	Est. Amount	
1. Lease acquisition and legal fees	$ 50,000	
2. Rig transportation cost	30,000	
3. Location preparation	185,000	
4. Rig time - 22 days at $500	110,000	
5. Bits	3,000	
6. Mud and chemicals	30,000	
7. Casinghead	2,000	
8. Christmas tree	60,000	(1)
9. Casing patch	6,000	
10. Rental tools and equipment	20,000	
11. 3-1/2" drill pipe rental	20,000	
12. Trucking	10,000	
13. Cement and services	12,000	
14. Gamma ray and cement bond log	5,600	
15. Perforating	28,500	
16. 1100' of 2-7/8" P-105 4.7# PH-6 Hydril tubing	15,000	(2)
17. 14,000' of 3-1/2" P-105 12.95# PH-6 Hydril tubing	287,000	(3)
18. Packer and subsurface equipment	3,500	
19. 3600' of 7" OD tieback casing per prognosis	74,900	
20. Supervision	7,500	
21. Miscellaneous	20,000	
22. Contingencies	45,000	
Total	$ 1,025,000	

(1) Requires minor shopping to reuse on other Geo^2 wells.

(2) 90% can be reused on other Geo^2 wells.

(3) All available tubing in stock at Intracoastal City, Louisiana was scheduled for use in the Watkins-Miller No. 1 and will not be salvaged in time for use in this well.

SALT WATER DISPOSAL WELL
FOR
NO. 1 GLADYS McCALL

The available electrical logs covering the shallow sands from ground surface through a depth of 5,000 feet indicate the fresh water sands to extend to approximately 900 feet and that adequate sand to accommodate salt water disposal occur above 4,500 feet. In view of these data the following well prognosis and estimated cost is submitted.

Operational Day		
0	1.	Drive 13-3/8" OD casing to refusal of ± 125 feet.
24th	2.	Move in and rig up water well rig.
26th	3.	Drill 12-1/8" hole to 1,200 feet.
27th	4.	Run 1,200 feet of 9-5/8" 35.0# H-40 casing with guide shoe on bottom and a float collar one joint above bottom. Use one centralizer per 100 feet of casing for bottom 500 feet and cement casing to surface.
29th	5.	Drill 8-3/4" hole below surface casing to 4,500 feet.
31st	6.	Run induction electric and density logs and SWC if desired.
32nd	7.	Run 5-1/2" OD 15.5# J-55 casing with guide shoe on bottom and float collar two joints above bottom. Run centralizers on every other joint of casing for bottom 500 feet. Cement casing with sufficient cement to get returns at the surface.
33rd	8.	Make trip with 2-7/8" work string and condition hole to float collar at approximately 4420 feet and displace mud in hole with water. Lay down work string.
34th	9.	Nipple up 5-1/2" casing and install christmas tree.
	10.	Test casing and tree to 2,000 psi surface pressure with water in hole.
35th	11.	Rig down and move out water well rig.
37th	12.	Run gamma ray - cement bond log from total depth to 1,200 feet and block squeeze with cement, if necessary to obtain good bond.

Operational Day

13. Rig up wireline unit and run gamma ray-collar log from bottom to 1,200 feet.

14. Perforate approximately 50 feet of the lowest clean sand determined from electrical logs with four shots per foot using a casing bullet gun and rig down wireline unit.

38th 15. Test injectivity of well with rig pumps or pump truck to achieve 10,000 barrels per day injection rate at 150 psi or less. If injection rate is not sufficient, select and perforate additional sand interval or consider treatment with mud cleanout acid, or both, if deemed necessary.

Estimated Cost

1. Move in rig, drill to 2,500 feet and set two casing strings.	$ 36,000
130 feet of 13-3/8" 65# J-55 plain end casing	3,600
1,200 feet of 9-5/8" 36# H-40 casing ST & C or LT & C	18,200
4,500 feet of 5-1/2" 15.5# J-55 ST & C or LT & C	30,960
Stand by rig time	3,000
Cement and Services	14,000
Electric logging	12,000
Perforating	4,000
Wellhead equipment	3,000
Stimulation	2,500
Miscellaneous supplies and rentals	5,000
Trucking	1,500
Contingencies	14,000
TOTAL WELL COST	$ 149,760

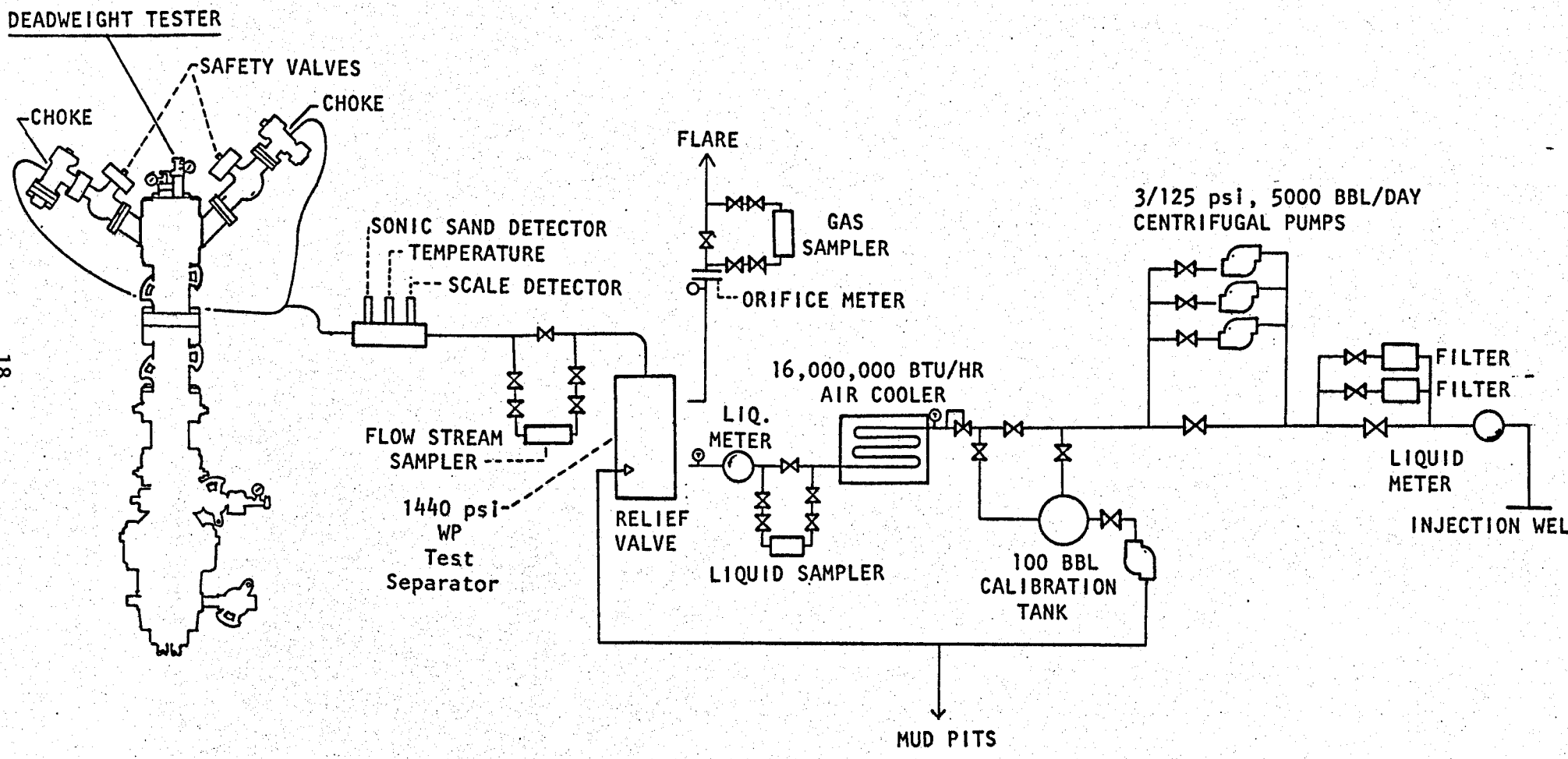
TEST PROGNOSIS

for

No. 1 Gladys McCall
East Crab Lake Area

Operational Day	
39th	1. Move in and nipple up test equipment. Hydraulically test all systems with water to 400 psi.
42nd	2. Run two Amerada RPG-3 pressure gauges with 24 hour clocks and 15,000 psi full-scale deflection to 16,060 feet, stopping for fifteen minutes each 3,000 feet. Hang bombs for two hours and record surface pressure with deadweight tester. Retrieve pressure bombs.
	3. Hook up two-pen pressure recorder to tubing upstream from the choke and to the casing to observe for tubing or packer leaks.
	4. Place well on production through adjustable choke at low setting and record surface flowing pressure every thirty minutes by deadweight tester.
	5. Record gas and liquid flow rates by calibrating the liquid turbine meter with the test tank.
43rd	6. Gradually increase the flow rate in increments until either the maximum flow rate from the well or 10,000 barrels per day is achieved. Continue to flow at this rate for 24 hours while recording surface temperature, pressure, and gas and liquid production. If maximum flow rate of well not sufficient, do one of the following: (1) acidize (2) perforate more interval
44th	7. Shut well in and measure surface pressure build-up with deadweight tester.
45th	8. When wellbore pressure has stabilized, run two Amerada RPG-3 pressure bombs with five day clocks and latch into landing nipple at bottom of tubing.
46th	9. Place well on production at 1,000 barrels per day, for 24 hours, monitor surface pressure, temperature and flow rates and take the following samples: (a) Two, one liter, full well stream samples for chemical analysis.

Operational Day		
		(b) Three, one liter, separator liquid samples.
		(c) Two, one liter, separator gas samples.
47th	10.	Increase flow rate to 4,000 barrels per day for 24 hours and sample as before.
48th	11.	Increase flow rate to 7,000 barrels per day for 24 hours and sample as before.
49th.	12.	Increase flow rate to 10,000 barrels per day for 24 hours and sample as before.
50th	13.	Shut well in, measure build-up for 24 hours, then retrieve pressure bombs.
51st	14.	Place well on production at low rate and gradually increase rate over a 12-hour period until it reaches 10,000 barrels per day.
	15.	Flow well at this rate for two weeks while measuring surface pressure, temperature and flow rates.
	16.	Sample as before prior to shutting well in.
64th	17.	Shut well in and run two pressure gauges to 16,060 feet and record until deadweight tester at surface indicates static conditions have been reached.
65th	18.	Pull pressure gauges, release test equipment and move same out.
	19.	Proceed with plug and abandonment operations.



SURFACE TESTING FACILITIES
Gruy Federal, Inc.

ESTIMATED TESTING COST

for

No. 1 Gladys McCall
East Crab Lake Area

Activity	Estimated Amount
Two phase separator	$ 16,800
Air cooler	12,600
3 centrifugal pumps	4,200
110 barrel calibration tank	60
Sand detector and manifold	3,900
200'-of 3" flow lines	2,850
2-3" expansion loops with unions	900
2 pen 10,000 psi recorder	600
Deadweight pressure gauge	600
Portable quartz iodide lights	600
Temperature recorder 0-400°	600
Trailer house for personnel	900
Supervision and labor	39,600
Sampling	1,500
Pressure gauges and wireline units	10,000
TOTAL	$ 95,710

GETTY-BUTTES GLADYS McCALL NO. 1

CAMERON PARISH, LOUISIANA

Analyses Required for Geo^2 Water and Gas

Chemical Analysis of Water

A. Metals
   1. Copper
   2. Zinc
   3. Boron
   4. Arsenic
   5. Chromium
   6. Mercury
   7. Lead
   8. Cadmium

B. Solids
   1. Dissolved
   2. Total

C. Hardness
   1. Calcium Carbonate
   2. Magnesium Carbonate

D. Others
   1. Carbonate
   2. Bicarbonate
   3. Chloride
   4. Iron
   5. Sulfate
   6. Dissolved Silicate

GETTY-BUTTES GLADYS McCALL NO. 1

CAMERON PARISH, LOUISIANA

Chemical Analysis of Vapor

A. Hydrocarbons (percent)
   1. Methane
   2. Ethane
   3. Iso-propane
   4. Normal Propane
   5. Iso Butane
   6. Normal Butane
   7. Pentane
   8. C_6+

B. Other
   1. Hydrogen Sulfide
   2. Carbon Dioxide
   3. Radon

Chemical Properties of Water

1. Density
2. Compressibility
3. Conductivity
4. Viscosity
5. pH

Recombination PVT Analysis

1. Solution gas-water ratio
2. Formation volume factor for water
3. Supercompressibility factor of gas

GETTY-BUTTES GLADYS McCALL NO. 1

CAMERON PARISH, LOUISIANA

Analytical Costs for Geo^2 Water and Gas

Recombination	
2 samples per well	$ 10,000
Chemical Analysis of Water	
5 samples per well	750
Total	$ 10,750

PLUGGING AND ABANDONMENT PROCEDURE

for

Getty-Buttes No. 1 Gladys McCall

1. Move in and rig up pulling unit capable of plugging and abandonment.
2. Nipple up pump trucks to well head.
3. Squeeze cement perforations.
4. If squeeze pressure is not obtained overdisplace cement into formation with water and repeat squeeze cementing until successful.
5. When squeeze pressure is obtained, unbolt christmas tree from tubing hanger, picker up tubing out of packer, and reverse excess cement.
6. Remove tree and install BOP's.
7. Run in hole with tubing and set cement plug 100' in and 100' out of 5" OD liner.
8. Pull tubing and set a plug from 50' to surface.
9. Cut off 13-3/8" casing 3' below ground level and weld on plate.
10. Release rig.
11. Send tubing and casing to pipeyard for inspection and repair.
12. Send christmas tree to shop for overhaul.

ESTIMATED PLUGGING COSTS

for

Getty-Buttes No. 1 Gladys McCall
East Crab Lake Area

Activity	Amount
Pulling unit at $1,000/day	$ 8,000
Rental tools at $500/day	4,000
Trucking	3,000
Cement and services	4,000
Supervision	2,000
Contingencies	2,400
Total	$ 23,400

SITE-SPECIFIC ENVIRONMENTAL INFORMATION CHECKLIST
GEOPRESSURED-GEOTHERMAL WELL TEST PROGRAM
GRUY FEDERAL, INC.
NO. L-3
(Drilled as Getty-Buttes-Gladys McCall No. 1)
Cameron Parish, Louisiana

A. GENERAL

1. Is the proposed site located in the area covered by the "Gulf Coast Programmatic Environmental Assessment, Geothermal Well Testing, the Frio Formation of Texas and Louisiana "October 1977?

   Yes X No ____ If no, explain.

2. Has a Federal, state and/or local environmental assessment been conducted previously for the proposed test well or other wells in the area?

   Yes ____ No X If yes, provide a copy, if available.

3. Have all required permits, licenses, and/or agreements for proposed project been obtained?

   Yes ____ No X If no, explain.

   Cannot be applied for until arrangements with landowner have been finalized.

4. Does the project site fall within the habitat of rare or endangered species?

   Yes ____ No X If yes, explain.

5. Are known archeological sites, histroic sites, or natural landmarks within or visible from the site area?

   Yes ____ No X If yes, explain.

6. Will expected continuous noise levels from site operations be 65 dBA or less at the nearest residence?

   Yes X No ____ If no, explain.

B. SITE CONSTRUCTION

1. Will additional land clearing be required for the test well (e.g., drill pad, road construction, mud reserve pits, pipeline)?

   Yes ____ No X If yes, describe.

2. Will additional land clearing be required for the disposal well (e.g., drill pad, reserve pits, utilities, road construction, pipeline)?
   Yes ____ No X If yes, describe.

3. Will the site and related roads be treated to minimize dust?
   Yes ____ No X If no, explain.
   Road and work site to be boarded.

4. Are portable sanitary facilities or an approved septic system to be used at the site?
   Yes X No ____ If no, explain.

5. Will liquid and solid wastes be disposed in accordance with local regulations?
   Yes X No ____ If no, explain.

6. Will erosion control be required for excavated areas?
   Yes ____ No X If yes, explain.

7. Will dredge spoil be deposited in swamp forest or marshland?
   Yes X No ____ If yes, explain. Copy B-7 for Watkins-Miller.

8. Upon completion of proposed test program, will the site be restored to as natural a condition as possible by regrading, filling, and reseeding?
   Yes X No ____ If no, explain.

C. WELL TESTING AND SAFETY

1. Is fluid production from the well during testing expected to be 2 weeks or less in duration per formation?
   Yes ____ No X If no, explain.
   Test expected to require 4 weeks.

2. Is the total dissolved solids of the produced geopressure fluid expected to be 90,000 mg/l or less?
   Yes X No ____ If no, explain.

3. Is the volume of geopressure fluid to be produced and injected expected to be 3,000,000 barrels or less?
   Yes X No ____ If no, explain.

4. Is the temperature of produced geoperssured fluid expected to be 260°C or less?
   Yes __X__ No ____ If no, explain.

5. Will the gas content of the produced fluid be flared?
   Yes __X__ No ____ If no, explain.

6. Will blowout preventers rated to at least 10,000 PSI be used?
   Yes __X__ No ____ If no, explain.

7. Will production tubing rated to at least 20,000 PSI, be used?
   Yes ____ No __X__ If no, explain. See Watkins-Miller for inconsistency.

8. Can safety valves be operated from remote locations?
   Yes __X__ No ____ If no, explain.

9. Will the test tree be rated to at least 10,000 PSI?
   Yes __X__ No ____ If no, explain.

10. Will a test well directional survey be conducted?
    Yes ____ No __X__ If yes, at what interval? ____feet. If no, explain.
    Well already drilled and cased.

11. Will a lined pond be used to hold all liquid effluents and production fluids that are not injected?
    Yes __X__ No ____ If no, explain.

12. Has an injection permit been obtained?
    Yes ____ No __X__ If no, explain.
    Cannot be applied for until arrangements are finalized with landowner.

13. Will H_2S monitors be located onsite?
    Yes ____ No __X__ If no, explain.
    No history of H_2S.

14. Will fire extinguishers be located onsite?
    Yes __X__ No ____
    If no, explain.

15. Do contingency plans exist for evacuating personnel should a blowout occur or high levels of H_2S be detected?
    Yes __X__ No ____ If no, explain.

16. Will high-pressure engineering and mud logging personnel be onsite during production well drilling operations.

Yes ____ No X If no, explain.

No mud logging personnel, because well is already cased, however, high pressure engineering personnel will be on site at all times.