



# CHUSKA ENERGY COMPANY

3315 BLOOMFIELD HIGHWAY • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 326-5525

10 April, 1991

State of Utah Department of Natural Resources  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Building, Suite 350  
Salt Lake City, Utah 84180-1203

**RECEIVED**

APR 12 1991

DIVISION OF  
OIL GAS & MINING

Ref: Application for Permit to Drill  
Lizard-4M Well, San Juan County, Utah

Gentlemen

Attached for your examination and approval is the original and two copies of an Application for Permit to Drill the Lizard Well No. 4M in San Juan County, Utah. This well will be drilled as part of an ongoing exploration and development program.

The location for this well falls outside the guidelines for the State of Utah spacing requirements. However, the topography of the area surrounding the desired location, coupled with the presence of a nearby archaeological site is such as to preclude the well being located in accordance with State requirements and yet remain in a position which will allow the well bore to penetrate geological structures which have been identified by seismic interpretation. We therefore apply for an exception to the General State Spacing requirements on topographic grounds. Chuska Energy controls the acreage surrounding the proposed site, as indicated on the attached land plat.

Please advise if you require additional information concerning this application. Chuska Energy will greatly appreciate your prompt consideration.

Sincerely,

*Larry G. Sessions*  
Larry G. Sessions  
Operations Manager

LGS/csw  
File: C:\WP51\LIZARD.4M\APDCOVER

encl.

UNITED STATES  
DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. TYPE OF WORK

DRILL  DEEPEN  PLUG BACK

b. TYPE OF WELL

OIL WELL  GAS WELL  OTHER  SINGLE ZONE  MULTIPLE ZONE

2. NAME OF OPERATOR

Chuska Energy Company

3. ADDRESS OF OPERATOR

3315 Bloomfield Highway, Farmington, NM 87401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.)\*

At Surface 1100' FSL, 160' FWL

At proposed prod. zone Same

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE\*

5 1/2 miles WSW of Montezuma Creek, Utah

15. DISTANCE FROM PROPOSED LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT.

(Also to nearest drilg. unit line, if any) 468'

16. NO. OF ACRES IN LEASE

49,997

17. NO. OF ACRES ASSIGNED TO THIS WELL

18. DISTANCE FROM PROPOSED LOCATION\*

TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT. 11,178'

19. PROPOSED DEPTH

5,560' KB *AKAH*

20. ROTARY OR CABLE TOOLS

Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.)

4497' GR/4,510' KB

22. APPROX. DATE WORK WILL START\*

8-31-91

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
12 1/4"	8 5/8"	24 lb	500'	371 sx 'G' + 2% CaCl <sub>2</sub>
7 7/8"	5 1/2"	15.5 lb	5,560'	779 sx 'G', 65:35 Poz + 6% Gel

Refer to attached 10-Point Drilling Plan etc.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

SIGNED

*Christopher S. Hill*

TITLE Operations Engineer

DATE 10 April, 1991

(This space for Federal or State office use)

APPROVED BY THE STATE  
OF UTAH DIVISION OF  
OIL, GAS, AND MINING

PERMIT NO.

43-037-31619

APPROVAL DATE

DATE: 4-18-91

BY: *J.P. Matthews*

APPROVED BY

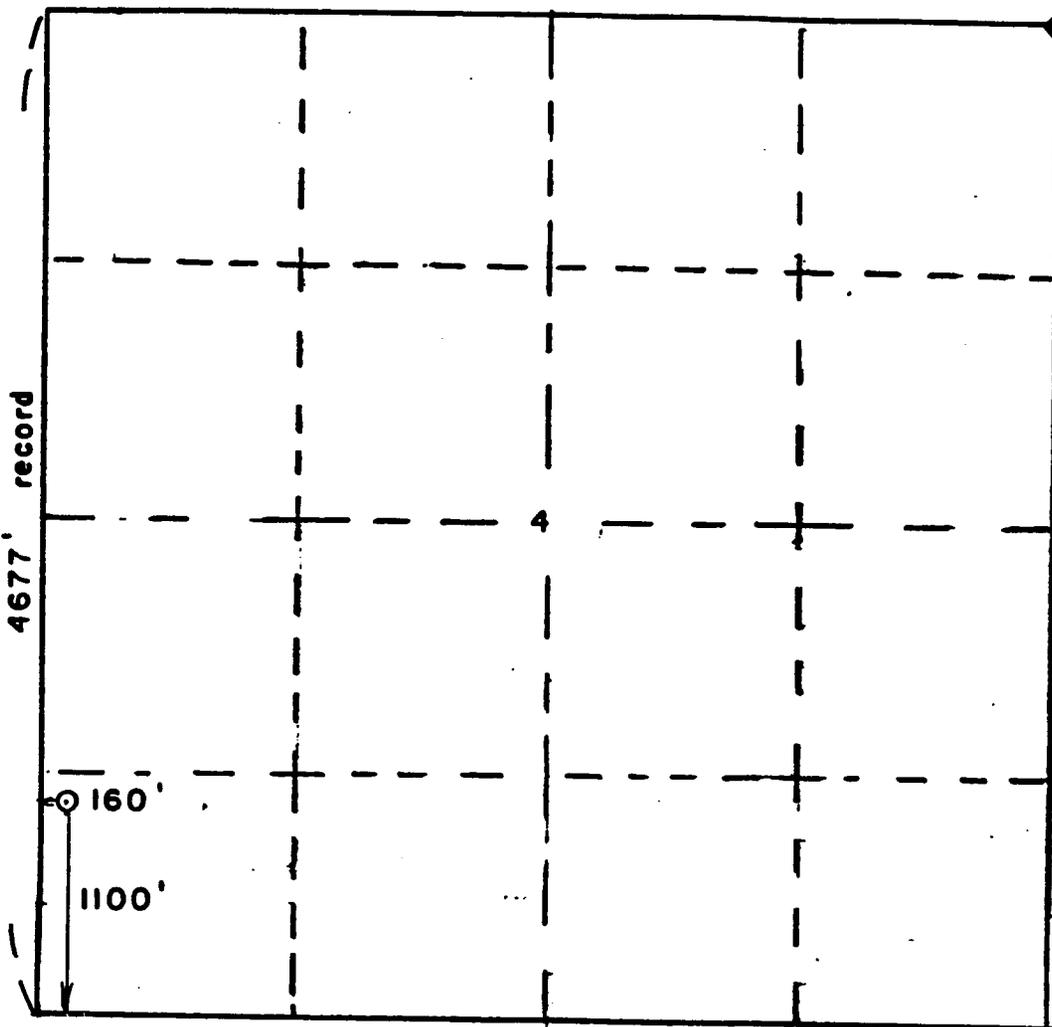
CONDITIONS OF APPROVAL, IF ANY:

TITLE

\*(See Instructions On Reverse Side)

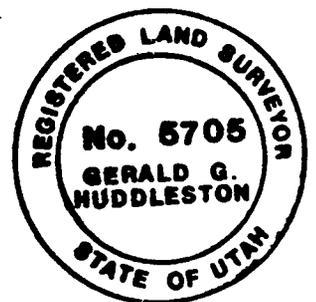
WELL SPACING: 615-3-3

WELL LOCATION PLAT



WELL LOCATION DESCRIPTION:

CHUSKA ENERGY CO., Lizard 4 - M  
1100' FSL & 160' FWL  
Section 4 T.41 S., R.23 E., SLM  
San Juan County, UT  
4497' ground elevation  
State plane coordinates from seismic control:  
X = 2,610,147      Y = 218,794



The above is true and correct to my knowledge and belief.

30 March 1991

*Gerald G. Huddleston*  
Gerald G. Huddleston, LS

CHUSKA ENERGY COMPANY

10 POINT DRILLING PLAN

Lizard Well No. 4M  
Section 4, Township 41S, Range 23E  
1100' FSL, 160' FWL  
San Juan County, Utah

1. SURFACE FORMATION

Geological name of surface formation: Morrison

2. ELEVATION

Surface elevation is 4497' GR/4,510' KB.

3. ESTIMATED FORMATION TOPS

<u>Depth</u>	<u>Formation</u>	<u>Sub Sea Elevation</u>	
Surface	Morrison	+ 4,510'	
385'	Navajo	+ 4,125'	
1,305'	Chinle	+ 3,205'	
2,319'	DeChelly	+ 2,191'	
2,440'	Organ Rock	+ 2,070'	
3,236'	Cedar Mesa	+ 1,274'	
4,260'	Hermosa	+ 250'	
5,139'	Upper Ismay	- 629'	
5,257'	Lower Ismay	- 747'	
5,335'	Desert Creek	- 825'	Primary Objective
5,484'	Akah	- 974'	
5,560'	Total Depth	- 1,050'	

4. PROPOSED CASING/CEMENTING PROGRAM

	<u>Depth</u>	<u>Size</u>	<u>Weight</u>	<u>Grade</u>	<u>Coupling</u>
Surface	500'	8 5/8"	24 lb	K-55	STC
Production:	5,560'	5 1/2"	15.5 lb	K-55	STC

Surface Cementing:

371 sx (427 ft<sup>3</sup>) Class 'G' cement with 2% CaCl<sub>2</sub> and 1/4 lb/sk Celloflake. Weight = 15.8 ppg, yield = 1.15 ft<sup>3</sup>/sk. Slurry volume calculated at 100% excess over annular volume.

## Production Cementing:

### First Stage

T.D. to 3,500' (stage collar @ ± 3,500'). Lead with 139 sx Class 'G' cement, 65:35 Pozmix, with 6% gel and 1/4 lb/sk Celloflake. Weight = 12.7 ppg, yield = 1.85 ft<sup>3</sup>/sk. Tail with 185 sx Class 'G' cement with 2% CaCl<sub>2</sub>. Weight = 15.8 ppg, yield = 1.15 ft<sup>3</sup>/sk. Total of 469 ft<sup>3</sup>. Bring Class 'G' slurry to 500' above top of Upper Ismay. Cement volumes calculated at 30% excess in open hole. WOC 4 hours between stages.

### Second Stage

3,500' to surface. Lead with 355 sx Class 'G' cement, 65:35 Pozmix with 6% gel and 1/4 lb/sk Celloflake. Weight = 12.7 ppg, yield = 1.85 ft<sup>3</sup>/sk. Tail with 100 sx Class 'G' cement with 2% CaCl<sub>2</sub>. Weight = 15.8 ppg, yield = 1.15 ft<sup>3</sup>/sk. Total of 772 ft<sup>3</sup>. Cement volumes calculated at 30% excess in open hole.

Note: Exact slurry volumes for the production string will be adjusted according to the caliper log which will be run prior to cementing. Special adjustments may be necessary if significant amounts of salt are drilled.

## 5. BLOWOUT PREVENTER (See attached schematics)

As abnormal pressure is not anticipated, a 2,000 psi BOP system would be sufficient for the drilling of this well. However, due to availability constraints, a 3,000 psi system will be used, as per the attached Exhibits "A" and "B". This will be a 10" x 900 Series double ram preventer, equipped with a set of pipe and blind rams.

An accumulator system, with a pressure capacity sufficient to operate the rams three complete cycles without rig power, will be required as part of the rig equipment.

## 6. PROPOSED MUD PROGRAM

### Surface to 3,000'

Fresh water, gel, lime and native solids. Weight 8.3 - 8.7 ppg. Gel/lime sweeps as necessary for hole cleaning.

### 3,000' to T.D.

Low solids, non-dispersed polymer system. Weight 8.6 - 9.5 ppg. Gel/lime sweeps as hole conditions dictate for hole cleaning. Fluid loss to be maintained at 15 - 20 cc. Fluid loss to be further reduced to 15 cc or less prior to coring, logging or DSTs.

7. AUXILIARY EQUIPMENT

- A. A kelly cock will be installed during drilling operations, with handle available on the rig floor.
- B. Floor (stabbing) valves will be available, on the rig floor at all times, with necessary subs to fit all of the drilling assemblies.
- C. Mud will be the circulating fluid. No abnormal formation pressures are expected.

8. WELL EVALUATION

Open hole electric logging program will consist of a minimum program of DLL-MSFL-SP-GR-Cal, FDC-CNL-GR-Lithodensity from T.D. to 4,500'.

Coring and/or drill stem testing will be as per the wellsite geologist's recommendations, based on shows. A mud logging unit will be utilized during drilling operations from at least 500' above the Upper Ismay.

9. ABNORMAL PRESSURES/GAS

Abnormal pressures are not anticipated. Monitoring of gas and hydrocarbon shows will be by wellsite mud logging unit. H<sub>2</sub>S gas is not anticipated, however regular checks will be made while drilling the well.

10. TIMING

The drilling and evaluation of this well is estimated to be 16 days. Anticipated spud date is 8-31-91.

EXHIBIT "A"  
BLOWOUT PREVENTER

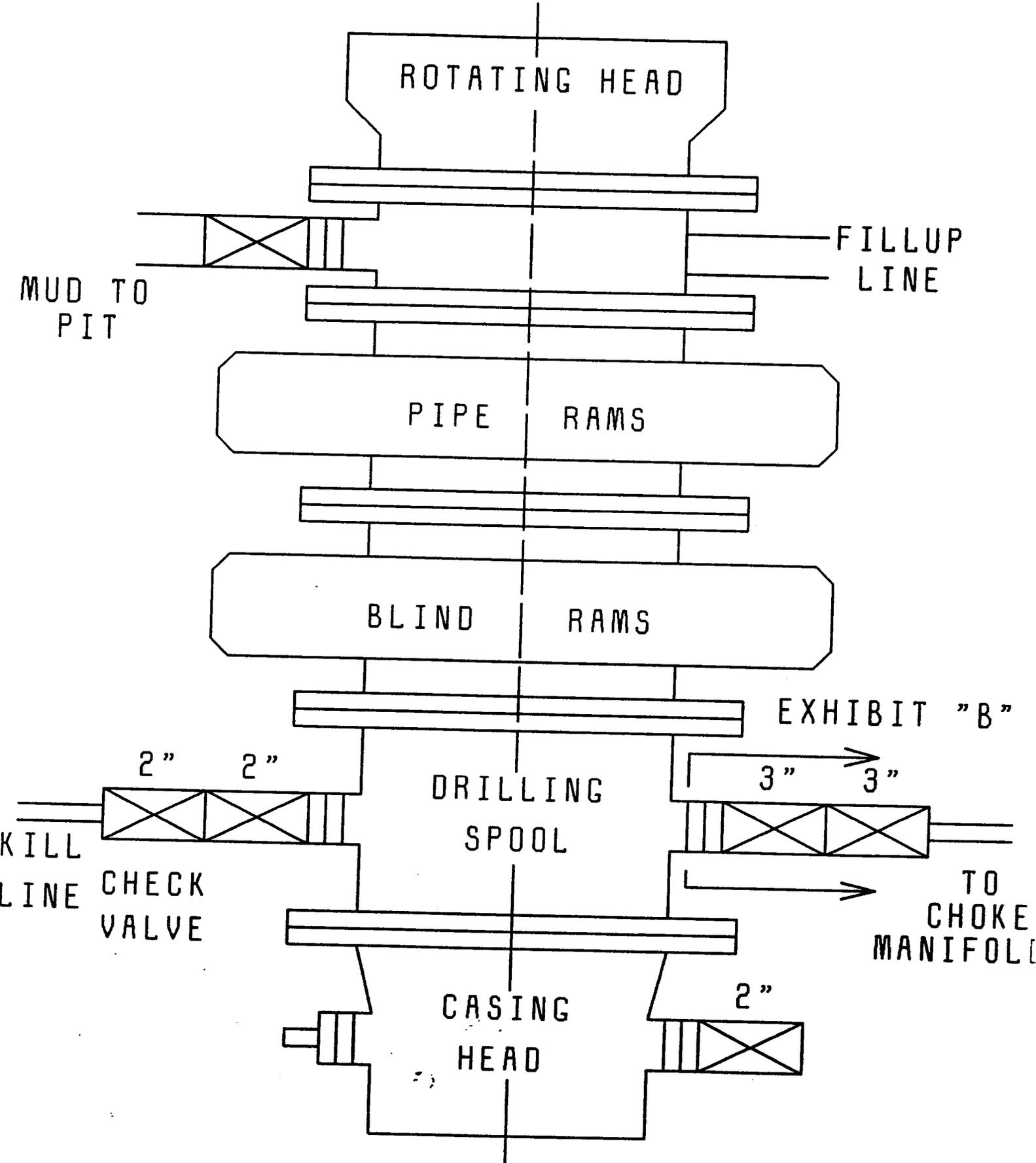
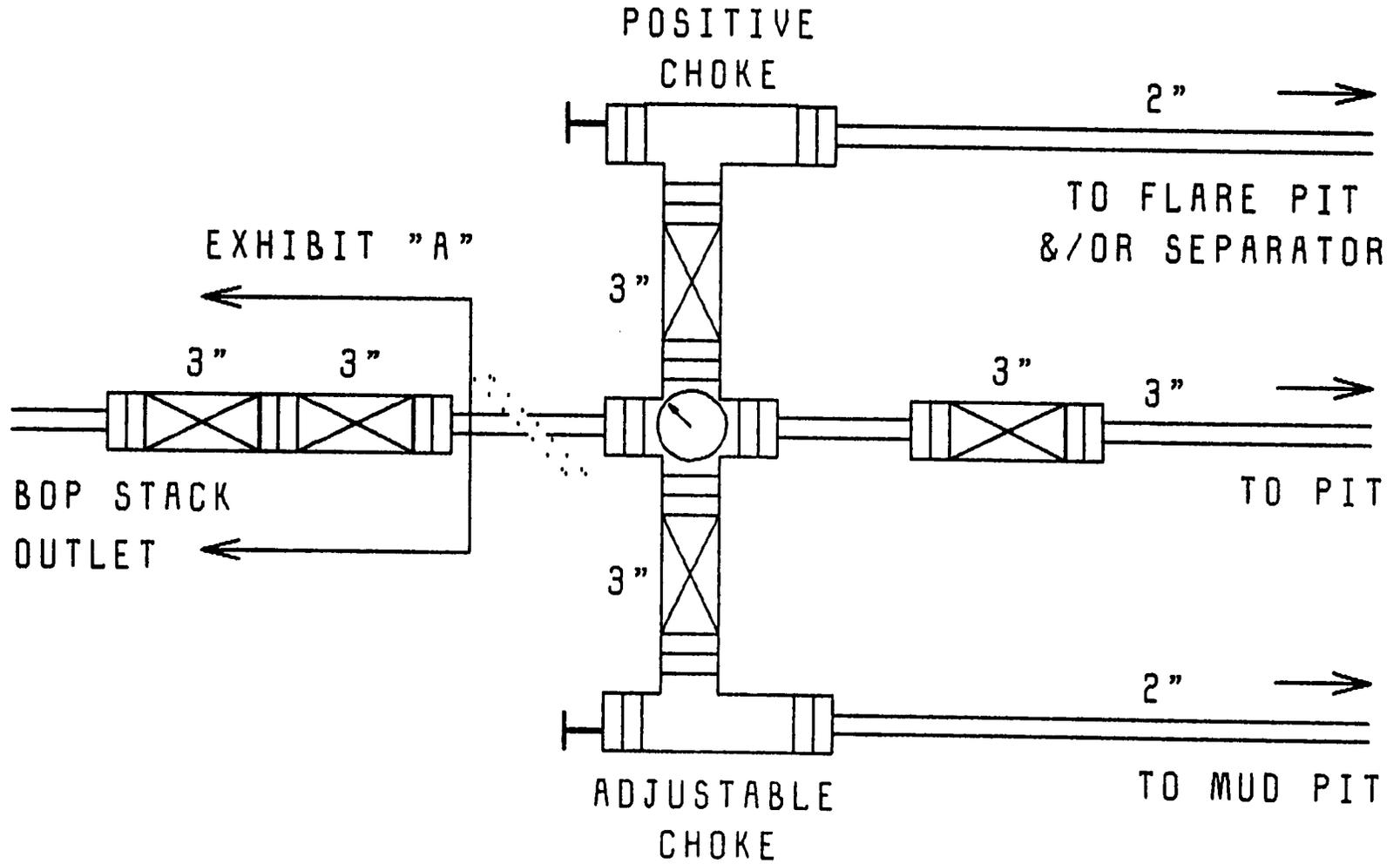


EXHIBIT "B"  
CHOKE MANIFOLD



## DETAILED DRILLING PROGRAM

DATE: 10 April, 1991

WELL NAME: Lizard WELL NO.: 4M

LOCATION: Section 4, Township 41S, Range 23E  
1100' FSL, 160' FWL  
San Juan County, Utah

ELEVATION: 4497' GR/4,510' KB

TOTAL DEPTH: 5,560' KB

PROJECTED HORIZON: Primary target is Desert Creek at 5,335'.

### DRILLING, CASING AND CEMENTING PROGRAM

1. Move in and rig up rotary tools. Notify BLM of time of spud and intent to run surface casing.
2. Drill mouse hole and rat hole. Mix mud prior to spudding well.
3. Drill 12 1/4" hole to  $\pm$  500'. Use fresh water gel/lime spud mud for drilling surface hole. Well bore inclination is not to exceed 1° at 500'. Deviation surveys will be run at least at 250' and at casing point.
4. Run 8 5/8", 24 lb/ft, K-55, STC casing to T.D. Cement with 371 sx (427 ft<sup>3</sup>) of Class 'G' cement with 2% CaCl<sub>2</sub> and 1/4 lb/sk Celloflake (sufficient slurry volume to circulate cement to surface).
5. W.O.C. a minimum of 4 hours prior to nipping up BOP stack and related equipment. See BOP schematics for details.
6. Ensure that plug has been down at least 8 hours prior to commencing pressure testing procedures. Pressure test BOP to 2,000 psig for 30 minutes. Pressure test manifold and all related equipment to 2,000 psig. Pressure test casing to 1,500 psig for 30 min.
7. Drill out surface casing with 7 7/8" bit. Drill 7 7/8" hole to T.D. Deviation surveys are to be taken every 500' or on a bit trip, whichever occurs first. Maximum allowable deviation will be 5° at T.D., with the maximum allowable rate of change to be 1°/100'.
8. Run open hole logs and evaluate. Coring and/or drill stem testing will be as per wellsite geologist's recommendation.

9. If the well is determined to be productive, run 5 1/2", 15.5 lb/ft, K-55, STC casing to T.D. Set stage cementing collar at  $\pm$  3,500'. In addition to placing centralizers over potential production zones, they will also be run to cover the aquifer sands of the Navajo and DeChelly formations, as per BLM stipulations. Cement production casing in two stages as per cementing program in 10-point Drilling Plan.
10. Nipple down BOPE. Set 5 1/2" casing slips and cut off casing. Install well head. Release drilling rig and move rig off location.
11. If well is non-productive it will be plugged and abandoned as per State, BLM and Navajo Tribal stipulations.

Lizard Well No. 4M  
Section 4, Township 41S, Range 23E  
1100' FSL, 160' FWL  
San Juan County, Utah

GENERAL COMPLETION PROCEDURE

If the well is determined to be productive, move in completion rig. Perforate, acidize, and test each productive porosity zone. Completion work will commence after Sundry Notice approval is received. Detailed procedures will follow.

PLUGGING AND ABANDONMENT

If the well is determined not to be productive, the well bore will be plugged as per BLM, State and Navajo Tribal requirements.

Lizard Well No. 4M  
Section 4, Township 41S, Range 23E  
1100' FSL, 160' FWL  
San Juan County, Utah

SURFACE USE PLAN

1. EXISTING ROADS

Shown on the attached topographic map are the existing roads in the immediate area. Outlined is the route to be followed from Montezuma Creek. Existing roads will be maintained, as necessary, while operations are in progress.

2. PLANNED ACCESS ROAD

The access road will be as shown on the attached topographic map. The road will be flat bladed, constructed 14' in width and will be maintained as necessary to prevent excessive damage to the existing terrain. The road will be upgraded if commercial production is established. It is anticipated that less than 500' of new road will need to be constructed to the location pad.

3. LOCATION OF EXISTING WELLS & TANK BATTERIES

There are no other producing wells or facilities in the immediate area.

4. LOCATION OF EXISTING AND PROPOSED FACILITIES

No production facilities are presently in place. Should the well prove to be productive, facilities (tank battery etc) will be sited on the drilling location pad.

5. LOCATION & TYPE OF WATER SUPPLY

Water will be acquired from the San Juan River or McElmo Creek and will be hauled using Chuska Energy Company water trucks, under State of Utah Division of Water Rights Permit Numbers 09-1724, (T64796) or 09-1723 (T64795).

6. SOURCE OF CONSTRUCTION MATERIALS

The need for additional construction materials is not anticipated. In the event that additional materials are required, they will be acquired either from private sources or with the approval of the Navajo Nation.

7. METHODS OF HANDLING WASTE MATERIAL

Trash will be contained on location in an enclosed bin. It will be hauled to an approved disposal site or burned on location if a burning permit is granted. The reserve pit will be lined as required, with an approved 7 mil liner, for containing drilling fluids. The pit will also be fenced. All drilling fluids, cuttings and chemical waste will be stored in the reserve pit. Liquid hydrocarbons will be stored in temporary storage tanks and hauled from location to approved sales facilities. The reserve pit will be emptied, back filled and restored to natural terrain status upon completion of drilling operations.

8. ANCILLARY FACILITIES

Chemical portable toilet facilities will be provided on location during drilling and completion operations. No camps or air strips are planned for this well.

9. WELL SITE LAYOUT

Attached is a surveyor's staking plat, cut and fill diagram and a schematic of the proposed rig layout.

10. PLANS FOR RESTORATION OF THE SURFACE

The location is laid out on a NNE/SSW trend and will require up to 17' of cut in the reserve pit (up to 8' of cut in the south eastern corner of the location pad) and up to 7' of fill in the north western corner of the location pad. Top soil removed from the pad will be stored at the well site. A reserve pit will be built on terrain containing sparse native vegetation. After drilling operations are complete, drilling fluid in the reserve pit will be allowed to evaporate. All remaining fluid in the pit will be disposed of into an approved disposal site. The reserve pit will remain fenced during the evaporation and disposal process. The pit will then be covered and the topsoil will be returned to the disturbed area. The terrain will be returned as near to its original condition as possible. Following operations, rehabilitation seeding will be in accordance with APD/BLM/BIA stipulations. There are no residents in the immediate area of the site.

11. OPERATORS REPRESENTATIVE

CHUSKA ENERGY COMPANY  
3315 BLOOMFIELD HIGHWAY  
FARMINGTON, NEW MEXICO 87401  
LARRY G. SESSIONS

12. CERTIFICATION

I hereby certify that either I, or persons under my direct supervision have inspected the proposed drill site and access route: that I am familiar with the conditions which presently exist: that the statements made in this plan are, to the best of my knowledge, true and correct and that the work planned will be performed by Chuska Energy, or its sub-contractors, in conformity with the terms and conditions under which it is approved.

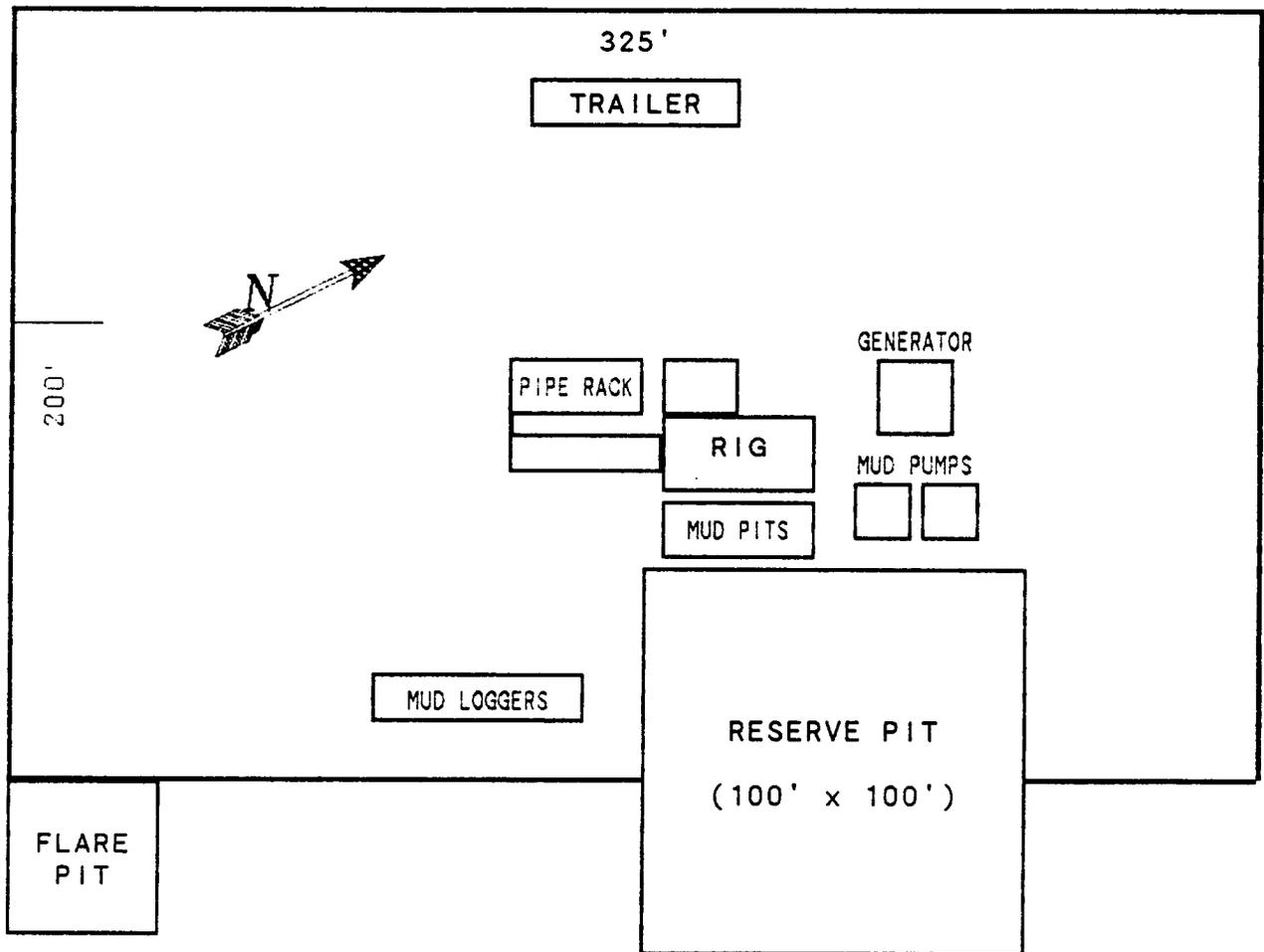
  
LARRY G. SESSIONS  
Operations Manager

# LIZARD 4-M

1100' FSL, 160' FWL

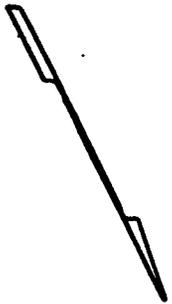
SECTION 4, TOWNSHIP 41S, RANGE 23E

SAN JUAN COUNTY, UTAH

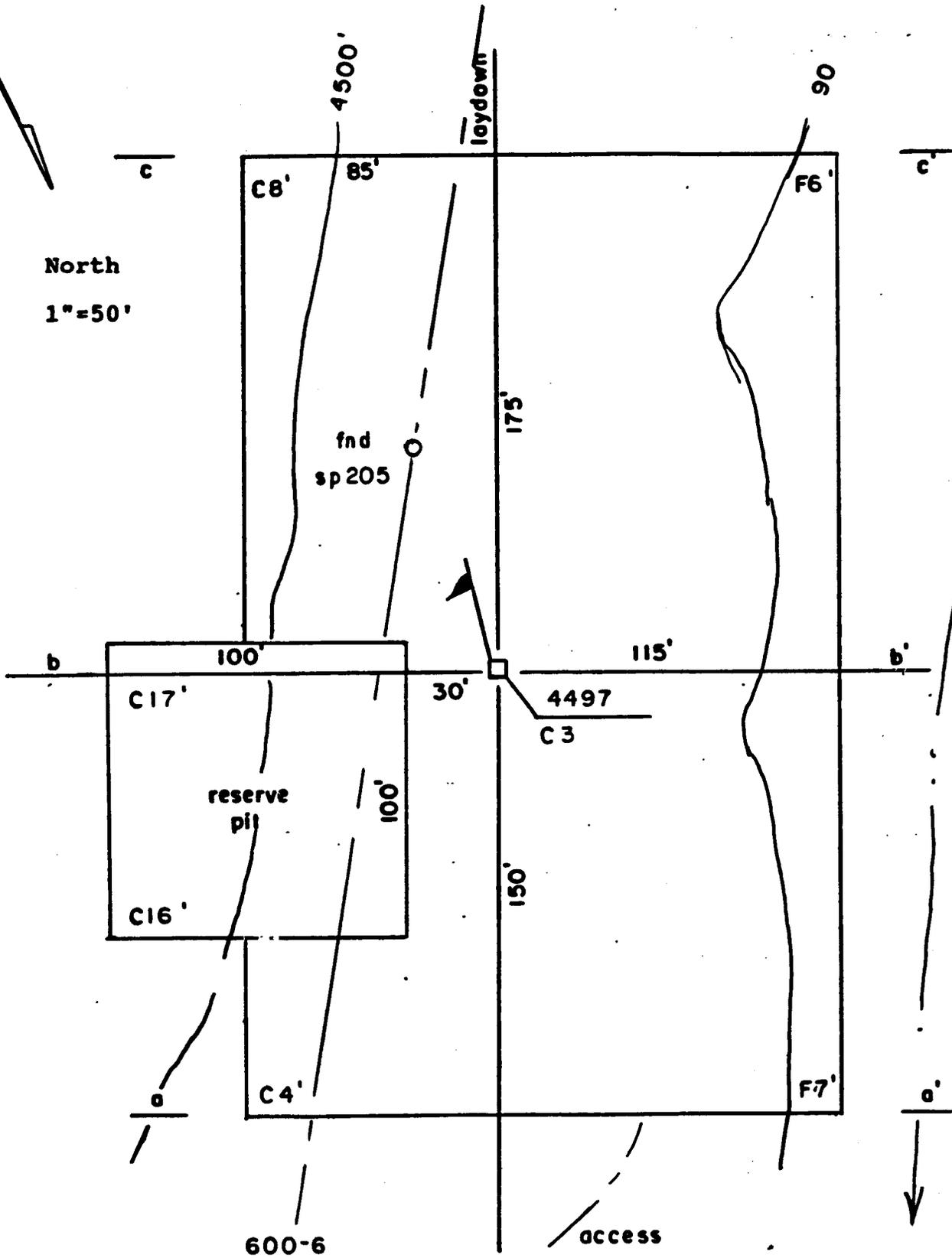


PLANVIEW SKETCH

Lizard 4 - M



North  
1"=50'

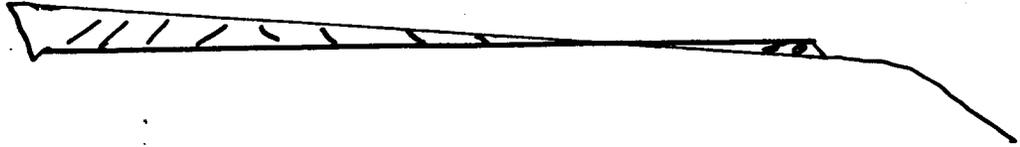


CROSS SECTION

Lizard 4 - M

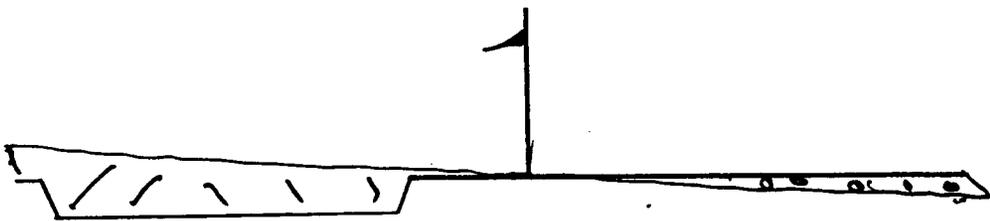
Cut /////  
Fill 

1"=50' vert. & horz.



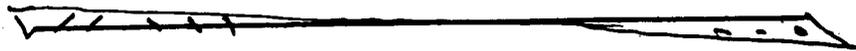
c

c'



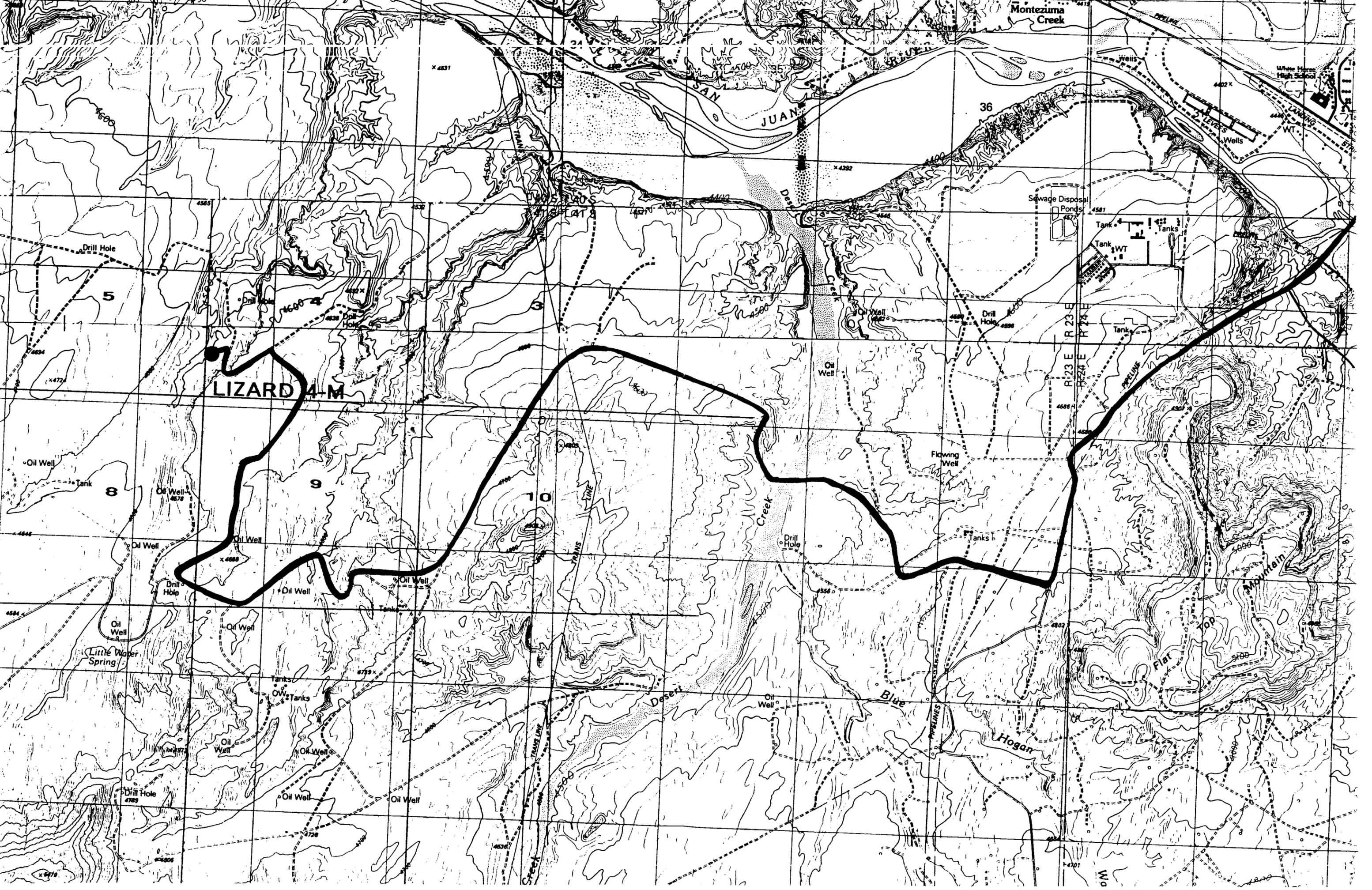
b

b'



a

a'



LIZARD 4-M

SAN JUAN RIVER

Montezuma Creek

36

White Horse High School

Sawage Disposal Ponds

Tank

Tanks

Flowing Well

Drill Hole

5

8

9

10

TRANS LINE

Desert Creek

Blue

Hogan

Flat

Mountain

TRANS LINE

PIPELINES

R 23 E

R 24 E

W 10

Drill Hole

Drill Hole

Drill Hole

Drill Hole

Oil Well

Oil Well

Oil Well

Oil Well

Tanks

Tanks

Tanks

Tanks

Little Water Spring

Little Water Spring

Little Water Spring

Little Water Spring

Oil Well

OPERATOR Chuska Energy Co N-9090 DATE 4-17-91

WELL NAME Olizaid 4m

SEC S4SW4 T 41S R 03E COUNTY San Juan

43-037-31619  
API NUMBER

Ordinary (o)  
TYPE OF LEASE

CHECK OFF:

PLAT.

BOND

NEAREST WELL

LEASE

FIELD SLOM

POTASH OR OIL SHALE

PROCESSING COMMENTS:

No other producing wells within sec 4.  
Water Permit 09-17014 (T64796)  
Exception location requested

APPROVAL LETTER:

SPACING:  R615-2-3

N/A  
UNIT

R515-3-2

N/A  
CAUSE NO. & DATE

R615-3-3

STIPULATIONS:

cc: BTA



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

Norman H. Bangertter

Governor

Dee C. Hansen

Executive Director

Dianne R. Nielson, Ph.D.

Division Director

355 West North Temple

3 Triad Center, Suite 350

Salt Lake City, Utah 84180-1203

801-538-5340

April 18, 1991

Chuska Energy Company  
3315 Bloomfield Highway  
Farmington, New Mexico 87401

Gentlemen:

Re: Lizard 4M Well, 1100 feet from the South line, 160 feet from the West line, SW SW, Section 4, Township 41 South, Range 23 East, San Juan County, Utah

Approval to drill the referenced well is hereby granted in accordance with Utah Admin. R.615-3-3.

In addition, the following actions are necessary to fully comply with this approval:

1. Spudding notification within 24 hours after drilling operations commence.
2. Submittal of Entity Action Form 6, within five working days following spudding and whenever a change in operations or interests necessitates an entity status change.
3. Submittal of the Report of Water Encountered During Drilling, Form 7.
4. Prompt notification in the event it is necessary to plug and abandon the well. Notify R. J. Firth, Associate Director, (Office) (801) 538-5340, (Home) 571-6068, or J. L. Thompson, Lead Inspector, (Home) 298-9318.
5. Compliance with the requirements of Utah Admin. R.615-3-20, Gas Flaring or Venting.

Page 2  
Chuska Energy Company  
Lizard 4M  
April 18, 1991

6. Prior to commencement of the proposed drilling operations, plans for facilities for disposal of sanitary wastes at the drill site shall be submitted to the local health department. These drilling operations and any subsequent well operations must be conducted in accordance with applicable state and local health department regulations. A list of local health departments and copies of applicable regulations are available from the Division of Environmental Health, Bureau of Drinking Water/Sanitation, telephone (801) 538-6159.
7. This approval shall expire one (1) year after date of issuance unless substantial and continuous operation is underway or an application for an extension is made prior to the approval expiration date.

The API number assigned to this well is 43-037-31619.

Sincerely,



R. J. Erth  
Associate Director, Oil & Gas

tas  
Enclosures  
cc: Bureau of Land Management  
Bureau of Indian Affairs  
J. L. Thompson  
we14/1-2



# CHUSKA ENERGY COMPANY

1775 SHERMAN STREET - SUITE 1800 • DENVER, COLORADO 80203 • PHONE: (303) 863-7021  
FAX #: (303) 863-7210

May 17, 1991

Ms. Vicki Kearney  
Utah Oil & Gas Commission  
355 West North Temple  
Three Triad Center  
Suite 350  
Salt Lake City, Utah  
84180-1203

Dear Ms. Kearney:

Please keep all Chuska Energy Company data confidential until further notice.

Thanks,

Herbert P. Mosca  
Chuska Staff Geologist

**RECEIVED**

MAY 20 1991

DIVISION OF  
OIL GAS & MINING

Division of Oil, Gas and Mining  
**PHONE CONVERSATION DOCUMENTATION FORM**

Route original/copy to:  
 Well File Liquid 4M  Suspense  Other  
SW/SW  
(Location) Sec 4 Twp 7S Rng 23E  
(API No.) 43-037-31619  
(Return Date) \_\_\_\_\_  
(To - Initials) \_\_\_\_\_

1. Date of Phone Call: 3-13-92 Time: 10:25

2. DOGM Employee (name) Frank Mulkens (Initiated Call )  
Talked to:  
Name Glenn Goodwin (Initiated Call ) - Phone No. ( )  
of (Company/Organization) DOGMA

3. Topic of Conversation: Chuska Energy well

4. Highlights of Conversation:  
Found the referenced well completed but no lease equipment in place as of yet.

STATE OF UTAH  
DIVISION OF OIL, GAS AND MINING

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1. TYPE OF WELL: OIL WELL  GAS WELL  DRY  Other \_\_\_\_\_

2. TYPE OF COMPLETION: NEW WELL  WORK OVER  DEEP-EN  PLUG BACK  DIFF. REVL.  Other \_\_\_\_\_

3. NAME OF OPERATOR  
Chuska Energy Company

4. ADDRESS OF OPERATOR  
3315 Bloomfield Hwy. Farmington, New Mexico 87401 505-326-5525

5. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)  
At surface 1100' FSL, 160' FWL  
At 100 prod. interval reported below  
At total depth Same

3. LEASE DESIGNATION AND SERIAL NO.  
NOG 8702-1116

6. IF INDIAN, ALLOTTEE OR TRIBE NAME  
Navajo Tribal

7. UNIT AGREEMENT NAME  
N/A

8. FARM OR LEASE NAME  
LIZARD 4 M

9. WELL NO.  
43-037-31619

10. FIELD AND POOL OR WILDCAT  
Wildcat

11. SEC., T., R. NO. OR BLOCK AND CORNER OR AREA  
S4-T41S-R23E

SEP 10 1993

14. API NO. 43-037-31619 DATE ISSUED \_\_\_\_\_

12. COUNTY San Juan 13. STATE Utah

15. DATE SPUDDED 9-4-91 16. DATE T.D. REACHED 9-20-91 17. DATE COMPL. (Ready to prod.) 10-7-91 (Plug & ABLE)

18. ELEVATIONS (OF. BSR. ST. CR. ETC.) 4497' GL, 4510' KB 19. ELEV. CASINGHEAD 4497' GL

20. TOTAL DEPTH, MD & TVD 5557' MD 21. PLUG BACK T.D. MD & TVD 5467'

22. IF MULTIPLE COMPL. HOW MANY 1 23. INTERVALS DRILLED BY \_\_\_\_\_ 24. TOTAL TOOLS ROTARY TOOLS Yes 25. CABLE TOOLS NO

26. PRODUCING INTERVAL(S). OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)  
Desert Creek 5450'-5477' MD and TVD 27. WAS DIRECTIONAL SURVEY MADE YES

28. TYPE ELECTRIC AND OTHER LOGS ION  
DLI/MSEL/GR/CAL. CNL/FDC/LAT/GR/CAL. CET/CBL/CCL/GR  WAS WELL CORED YES  NO  (See Remarks)  
BHC/CAL/GR  DRILL STEM TEST YES  NO  (See Remarks) YES

29. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
8 5/8" K-55	24.00	521'	12 1/4"	371 SX Class 'G'	
5 1/2" J-55	15.50	5550'	7 7/8"	ST1: 235 SX 65/35 Poz + 210 SX Class 'G'	
				ST2: 610 SX 65/35 Poz + 200 SX Class 'G'	

30. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	BACKS CEMENT	SCREEN (MD)	30. TUBING RECORD
					SIZE DEPTH SET (MD) PACKER SET (MD)

31. PERFORATION RECORD (Interval, size and number)

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5477' - 5482', 5', .46" @ 4 SPF/20 Shots	
5450' - 5460', 10', .46" @ 4 SPF/10 Shots	

32. ACID, SHOT, FRACTURE CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5477'-5482'	45 Gal 15% HCL, 1500 Gal 28% HCL
5450'-5460'	3000 Gal 28% HCL

33. PRODUCTION

DATE FIRST PRODUCTION NONE PRODUCTION METHOD Flowing, gas lift, pumping—size and type of pump

WELL STATUS (Producing or Abandoned) SOW DTG 2/24/94

34. DATE OF TEST \_\_\_\_\_ HOURS TESTED \_\_\_\_\_

35. FLOW, TUBING PUMP, CASING PRESSURE, CALCULATED 24-HOUR RATE, OIL—GAL., GAS—MCF., WATER—GAL., OIL GRAVITY—API (CORR.)

36. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.) TEST WITNESSED BY \_\_\_\_\_

37. LIST OF ATTACHMENTS

I and attached information is complete and correct as determined from all available records

*[Signature]* TITLE Operations Manager DATE 5-26-93

No statue given  
Set up as SOW for now  
DTG 2/24/94

See Spaces for Additional Data on Reverse Side

STATE OF UTAH  
DIVISION OF OIL, GAS AND MINING

3. LEASE DESIGNATION AND SERIAL NO.  
NOG 8702-1116

6. IF INDIAN, ALLOTTEE OR TRIBE NAME  
Navajo Tribal

7. UNIT AGREEMENT NAME  
N/A

8. FARM OR LEASE NAME  
LIZARD 4 M

9. WELL NO.  
43-037-31619

10. FIELD AND POOL OR WILDCAT  
Wildcat

11. SEC., T., R. N., OR BLOCK AND SURVEY OR AREA  
S4-T41S-R23E

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1. TYPE OF WELL: OIL WELL  GAS WELL  DRY  Other \_\_\_\_\_

2. TYPE OF COMPLETION: NEW WELL  WORK OVER  DEEP-EN  PLUG BACK  DIFF. REVEAL  Other \_\_\_\_\_

3. NAME OF OPERATOR  
Chuska Energy Company

4. ADDRESS OF OPERATOR  
3315 Bloomfield Hwy. Farmington, New Mexico 87401 505-326-5525

5. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)  
At surface 1100' FSL, 160' FWL  
At top prod. interval reported below  
At total depth Same

SEP 10 1993

14. API NO. 43-037-31619

DATE ISSUED

12. COUNTY San Juan

13. STATE Utah

15. DATE SPUNDED 9-4-91

16. DATE T.S. REACHED 9-20-91

17. DATE COMPL. (Ready to prod.) 10-7-91 (Plug & Abd.)

18. ELEVATIONS (OP. ABS. AT, CR. ETC.) 4497' GL, 4510' KB

19. ELEV. CASINGHEAD 4497' GL

20. TOTAL DEPTH, MD & TVD 5557' MD

21. PLUG BACK T.S. MD & TVD 5467'

22. IF MULTIPLE COMPL. HOW MANY 1

23. INTERVALS DRILLED BY

24. ROTARY TOOLS Yes

25. CABLE TOOLS NO

26. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)  
Desert Creek 5450'-5477' MD and TVD

27. WAS DIAGONAL SURVEY MADE YES

28. TYPE ELECTRIC AND OTHER LOGS LOG

29. DLL/MSFL/GR/CAL. CNL/FDC/LAT/GR/CAL. BHC/CAL/GR  WAS WELL CORED YES  NO  (Same as previous)

30. DRILL STEM TEST YES  NO  (See separate sheet) YES

31. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB/FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
8 5/8" K-55	24.00	521'	12 1/4"	371 SX Class 'G'	
5 1/2" J-55	15.50	5550'	7 7/8"	ST1: 235 SX 65/35 Poz + 210 SX Class 'G'	
				ST2: 610 SX 65/35 Poz + 200 SX Class 'G'	

32. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	BACKS CEMENT	SCREEN (MD)	33. TUBING RECORD
					SIZE DEPTH SET (MD) PACKER SET (MD)

34. PREPARATION RECORD (Interval, size and number)

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5477' - 5482', 5', .46" @ 4 SPF/20 Shots	
5450' - 5460', 10', .46" @ 4 SPF/10 Shots	

35. ACID, SHOT, FRACTURE CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5477'-5482'	45 Gal 15% HCL, 1500 Gal 28% HCL
5450'-5460'	3000 Gal 28% HCL

36. PRODUCTION

DATE FIRST PRODUCTION NONE

PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)

WELL STATUS (Producing or Abandon) 50W DTS 2/24/94

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD. FOR TEST PERIOD	OIL—GAL.	GAS—MCF.	WATER—GAL.	GAS-OIL RATIO

37. FLOW, TUBING PUMP, CASING PRESSURE, CALCULATED 24-HOUR RATE, OIL—GAL., GAS—MCF., WATER—GAL., OIL GRAVITY—API (CORR.)

38. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.)

TEST WITNESSED BY

39. LIST OF ATTACHMENTS

40. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED *[Signature]* TITLE Operations Manager DATE 5-26-93

See Spaces for Additional Data on Reverse Side

## INSTRUCTIONS

This form should be completed in compliance with the Utah Oil and Gas Conservation General Rules. If not filed prior to this time, all logs, tests, and directional surveys as required by Utah Rules should be attached and submitted with this report.

ITEM 18: Indicate which elevation is used as reference for depth measurements given in other spaces on this form and on any attachments.

ITEMS 22 and 24: If this well is completed for separate production from more than one interval zone (multiple completion), so state in item 22, and in item 24 show the producing interval, or intervals, top(s), bottom(s) and name(s) for only the interval reported in item 33. Submit a separate report (page) on this form, adequately identified, for each additional interval to be separately produced, showing the additional data pertinent to such interval.

ITEM 29: "Sacks Cement": Attached supplemental records for this well should show the details of any multiple stage cementing and the location of the cementing tool.

ITEM 33: Submit a separate completion report on this form for each interval to be separately produced (see instructions for items 22 and 24 above).

### 37. SUMMARY OF POROUS ZONES

Show all important zones of porosity and contents thereof; cored intervals; and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut in pressures, and recoveries.

Formation	Top	Bottom	Description, contents, etc.
CORE #1	5381'	5386'	5' Recovered 100%. Desert Creek
CORE #2	5386'	5446'	60' Recovered 100%. Desert Creek
CORE #3	5446'	5506'	60' Recovered 100%. Desert Creek
<u>CEMENT SQUEEZE:</u> 10-01-91	Squeeze Perforations (5477'-5482') W/75 SXS 'G' Cement @ 2.6 Minute @ 1500 PSI.		

### 38.

### GEOLOGIC MARKERS

Name	Top	
	Meas. Depth	True Vert. Depth
Hermosa	4284'	4282'
Upper Ismay	5164'	5164'
Hoven Weep Shale	5280'	5280'
Lower Ismay	5287'	5287'
Gothic Shale	5316'	5316'
Desert Creek	5338'	5338'
Chimney Rock Shale	5491'	5491'
AKAH	5518'	5518'

(October 1990)

UNITED STATES

SUBMIT IN DUPLICATE

FOR APPROVED OMB NO. 1004-0137 Expires: December 31, 1991

DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

(Other Instructions on side)

WELL COMPLETION OR RECOMPLETION REPORT AND LOG \*

1a. TYPE OF WELL: OIL WELL [ ] GAS WELL [ ] DRY [X] Other [ ]
b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER [ ] DEEP EN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] Other [ ]

2. NAME OF OPERATOR: CHUSKA ENERGY COMPANY

3. ADDRESS AND TELEPHONE NO.: 3315 BLOOMFIELD HIGHWAY, FARMINGTON, NM 87401 (505) 326-5525

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)\*
At surface 1000' FSL, 160' FWL
At top prod. interval reported below
At total depth SAME

CONFIDENTIAL

14. PERMIT NO. 43-037-31619 DATE ISSUED

5. LEASE DESIGNATION AND SERIAL NO. NOG 8702-1116

6. IF INDIAN, ALLOTTEE OR TRIBE NAME NAVAJO TRIBAL

7. UNIT AGREEMENT NAME N/A

8. FARM OR LEASE NAME, WELL NO. LIZARD 4 M

9. APIWELL NO. 43-037-31619

10. FIELD AND POOL, OR WILDCAT WILDCAT

11. SEC. T., R., M., OR BLOCK AND SURVEY OR AREA S4-T41S-R23E

12. COUNTY OR PARISH SAN JUAN 13. STATE UTAH

15. DATE SPUDDED 9-4-91 16. DATE T.D. REACHED 9-20-91 17. DATE COMPL. (Ready to prod.) 10-7-91 18. ELEVATIONS (DF. RKB, RT, GR, ETC.)\* 4497' GL, 4510' KB 19. ELEV. CASINGHEAD 4497' GL

20. TOTAL DEPTH, MD & TVD 5557' MD 21. PLUG, BACK T.D., MD & TVD 5467' 22. IF MULTIPLE COMPL., HOW MANY\* 1 23. INTERVALS DRILLED BY ROTARY TOOLS YES CABLE TOOLS NO

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)\* DESERT CREEK; 5450'-5477' MD AND TVD 25. WAS DIRECTIONAL SURVEY MADE YES

26. TYPE ELECTRIC AND OTHER LOGS RUN DLL/MSFL/GR/CAL, CNL/FDC/LAT/GR/CAL, BHC/CAL/GR, CET/CBL/CCL/GR 27. WAS WELL CORRED YES

28. CASING RECORD (Report all strings set in well)

Table with 6 columns: CASING SIZE-GRADE, WEIGHT, LB./FT., DEPTH SET (MD), HOLE SIZE, TOP OF CEMENT, CEMENTING RECORD, AMOUNT PULLED. Rows include 8 5/8" K-55, 5 1/2" J-55, and DVT @ 3485'.

29. LINER RECORD and 30. TUBING RECORD tables with columns for SIZE, TOP (MD), BOTTOM (MD), SACKS CEMENT, SCREEN (MD), SIZE, DEPTH SET (MD), PACKER SET (MD).

31. PERFORATION RECORD (Interval, size and number) and 32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC. tables.

33.\* PRODUCTION table with columns for DATE FIRST PRODUCTION, PRODUCTION METHOD, WELL STATUS, DATE OF TEST, HOURS TESTED, CHOKER SIZE, PROD'N. FOR TEST PERIOD, OIL-BBL., GAS-MCF., WATER-BBL., GAS-OIL RATIO.

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.) TEST WITNESSED BY SEP 0

35. LIST OF ATTACHMENTS

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records. SIGNED [Signature] TITLE OPERATIONS MANAGER ACCEPTED FOR RECORD DATE 5/5/92

\*(See Instructions and Spaces for Additional Data on Reverse Side)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

OPERATOR

FARMINGTON RESOURCE AREA BY [Signature]

MAY 07 1992

57-51226

37. SUMMARY OF POROUS ZONES: (Show all important zones of porosity and contents thereof; cored intervals; and all drill-stem, tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries):

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
CORE #1	5381'	5386'	5' RECOVERED 100%. DESERT CREEK
CORE #2	5386'	5446'	60' RECOVERED 100%. DESERT CREEK
CORE #3	5446'	5506'	60' RECOVERED 100%. DESERT CREEK
<u>CEMENT SQUEEZE:</u>			
10-1-91	SQUEEZE PERFORATIONS		(5477'-5482') W/75 SXS "G" CEMENT @ 2.6 BBL/ MINUTE @ 1500 PSI.

CONFIDENTIAL  
 INFORMATION

SEP 10 1993

38. GEOLOGIC MARKERS

NAME	TOP	
	MEAS. DEPTH	TRUE VERT. DEPTH
HERMOSA	4284'	4284'
UPPER ISMAY	5164'	5164'
HOVEN WEEP SHALE	5280'	5280'
LOWER ISMAY	5287'	5287'
GOTHIC SHALE	5316'	5316'
DESERT CREEK	5338'	5338'
CHIMNEY ROCK SHALE	5491'	5491'
AKAH	5518'	5518'

STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

6. Lease Designation and Serial Number NOG 8702-1116
7. Indian Allottee or Tribe Name Navajo Tribal
8. Unit or Communitization Agreement

**SUNDRY NOTICES AND REPORTS ON WELLS**

Do not use this form for proposals to drill new wells, deepen existing wells, or to reenter plugged and abandoned wells.  
Use APPLICATION FOR PERMIT for such proposals

1. Type of Well <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other (specify)
2. Name of Operator Chuska Energy Company
3. Address of Operator 3315 Bloomfield Hwy. Farmington, NM 87401
4. Telephone Number 505-326-5525
5. Location of Well Footage : 1100' FSL, 160' FWL QQ, Sec. T., R., M. : S4-T41S-R23E
County : San Juan State : UTAH

9. Well Name and Number LIZARD 4 M
10. API Well Number 43-037-31619
11. Field and Pool, or Wildcat Wildcat

**12. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA**

**NOTICE OF INTENT**  
(Submit in Duplicate)

<input type="checkbox"/> Abandonment	<input type="checkbox"/> New Construction
<input type="checkbox"/> Casing Repair	<input type="checkbox"/> Pull or Alter Casing
<input type="checkbox"/> Change of Plans	<input type="checkbox"/> Recompletion
<input type="checkbox"/> Conversion to Injection	<input type="checkbox"/> Shoot or Acidize
<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Vent or Flare
<input type="checkbox"/> Multiple Completion	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Other _____	

Approximate Date Work Will Start \_\_\_\_\_

**SUBSEQUENT REPORT**  
(Submit Original Form Only)

<input type="checkbox"/> Abandonment *	<input type="checkbox"/> New Construction
<input type="checkbox"/> Casing Repair	<input type="checkbox"/> Pull or Alter Casing
<input type="checkbox"/> Change of Plans	<input type="checkbox"/> Shoot or Acidize
<input type="checkbox"/> Conversion to Injection	<input type="checkbox"/> Vent or Flare
<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Water Shut-Off
<input checked="" type="checkbox"/> Other <u>Production Casing</u>	

Date of Work Completion \_\_\_\_\_

Report results of Multiple Completions and Recompletions to different reservoirs on WELL COMPLETION OR RECOMPLETION AND LOG form.  
\* Must be accompanied by a cement verification report.

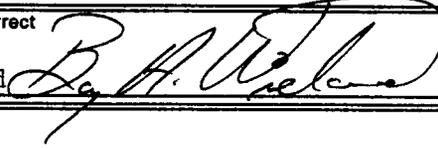
**13. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)**

Drilled 5557'. Logged and ran 136 jts 5 1/2", 15.5#. J-55 LT&C Xsg and landed at 5550'. DV tool @ 3450', cement as follows:

Stage #1: Lead with 235 sx 65/35 Poz & 8% gel + 1/4#/sx celloflake (397 ft3). Tail with 210 sx Class 'G' + 0.6% gel D-112, 0.3% D-66. Dropped bomb and opened DV tool to circulate. Circulated 15 bbls cement slurry to surface.

Stage #2: Lead with 610 sx 65/35 Poz + 6% gel + 1/4#/sx celloflake (1031 ft3). Tail with 200 sx Class 'G' + 2% CaCl<sub>2</sub> = 1/4#/sx celloflake (230 ft3). Displaced with water. Circulated 1 bbl cement slurry to surface. Rig release 2230 hrs, 9-20-91. Notification of casing job to BLM, Mr Snow, @ 2:00 pm, 9-19-91, by Jim Meyers.

14. I hereby certify that the foregoing is true and correct

Name & Signature Barry A. Wieland  Title Operations Manager Date 5-26-93

(State Use Only)

SEP 10 1993

Form 3160-9  
(June 1990)

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

*Permits  
Federal Sundry*

FORM APPROVED  
Budget Bureau No. 1004-0135  
Expires: March 31, 1993

5. Lease Designation and Serial No.

NOG 8702-1118

6. If Indian, Allottee or Tribe Name

Navajo Tribal

7. If Unit or CA, Agreement Designation

XXXXXX

8. Well Name and No.

Lizard 4M

9. API Well No.

43-037-31619

10. Field and Pool, or Exploratory Area

Wildcat

11. County or Parish, State  
San Juan County, UT

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals

SUBMIT IN TRIPLICATE

1. Type of Well

Oil Well  Gas Well  Other

2. Name of Operator

CHUSKA ENERGY COMPANY

3. Address and Telephone No.

315 Bloomfield Highway Farmington New Mexico 87401 (505)326-5525

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

1100' FSL 160' FWL  
Section 4-41S-23E

12. CHECK APPROPRIATE BOX(S) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

- Notice of Intent
- Subsequent Report
- Final Abandonment Notice

TYPE OF ACTION

- Abandonment
- Completion
- Fracturing Back
- Casing Repair
- Altering Casing
- Other PRODUCTION CSG

- Change of Plans
- New Construction
- Non-Routine Fracturing
- Water Shut-Off
- Conversion to Injection
- Dispose Water

(Note: Report results of multiple completions on Well Completion or Recompletion Report and Log (Form 3160-10))

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

Drilled to 5557'. Logged and ran 138 JTS 5 1/2", 15.50#, J-55 LT&C Csg and landed at 5550'. Float collar @ 5525'. DV Tool @ 3450'. Cemented as follows:  
 STAGE #1: Lead w/235 sx 65/35 poz & 8% gel + 1/4#/sx celloflake (397 ft3). Tail w/210 sx Class 'G' + 0.6% gel D-112, 0.3% D-66. Dropped bomb and opened DV tool to circulate. Circulated 15 bbls cement slurry to surface.  
 STAGE #2: Lead w/810 sx 65/35 poz + 6% gel + 1/4#/sx celloflake (1031 ft3). Tail w/200 sx Class 'G' + 2% CaCl2 + 1/4#/sx celloflake (230 ft3). Displaced with water. Circulated 1 bbl cement slurry to surface. Rig released 2230 hrs, 9-20-91. Notification of casing job to BLM, Mr. Snow, @ 2:00 pm, 9-19-91, by Jim Meyers.

14. I hereby certify that the foregoing is true and correct

Signed Greg A. Chasler

Title Production Eng

Date 9-23-91

(This space for Federal or State office use)

ACCEPTED FOR RECORD

Approved by \_\_\_\_\_

Title \_\_\_\_\_

Date \_\_\_\_\_

Conditions of approval, if any:

Oper

MAY 07 1992

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

\*See instruction on Reverse Side

BY

SM

STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

6. Lease Designation and Serial Number NOG 8702-1116
7. Indian Allottee or Tribe Name Navajo Tribal
8. Unit or Communitization Agreement
9. Well Name and Number LIZARD 4 M
10. API Well Number 43-037-31619
11. Field and Pool, or Wildcat Wildcat

**SUNDRY NOTICES AND REPORTS ON WELLS**  
Do not use this form for proposals to drill new wells, deepen existing wells, or to reenter plugged and abandoned wells.  
Use APPLICATION FOR PERMIT— for such proposals

1. Type of Well <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other (specify)	
2. Name of Operator Chuska Energy Company	
3. Address of Operator 3315 Bloomfield Hwy. Farmington, NM 87401	4. Telephone Number 505- 326-5525
5. Location of Well Footage : 1100' FSL, 160' FWL County : San Juan QQ, Sec. T., R., M. : S4-T41S-R23E State : UTAH	

12. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA	
<p><b>NOTICE OF INTENT</b> (Submit in Duplicate)</p> <p><input type="checkbox"/> Abandonment                      <input type="checkbox"/> New Construction</p> <p><input type="checkbox"/> Casing Repair                      <input type="checkbox"/> Pull or Alter Casing</p> <p><input type="checkbox"/> Change of Plans                      <input type="checkbox"/> Recompletion</p> <p><input type="checkbox"/> Conversion to Injection              <input type="checkbox"/> Shoot or Acidize</p> <p><input type="checkbox"/> Fracture Treat                      <input type="checkbox"/> Vent or Flare</p> <p><input type="checkbox"/> Multiple Completion              <input type="checkbox"/> Water Shut-Off</p> <p><input type="checkbox"/> Other _____</p> <p>Approximate Date Work Will Start _____</p>	<p><b>SUBSEQUENT REPORT</b> (Submit Original Form Only)</p> <p><input type="checkbox"/> Abandonment *                      <input type="checkbox"/> New Construction</p> <p><input type="checkbox"/> Casing Repair                      <input type="checkbox"/> Pull or Alter Casing</p> <p><input type="checkbox"/> Change of Plans                      <input type="checkbox"/> Shoot or Acidize</p> <p><input type="checkbox"/> Conversion to Injection              <input type="checkbox"/> Vent or Flare</p> <p><input type="checkbox"/> Fracture Treat                      <input type="checkbox"/> Water Shut-Off</p> <p><input checked="" type="checkbox"/> Other <u>Spud/Surface Casing</u></p> <p>Date of Work Completion _____</p> <p>Report results of Multiple Completions and Recompletions to different reservoirs on WELL COMPLETION OR RECOMPLETION AND LOG form. * Must be accompanied by a cement verification report.</p>

13. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

MIRU Four States Drilling Co. Rig #1. Spudded 0100 hrs, 9-4-91. Drilled to 525'. RU and ran 12 jts 8 5/8", 24lb/ft, K-55, STC casing and landed at 521. Cemented with 371 sx Class 'G' cement with 2% CaCl<sub>2</sub> and 1/4#/sk celloflake. Circulated 2 bbl slurry to surface. Notification of spud by Larry Sessions, to BLM, Herman Lujan, @ 3:45 pm on 9-3-91,

14. I hereby certify that the foregoing is true and correct

Name & Signature Barry A. Wieland  Title Operations Manager Date 5-26-93  
(State Use Only)

RECEIVED SEP 23 1991

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

RECEIVED BLM

FORM APPROVED Budget Bureau No. 1004-0135 Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

SEP 12 11:10:59

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals

5. Lease Designation and Serial No. NOG 8702-1116

6. If Indian, Allottee or Tribe Name Navajo Tribal

7. If Unit or CA, Agreement Designation

XXXXXX

8. Well Name and No. Lizard 4M

9. API Well No. 43-037-31619

10. Field and Pool, or Exploratory Area Wildcat

11. County or Parish, State San Juan County, UT

SUBMIT IN TRIPLICATE

1. Type of Well [X] Oil Well [ ] Gas Well [ ] Other

2. Name of Operator CHUSKA ENERGY COMPANY

3. Address and Telephone No.

315 Bloomfield Highway, Farmington, New Mexico 87401 1(505)326-5525

4. Location of Well (Footage, Sec., T., R., M., or Survey Description) 1100' FSL, 160' FWL Section 4-41S-23E

12. CHECK APPROPRIATE BOX(S) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

Table with columns: TYPE OF SUBMISSION, TYPE OF ACTION. Includes checkboxes for Notice of Intent, Subsequent Report, Final Abandonment Notice, Abandonment, Recompletion, Plugging Back, Casing Repair, Altering Casing, Other, Change of Plans, New Construction, Non-Routine Fracturing, Water Shut-Off, Conversion to Injection, Dispose Water. Includes handwritten 'CONFIDENTIAL' and 'Spill/Surface Csg'.

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)\*

MIRU Four States Drilling Co. Rig #1. Spudded 0100 hrs, 9-4-91. drilled to 525'. RU and ran 12 jts 8 5/8", 24 lb./ft, K-55, STC casing and landed at 521. Cemented w/ 371 sx class 'G' cement w/ 2% CaCl2 and 1/4 #/sk celloflake. Circulated 2 bbl slurry to surface. Notification of spud by Larry Sessions, to BLM, Herman Lujan, @ 3:45 pm on 9-3-91.

ACCEPTED FOR RECORD

SEP 10 1991

FARMINGTON RESOURCE AREA

BY [Signature]

14. I hereby certify that the foregoing is true and correct

Signed [Signature] Title Production Engineer Date 9-10-91

(This space for Federal or State office use)

Approved by \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

Conditions of approval, if any:

\*See Instruction on Reverse Side

OPERATOR



# CHUSKA ENERGY COMPANY

3315 BLOOMFIELD HIGHWAY • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 326-5525

September 7, 1993

State of Utah  
Department of Natural Resources  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

RECEIVED

SEP 10 1993

DIVISION OF  
OIL, GAS & MINING

Attn: Mr. R.J. Firth  
Associate Director

RE: Utah Division of Oil, Gas and Mining's  
Reporting Requirements

Dear Mr. Firth:

Enclosed please find the following reports and well logs run on wells drilled by Chuska Energy Company during the period January 1, 1992 forward. The Production Reports were filed in June under a separate cover letter by our home office, Harken Energy Company, out of Dallas. We have received conflicting statements as to whether or not the data was received. Therefore, a second set of Production reports from January 1992 forward are also forwarded to your office under this cover letter.

APD(S), SUNDRY NOTICES AND ENTITY ACTION FORMS

Barnes 18M  
Barnes 18M(N)  
Brown Hogan 1A-2  
Burro 33I  
Clay Hill 33-0  
Crane 35H  
Copperhead 15E  
D.C. Anticline 35K  
Heron 35H  
Heron 35H(A)  
Jack 31G  
Kokopelli 29I  
Lark 19B  
Lark 19B(G)  
Lighting Rock 2E  
Lizard 4M  
Lone Mountain Creek 12F-1

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SEP 10 1993

DIVISION OF  
OIL, GAS & MINING

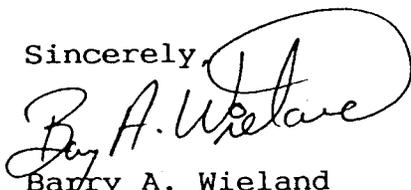
Monument 17E-2  
Mule 31K  
Mule 31K(N)  
Mule 31M  
NW Cajon 1I-1  
North Heron 35C  
Northwest Cajon 6E  
North Cajon Mesa 5E-1  
North Ruins 16K  
Red Lake 25B  
Tower 1F  
Box Canyon 5F  
Shalene 11K  
South Triangle 7I  
West Clay Hill 5B(A)

LOGS

Barnes 18M(N)  
Brown Hogan 1A-2  
Burro 33I  
Clay Hill 33-0  
Copperhead 15E  
D.C. Anticline 35K  
Heron 35H  
Jack 31G  
Kokopelli 29I  
Lark 19B(G)  
Lighting Rock 2E  
Lone Mountain Creek 12F-1  
Mule 31K(N)  
Mule 31M  
North Cajon Mesa 5E-1  
North Heron 35C  
N.W. Cajon 1I-1  
N.W. Cajon 6E  
Red Lake 25B  
West Clay Hill 5B(A)

If you should have any further questions, please don't  
hesitate to contact me, or Nell Lindenmeyer, at 505-326-  
5525.

Sincerely,



Barry A. Wieland  
Operations Manager

Enclosures  
cc: Well File

ENTITY ACTION FORM - FORM 6

ADDRESS \_\_\_\_\_

\_\_\_\_\_

ACTION CODE	CURRENT ENTITY NO.	NEW ENTITY NO.	API NUMBER	WELL NAME	WELL LOCATION					SPUD DATE	EFFECTIVE DATE
					QQ	SC	TP	RG	COUNTY		
A	99999	11553	43-037-31525	<i>Conf.</i> MEANDER 2D-1	NWNW	2	41S	21E	SAN JUAN		10-19-93
WELL 1 COMMENTS:											
A	99999	11554	43-037-31576	<i>Conf.</i> SAGUARO 2E-1	SWNW	2	41S	23E	SAN JUAN		10-19-93
WELL 2 COMMENTS:											
A	99999	11555	43-037-31619	<i>Conf.</i> LIZARD 4M	SWSW	4	41S	23E	SAN JUAN		10-19-93
WELL 3 COMMENTS:											
A	99999	11556	43-037-31574	<i>Conf.</i> OCATILLA 11D #1	NWNW	11	41S	23E	SAN JUAN		10-19-93
WELL 4 COMMENTS:											
A	99999	11557	43-037-31618	<i>Conf.</i> MULE 31-K-2	SESW	31	41S	24E	SAN JUAN		10-19-93
WELL 5 COMMENTS:											

ACTION CODES (See instructions on back of form)

- A - Establish new entity for new well (single well only)
- B - Add new well to existing entity (group or unit well)
- C - Re-assign well from one existing entity to another existing entity
- D - Re-assign well from one existing entity to a new entity
- E - Other (explain in comments section)

NOTE: Use COMMENT section to explain why each Action Code was selected.

(3/89)

*LC*  
L. CORDOVA (DOGM)

Signature

ADMIN. ANALYST

Title

10-19-93

Date

Phone No. ( )

MONTHLY OIL AND GAS PRODUCTION REPORT

OPERATOR NAME AND ADDRESS:

LARRY G SESSIONS  
 CHUSKA ENERGY COMPANY  
 3315 BLOOMFIELD HWY  
 FARMINGTON NM 87401

UTAH ACCOUNT NUMBER: N9290

REPORT PERIOD (MONTH/YEAR): 12 / 93

AMENDED REPORT  (Highlight Changes)

Well Name			Producing Zone	Well Status	Days Oper	Production Volumes		
API Number	Entity	Location				OIL(BBL)	GAS(MCF)	WATER(BBL)
JACK 31G								
✓ 4303731709	11497	41S 24E 31	DSCR	NO CERT NO FILE		done / DTS		
MULE 31M								
✓ 4303731710	11498	41S 24E 31	DSCR					
HERON 35H-A (RIG SKID)								
✓ 4303731711	11499	41S 25E 35	PRDX					
LIZARD 4m								
✓ 4303731619	11555	41S 23E 4	DSCR					
HILLSIDE 6C-1								
4303731721	11570	42S 25E 6	IS-DC	DRL (Cont.)				
CLAY HILL 330								
✓ 4303731723	11612	41S 25E 33	DSCR					
<b>TOTALS</b>								

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

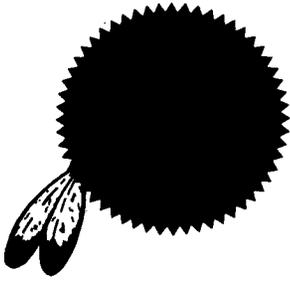
\_\_\_\_\_

I hereby certify that this report is true and complete to the best of my knowledge.

Date: \_\_\_\_\_

Name and Signature: \_\_\_\_\_

Telephone Number: \_\_\_\_\_



# HARKEN SOUTHWEST CORPORATION

(formerly Chuska Energy Company)

We are pleased to announce that effective January 18, 1994, Chuska Energy Company, has changed its name to Harken Southwest Corporation. This is in line with the February 1993 merger with Harken Exploration Company.

Harken Southwest Corporation is still located at 3315 Bloomfield Highway, Farmington, New Mexico, 87401. You may still contact us at (505) 326-5525.

Please reflect this name change as necessary on all future correspondence.

Thank you for your assistance in this matter and we look forward to working with you as Harken Southwest Corporation.

Sincerely,

Barry A. Wieland  
Operations Manager

RECEIVED

FEB 07 1994

DIVISION OF  
OIL, GAS & MINING

Division of Oil, Gas and Mining  
**PHONE CONVERSATION DOCUMENTATION FORM**

Route original/copy to:

Well File \_\_\_\_\_

Suspense  
(Return Date) \_\_\_\_\_  
(To - Initials) \_\_\_\_\_

Other  
*Oper. Nm. Change*  
\_\_\_\_\_  
\_\_\_\_\_

(Location) Sec \_\_\_\_\_ Twp \_\_\_\_\_ Rng \_\_\_\_\_  
(API No.) \_\_\_\_\_

1. Date of Phone Call: 2-9-94 Time: 12:29

2. DOGM Employee (name) L. Cordova (Initiated Call )  
Talked to:

Name Wayne Townsend (Initiated Call ) - Phone No. (505) 599-8900  
*(or Ken Townsend)*  
of (Company/Organization) Btm / Farmington N.M.

3. Topic of Conversation: Chuska Energy Co. to Harken Southwest Corp.

4. Highlights of Conversation:

They have not rec'd doc. of name change. When they do receive doc. they will most likely keep "Chuska" as operator yet mail any correspondence % Harken, until BIA approval. (BIA approval may take a while!)

\* 940210 Per Admin. OK to change.

Division of Oil, Gas and Mining  
**OPERATOR CHANGE WORKSHEET**

Routing:

1-IBC	7-SJ
2-DTS	8-FILE
3-VLC	
4-RJB	
5- <del>PL</del>	
6-PL	

Attach all documentation received by the division regarding this change.  
 Initial each listed item when completed. Write N/A if item is not applicable.

- Change of Operator (well sold)                       Designation of Agent  
 Designation of Operator                               Operator Name Change Only

The operator of the well(s) listed below has changed (EFFECTIVE DATE: 1-18-94)

TO (new operator) <u>HARKEN SOUTHWEST CORPORATION</u> FROM (former operator) <u>CHUSKA ENERGY COMPANY</u>
(address) <u>3315 BLOOMFIELD HWY</u> (address) <u>3315 BLOOMFIELD HWY</u>
<u>FARMINGTON NM 87401</u> <u>FARMINGTON NM 87401</u>
phone ( <u>505</u> ) <u>326-5525</u> phone ( <u>505</u> ) <u>326-5525</u>
account no. <u>N 9290</u> account no. <u>N9290</u>

Well(s) (attach additional page if needed):

Name: <u>**SEE ATTACHED**</u>	API: <u>037 31619</u>	Entity: _____	Sec _____	Twp _____	Rng _____	Lease Type: _____
Name: _____	API: _____	Entity: _____	Sec _____	Twp _____	Rng _____	Lease Type: _____
Name: _____	API: _____	Entity: _____	Sec _____	Twp _____	Rng _____	Lease Type: _____
Name: _____	API: _____	Entity: _____	Sec _____	Twp _____	Rng _____	Lease Type: _____
Name: _____	API: _____	Entity: _____	Sec _____	Twp _____	Rng _____	Lease Type: _____
Name: _____	API: _____	Entity: _____	Sec _____	Twp _____	Rng _____	Lease Type: _____

**OPERATOR CHANGE DOCUMENTATION**

- Lee 1. (Rule R615-8-10) Sundry or other legal documentation has been received from former operator (Attach to this form). *(Rec'd 2-7-94)*
- N/A 2. (Rule R615-8-10) Sundry or other legal documentation has been received from new operator (Attach to this form).
- Lee 3. The Department of Commerce has been contacted if the new operator above is not currently operating any wells in Utah. Is company registered with the state? (yes)/no \_\_\_\_ If yes, show company file number: #096704.
- Lee 4. (For Indian and Federal Wells ONLY) The BLM has been contacted regarding this change (attach Telephone Documentation Form to this report). Make note of BLM status in comments section of this form. Management review of Federal and Indian well operator changes should take place prior to completion of steps 5 through 9 below.
- Lee 5. Changes have been entered in the Oil and Gas Information System (Wang/IBM) for each well listed above. *(2-10-94)*
- Lee 6. Cardex file has been updated for each well listed above. *(2-10-94)*
- Lee 7. Well file labels have been updated for each well listed above. *(2-10-94)*
- Lee 8. Changes have been included on the monthly "Operator, Address, and Account Changes" memo for distribution to State Lands and the Tax Commission.
- Lee 9. A folder has been set up for the Operator Change file, and a copy of this page has been placed there for reference during routing and processing of the original documents.

**ENTITY REVIEW**

- Yes 1. (Rule R615-8-7) Entity assignments have been reviewed for all wells listed above. Were entity changes made? (yes/no) no (If entity assignments were changed, attach copies of Form 6, Entity Action Form).
- N/A 2. State Lands and the Tax Commission have been notified through normal procedures of entity changes.

**BOND VERIFICATION (Fee wells only)**

- N/A Yes 1. (Rule R615-3-1) The new operator of any fee lease well listed above has furnished a proper bond.
- 2. A copy of this form has been placed in the new and former operators' bond files.
- 3. The former operator has requested a release of liability from their bond (yes/no)     . Today's date      19    . If yes, division response was made by letter dated      19    .

**LEASE INTEREST OWNER NOTIFICATION RESPONSIBILITY**

- N/A 1. (Rule R615-2-10) The former operator/lessee of any fee lease well listed above has been notified by letter dated      19    , of their responsibility to notify any person with an interest in such lease of the change of operator. Documentation of such notification has been requested.   
*BTS 3/2/94*
- N/A 2. Copies of documents have been sent to State Lands for changes involving State leases.

**FILMING**

- 1. All attachments to this form have been microfilmed. Date: March 7 1994.

**FILING**

- Yes 1. Copies of all attachments to this form have been filed in each well file.
- Yes 2. The original of this form and the original attachments have been filed in the Operator Change file.

**COMMENTS**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

**RECEIVED**  
OCT 5 1995  
DIV. OF OIL, GAS & MINING  
Nevada

FORM APPROVED  
Budget Bureau No. 1004-0135  
Expires: March 31, 1993

**SUNDRY NOTICES AND REPORTS ON WELLS**

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals.

5. Lease Designation and Serial No.  
NOG 8707-1240  
6. If Indian, Allottee or Tribe Name

**SUBMIT IN TRIPLICATE**

1. Type of Well  
 Oil Well  Gas Well  Other

2. Name of Operator  
Harken Southwest Corporation

3. Address and Telephone No.  
P.O. Box 612007 Dallas, Texas 75261 (214) 753-6900

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)  
SW/SW Sec 4-41S-23E  
1100' FSL & 160' FWL

7. If Unit or CA, Agreement Designation

N/A

8. Well Name and No.

Lizard 4M

9. API Well No.

43-037-31619

10. Field and Pool, or Exploratory Area

11. County or Parish, State

San Juan, Utah

12. CHECK APPROPRIATE BOX(S) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION
<input checked="" type="checkbox"/> Notice of Intent	<input checked="" type="checkbox"/> Abandonment
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Recompletion
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Plugging Back
	<input type="checkbox"/> Casing Repair
	<input type="checkbox"/> Altering Casing
	<input type="checkbox"/> Other _____
	<input type="checkbox"/> Change of Plans
	<input type="checkbox"/> New Construction
	<input type="checkbox"/> Non-Routine Fracturing
	<input type="checkbox"/> Water Shut-Off
	<input type="checkbox"/> Conversion to Injection
	<input type="checkbox"/> Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)\*

Attached please find the following information regarding the plugging and abandonment on the subject wellbore:

- Current Well Information
- Schematic of Current Wellbore Configuration
- Abandonment Procedures
- Schematic of Proposed P&A Configuration

Harken will permanently abandon the wellbore during the 1995 P&A program, scheduled to be completed prior to 12/31/95. Location reseeded will take place during 1996 as stipulated on the original APD.

Should any questions arise, please contact Mr. Richard Cottle in the Farmington, NM office at telephone (505) 327-5531 or the undersigned at the address/telephone number above.

CC: State of Utah  
Navajo Nation - Minerals Dept  
Bureau of Indian Affairs - Gallup, NM

I hereby certify that the foregoing is true and correct  
Signed Montgomery  
(This space for Federal or State office use)  
Approved by \_\_\_\_\_  
Conditions of approval, if any:

Title Production Administrator Date 10-3-95  
**Accepted by the**  
**Utah Division of**  
**Oil, Gas & Mining**  
Date \_\_\_\_\_

**FOR RECORD ONLY**

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**PLUG and ABANDONMENT**  
**Lizard #4 M**  
 1,100' FSL & 160' FWL, Sec 4 - T41S - R23E  
 San Juan County, Utah  
 September 26, 1995

Present Status: Shut-In Uneconomic Oil Well

Elevation: 4497' GL Reference Elevation: 4510' KB

Total Depth: 5557' MD PBTD: 5467' KB

Casing Program:  
 8-5/8", 24#, Surface csg @ 521' to surface w/375 sacks cmt  
 5-1/2", 15.5#, Production csg @ 5550' w/1,255 sacks cmt in two stages

Production Equipment: 171 joints of 2 7/8" tubing (5406'), pkr set @ 5408'

**Casing and Tubing Detail**

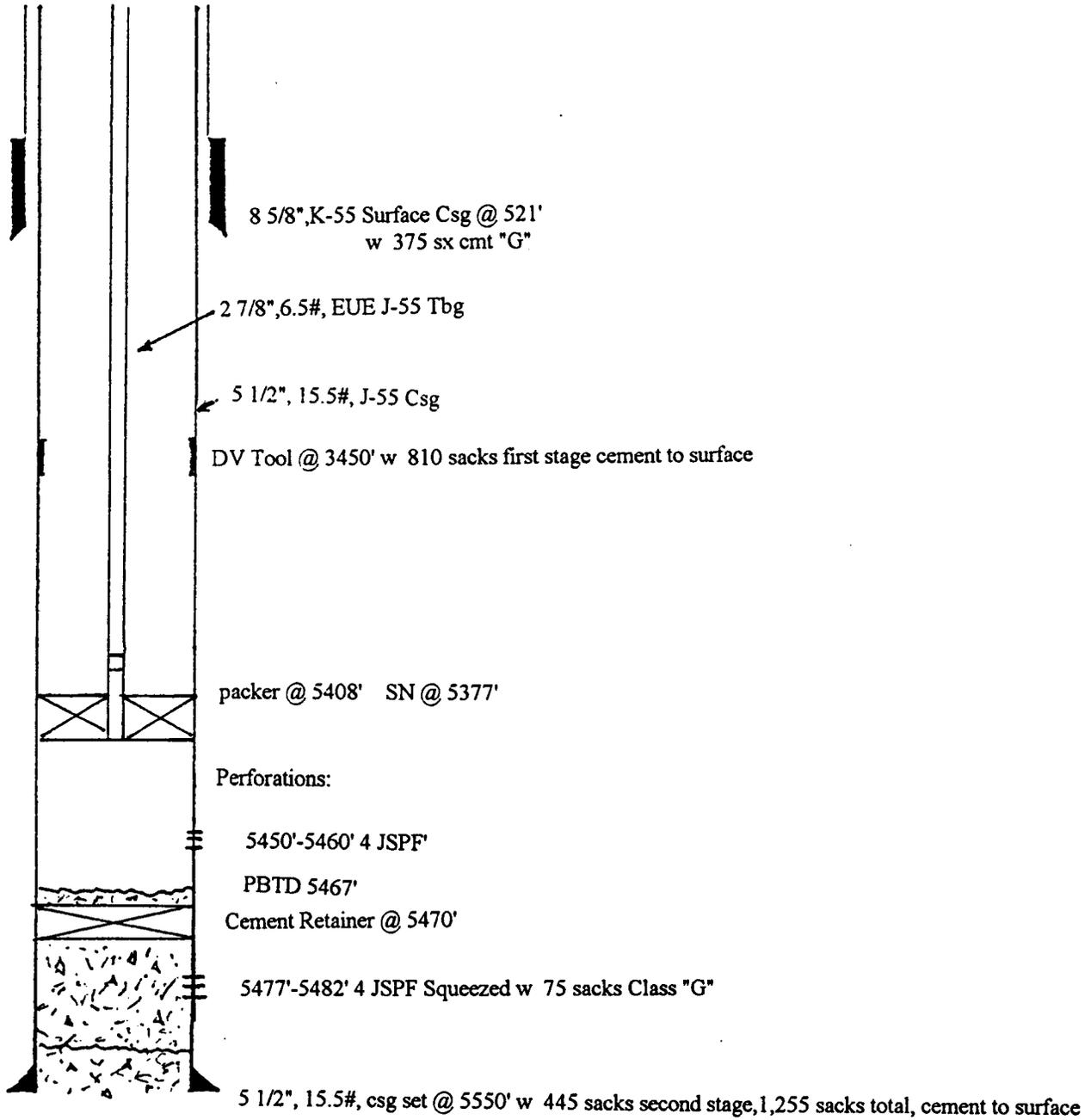
Depth	Size (in)	Wt. #/ft	Grade Thread	Burst (psi)	Collapse (psi)	Yield M#	Drift (in)	Capacity (bbls/ft)
Surf 5550'	5 1/2	15.5	K-55 STC	4810	4040	222	4.825	0.0238
Surf 5406'	2 7/8"	6.5	J-55 EUE	7260	7680	99.7	2.347	0.00579

# HARKEN SOUTHWEST CORPORATION

(formerly Chuska Energy Company)

## LIZARD 4 M

### Present wellbore Configuration



TD 5557'

**Lizard #4 M Plug and Abandonment**  
1,100' FSL & 160' FWL, Sec 4 - T41S - R23E  
San Juan County, Utah  
API 43-037-31619  
9/26/95 ROC

**P & A Procedures**

1. MIRU, Blow Down, hold safety meeting, ND wellhead, NU BOPs.
2. Unset packer and POH with 2 7/8" tubing and packer.
3. PU cement retainer and RIH on tbg to 5400'.
4. Set retainer at 5400', mix up and circulate Plug #1, 25 sacks (5.0 bbl) of Class "B" cement to the end of the tubing, sting into cmt retainer, pump cement thru retainer to squeeze Desert Creek perforations @ 5450'-5460'.
5. Pull off retainer and circulate 71 Bbls of 9.0 lb/gal mud from 5400' to 2400'.
6. Mix up and circulate Plug #2, 12 sacks (2.4 Bbl) of Class "B" cement to the end of the tubing, balance the plug from 2400' to 2275'.
7. Circulate 41 Bbls of 9.0 lb/gal mud from 2275' to 571'.
8. Mix up and circulate, Plug #3, 12 sacks (2.4 bbl) of Class "B" cement to the end of the tubing, balance the plug from 571' to 471'.
9. Circulate 10 bbls of 9.0lb/gal mud from 471' to 50'.
10. Mix up and circulate, Plug #4, 6 sacks ( 1.2 bbl) of Class"B" cement to surface while pulling out of the hole.
11. ND BOPs, cut off wellhead flange and csg 4' below ground level and install P&A surface marker.
12. Restore location.

**TOTAL CEMENT:**

Plug#1 25 sacks (100% excess)  
Plug#2 15 sacks  
Plug#3 12 sacks  
Plug#4 6 sacks

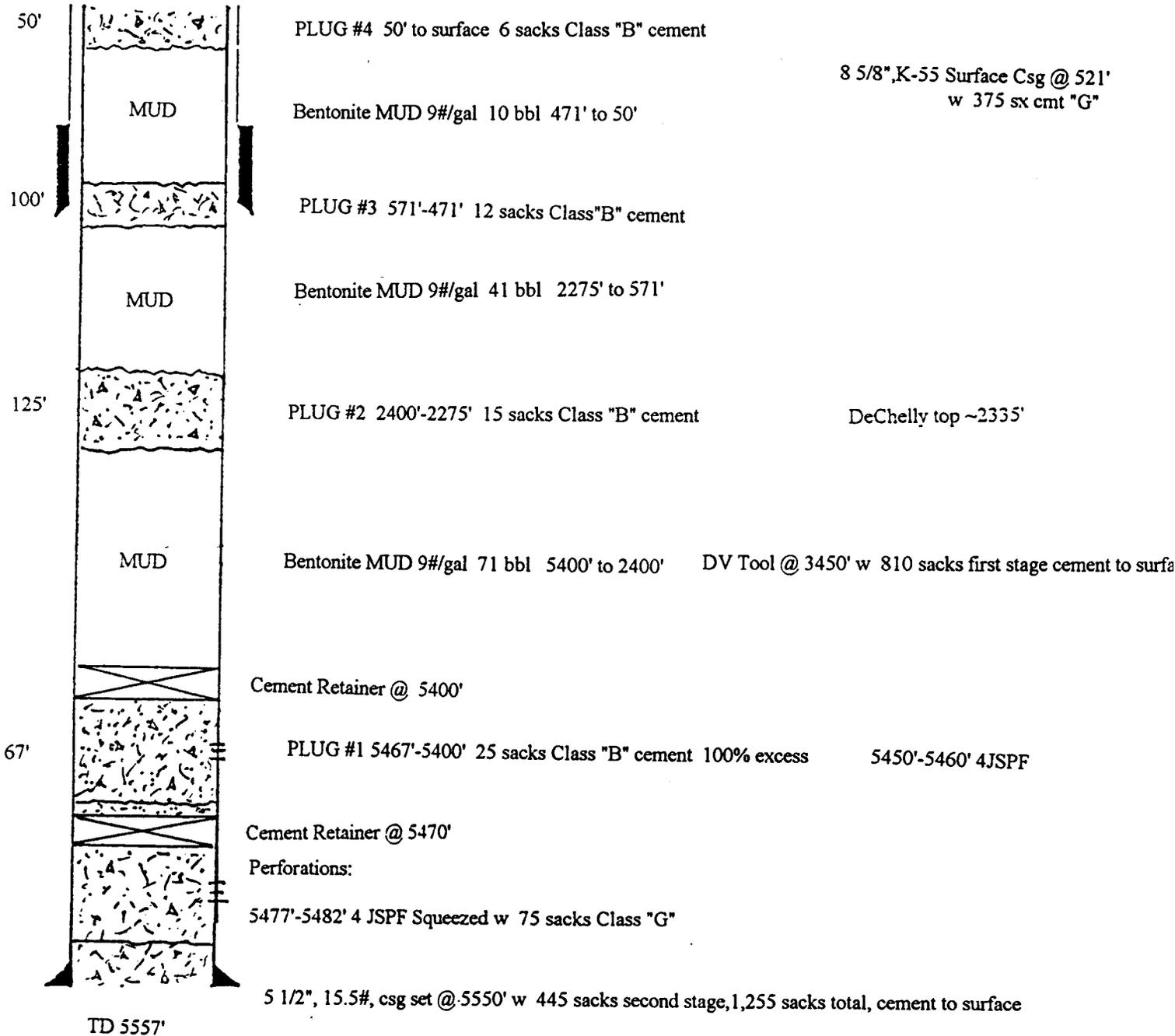
-----  
TOTAL 58 sacks

# HARKEN SOUTHWEST CORPORATION

(formerly Chuska Energy Company)

## LIZARD 4 M

### P&A Wellbore Configuration



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
Budget Bureau No. 1004-0135  
Expires: March 31, 1993

**SUNDRY NOTICES AND REPORTS ON WELLS**

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals

5. Lease Designation and Serial No.

NOG 8707-1240

6. If Indian, Allottee or Tribe Name

NAVAJO

7. If Unit or CA, Agreement Designation

8. Well Name and No.

LIZARD 4M

9. API Well No.

43-037-31619

10. Field and Pool, or Exploratory Area

11. County or Parish, State

SAN JUAN CO., UTAH

**SUBMIT IN TRIPLICATE**

1. Type of Well

Oil Well  Gas Well  Other

2. Name of Operator

HARKEN SOUTHWEST CORPORATION

3. Address and Telephone No.

P. O. BOX 612007 DALLAS, TX 75261-2007 214/753-6900

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

SEC 4-41S-23E (SW/SW)  
1100' FSL & 160' FWL

12. CHECK APPROPRIATE BOX(S) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

TYPE OF ACTION

- Notice of Intent
- Subsequent Report
- Final Abandonment Notice

- Abandonment
- Recompletion
- Plugging Back
- Casing Repair
- Altering Casing
- Other \_\_\_\_\_

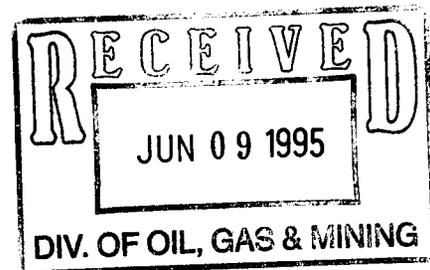
- Change of Plans
- New Construction
- Non-Routine Fracturing
- Water Shut-Off
- Conversion to Injection
- Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)\*

Harken Southwest anticipates plugging and abandonment of the subject wellbore by year-end.

CC: State of Utah  
Navajo Nation - Minerals Dept  
BIA - Gallup, NM



14. I hereby certify that the foregoing is true and correct

Signed

*Richard Montgomery*

Title PRODUCTION ADMINISTRATOR

Date 6/08/95

(This space for Federal or State office use)

Approved by

Conditions of approval, if any:

Title \_\_\_\_\_

Date \_\_\_\_\_

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
DIV OF OIL, GAS & MINING

FORM APPROVED  
Budget Bureau No. 1004-0135  
Expires: March 31, 1993

DEC 15 1995

**SUNDRY NOTICES AND REPORTS ON WELLS**

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals

5. Lease Designation and Serial No.

NOG 8707-1240

6. If Indian, Allottee or Tribe Name

Navajo

7. If Unit or CA, Agreement Designation

N/A

8. Well Name and No.

Lizard 4M

9. API Well No.

43-037-31619

10. Field and Pool, or Exploratory Area

11. County or Parish, State

San Juan, Utah

**SUBMIT IN TRIPLICATE**

1. Type of Well

Oil Well    Gas Well    Other Shut-In

2. Name of Operator

Harken Southwest Corporation

3. Address and Telephone No.

P.O. Box 612007, Dallas, Texas 75261      (214) 753-6900

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

SW/SW Sec. 4-41S-23E  
1100' FSL & 160' FWL

12. CHECK APPROPRIATE BOX(S) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION	
<input type="checkbox"/> Notice of Intent	<input checked="" type="checkbox"/> Abandonment	<input type="checkbox"/> Change of Plans
<input checked="" type="checkbox"/> Subsequent Report	<input type="checkbox"/> Recompletion	<input type="checkbox"/> New Construction
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Plugging Back	<input type="checkbox"/> Non-Routine Fracturing
	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> Water Shut-Off
	<input type="checkbox"/> Altering Casing	<input type="checkbox"/> Conversion to Injection
	<input type="checkbox"/> Other _____	<input type="checkbox"/> Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)\*

The subject well was plugged and abandoned as follows:

12/07/95 - RIH to 5385' KB and set retainer. Pump 9 sxs Class "B" cmt into retainer and placed 30 sxs cmt on top of retainer. **Plug #1** -5460-5114' KB (346'); covered Ismay top @ 5104' KB and squeezed perms @ 5460-5450'. Balanced **Plug #2** - 4322-4172' KB (150') - 17 sxs Cl "B" cmt; covered Hermosa top @ 4284'. Balanced **Plug #3** - 2390-2240' KB (150') - 17 sxs Cl "B" cmt; covered DeChelly top @ 2335'. Balanced **Plug #4** - 1327-1177' KB (150') - 17 sxs Cl "B" cmt; covered Chinle top @ 1263'. Balanced **Plug #5** - 586-436' KB (150') - 17 sxs Cl "B" cmt; covered surface csg shoe @ 521'. **Plug #6** - 50' surface w/ 10 sxs cmt.

**NOTE:** BLM (Farmington Dist) representative Ron Snow on location. Any deviation from original procedures were required or authorized by BLM rep.

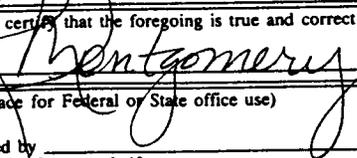
12/08/95 - Cut off csg and tbg heads. Installed subsurface P&A marker 3' below GL.

**LIZARD 4M PERMANENTLY ABANDONED 12/08/95**

CC: State of Utah  
Navajo Nation  
BIA - Gallup, NM

I hereby certify that the foregoing is true and correct

Signed



Title Production Administrator

Date 12/11/95

(This space for Federal or State office use)

Approved by \_\_\_\_\_  
Conditions of approval, if any:

Title \_\_\_\_\_

Date \_\_\_\_\_

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

1995 - 5 1995

FORM APPROVED  
Budget Bureau No. 1004-0135  
Expires: March 31, 1993

**SUNDRY NOTICES AND REPORTS ON WELLS**

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals

**SUBMIT IN TRIPLICATE**

1. Type of Well <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other	5. Lease Designation and Serial No. NOG 8707-1240
2. Name of Operator Harken Southwest Corporation	6. If Indian, Allottee or Tribe Name Navajo
3. Address and Telephone No. P.O. Box 612007   Dallas, Texas 75261-2007   (214) 753-6900	7. If Unit or CA, Agreement Designation N/A
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) SW/SW Section 4 - 41S - 23E 1100' FSL & 160' FWL	8. Well Name and No. Lizard 4M
	9. API Well No. 43-037-31619
	10. Field and Pool, or Exploratory Area
	11. County or Parish, State San Juan Co., Utah

12. CHECK APPROPRIATE BOX(S) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION
<input type="checkbox"/> Notice of Intent	<input type="checkbox"/> Abandonment
<input checked="" type="checkbox"/> Subsequent Report	<input type="checkbox"/> Recompletion
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Plugging Back
	<input type="checkbox"/> Casing Repair
	<input type="checkbox"/> Altering Casing
	<input checked="" type="checkbox"/> Other <u>Surface Restoration</u>
	<input type="checkbox"/> Change of Plans
	<input type="checkbox"/> New Construction
	<input type="checkbox"/> Non-Routine Fracturing
	<input type="checkbox"/> Water Shut-Off
	<input type="checkbox"/> Conversion to Injection
	<input type="checkbox"/> Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)\*

The subject well was plugged and abandoned on December 8, 1995. Following well plugging, surface rehabilitation operations and locatiob reseeding operations were concluded on January 4, 1996. Verbal reseeding notification was given to Don Ellsworth, BLM, on December 1, 1995. Required surface restoration stipulations are complete.

CC: State of Utah  
Navajo Nation  
BIA - Gallup

Attachments: 3

14. I hereby certify that the foregoing is true and correct

Signed [Signature] Title Operations Manager Date February 1, 1996

(This space for Federal or State office use)

Approved by \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_  
Conditions of approval, if any:



# United States Department of the Interior

## BUREAU OF LAND MANAGEMENT

Farmington District Office  
1235 La Plata Highway  
Farmington, New Mexico 87401

cc: R. Cottle

IN REPLY REFER TO:  
3162.3-4 (07600)  
NOG-8707-1146 NOG-8707-1240; NOG-8708-1033  
NOG-8707-1216 NOG-8707-1169 (WC)

007-1 0 1005

Harken Southwest Corp.  
Attn: R. Montgomery  
P.O. Box 612007  
Dallas, TX 75261

Dear Ms. Montgomery:

The following surface rehabilitation stipulations must be complied with as applicable, before wells in San Juan County, nos.

Well No. & Name	Lease No.	Footages	S	T	R	
1. 1 Beclabito 3	NOG-8707-1146	1695' FNL/1980 FEL	13	30N	21W	NM
2. 4M-Lizard	NOG-8707-1240	1100' FSL/160' FWL	4	41S	23E	UT
3. 2 Navajo Tribal 42	NOG-8308-1033	2140' FNL/590' FEL	2	42S	24E	UT
4. 33-0 Clay Hill	NOG-8707-1216	370' FSL/1750' FEL	33	41S	25E	UT
5. 2 Tower 1 I	NOG-8707-1169	1940' FSL/689' FEL	1	40S	25E	UT

can be approved for final abandonment (see 43 CFR 3162.3-4).

1. A permanent monument must be cemented in the wellbore. It must be labeled with the operators name, well name and number, legal location and lease number (see CFR 3162.6).
2. All fences, production equipment, purchaser's equipment, concrete slabs, deadman (anchors), flowlines, risers, debris and trash must be removed from the location.
3. Production pits will be closed according to the Unlined Surface Impoundment Closure Guidelines, as approved in the Environmental Assessment of December 1993. Any oil stained soils may be remediated on-site according to these guidelines or disposed of in an approved disposal facility.
4. Pads must be leveled, dressed up by a maintainer, ripped and disked. The edge of the pads will be shaped to conform to the natural terrain.
5. Access roads must be leveled, waterbarred, ripped, disked and blocked off with earthen berms at the junction with the main road and at the entrance to the well pad. Waterbars should be spaced as shown below:

<i>% Slopes</i>	<i>Spacing Interval</i>
Less than 2%	200'
2 to 5%	150'
6 to 9 %	100'
10 to 15%	50'
Greater than 15%	30"

All water bars should divert water to the downhill side of the road.

6. All disturbed areas will be seeded between July 1 and September 15 with the prescribed seed mix (reseeding may be required).

7. Notify Surfacing Managing Agency (SMA) seven (7) days prior to seeding so they may be present for that option.

Other SMA's may vary slightly in their restoration requirements. It is your responsibility, as the operator, to obtain surface restoration requirements from other SMA's. We need to be provided with a copy of these requirements. Any problems concerning stipulations received from other SMA's should be brought to us.

On private land, we should be provided with a letter from the fee owner stating that the surface restoration is satisfactory.

If the surface restoration has not yet been completed, notify us by Sundry Notice upon completion. We will schedule an inspection to check the well site after we receive notice from you that the vegetation has become established.

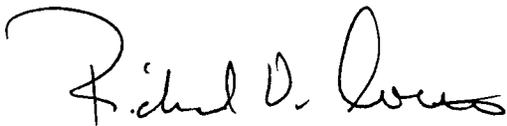
If you have any questions, please contact the Environmental Compliance Staff at (505) 599-8900.

Sincerely,



Don W. Ellsworth  
Senior Technical Specialist  
Environmental Compliance

*All work is complete*



*1-4-96*

Post-It® Fax Note	7671	Date	1/25/96	# of pages	2
To	Riel Cattle	From	Jeery Ayers		
Co./Dept	Hartke SW	Co.	BWR		
Phone #		Phone	970 565-0143		
Fax #	(505) 327-5495	Fax #	970 565-0672		

OUTWEST FERT INC.  
 3240 O.R. 9  
 DALORES, CO. 81323  
 (303) 565-8702

SEED CONSULTING SERVICE

SPECIES / VARIETY	LOT #	ORIG	PURE	INCR	CROP	NEED	R/W	NOX	GERM	PLS %	DATE	PLS lbs	BULA #	% OF MIX
GRASS W: ALKAL SACATON VNS	05003	19	93.14	5.94	0.18	0.74	4F	NF	82.00	75.17	11/22/95	2.00	2.62	14.29
GRASS W: VAOPS ED SAND	05034	1X	93.17	6.96	0.01	0.01	NF	NF	88.00	81.95	12/15/95	2.00	2.44	14.29
SHRUB: SHADSCAPE VNS	04586	MT	98.30	1.67	0.02	0.01	NF	NF	54.00	51.08	03/15/95	4.00	7.54	28.57
SHRUB: FOUR WING SALT BUSH NM	04355	NM	95.80	4.16	0.04	0.00	NF	NF	63.00	60.35	04/14/95	6.00	9.94	42.86
												14	22.54	100.00

065040 BWR-LIZARD MIX

DATE IS 12/18/95  
 TIME IC 13:43:26

FOUR CORNERS AREA U.S.A.  
WELL DATA CARD

WELL NAME: Lizard 4-M

DESCRIPTIVE LOCATION: SE SE Section 4, T41S, R23E

Operator: Chuska Energy Company  
 Well Category: Exploratory Field: \_\_\_\_\_  
 Footings: 1100' FSL, 160' FWL  
 Seismic S.P./Line: St.205; 80'N & 10'E of St. 205, Line 600-6  
 Elevations: 4497' G.L. 4510' K.B.  
 County: San Juan State: Utah  
 Rig: Four States Drlg Rig #1 Spud Date: 9/4/91  
 Release Date: 9/19/91 TD: 5558'  
 Well Status: Suspended

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Formation Tops:

Age	Group/Formation	Depths		Thickness (ft)
		Drilling (ft)	Subsea (ft)	
Triassic	Navajo	535	3975	731
	Chinle	1266	3244	1069
Permian	DeChelly	2335	2175	114
	Organ Rock	2449	2061	741
	Cedar Mesa	3190	1320	1092
Penn.	Hermosa	4282	228	882
	Upper Ismay	5164	- 654	117
	Hovenweep Sh.	5281	- 771	5
	Lower Ismay	5286	- 776	32
	Gothic	5318	- 808	20
	Desert Creek	5338	- 828	163
	Chimney Rock Sh.	5501	- 991	15
	Akah	5516	-1006	

-----  
EVALUATION:

CORES:

<u>Formation</u>	<u>Number</u>	<u>Interval</u>	<u>Cut</u>	<u>Rec. Log</u>	<u>Correlation</u>
Desert Creek	#1	5381-5386'	5'/5'	5379-5384'	
Desert Creek	#2	5386-5346'	60'/59.5'		5384-5344'

WIRELINE LOGS:

<u>Log</u>	<u>Interval</u>	<u>Log</u>	<u>Interval</u>
BHC-Sonic	5550-517'	CNL-FDC	5555-4000'
GR	5550-517'	Litho Density	
DLL-Micro	5543-4000'		

WELL DATA CARD

Page Two

Well Name: Lizard 4-M

FORMATION TESTS:

No.	Type	Interval	Formation	Flow Time	S.I. Time	Bottom Gauge IP/FP	Fluid	Ck	Remarks
1	CH	5477-82'	D.C.	Swab Tst		Total 28 Runs			100% Water
2	CH	5450-5460'	D.C.	Swab Tst		Five Days			100% Water
3	CH								

ENGINEERING DATA:

<u>Casing Size</u>	<u>Shoe Depth</u>	<u>Perforations Formation</u>	<u>Interval</u>	<u>SPF</u>
8 5/8"	517'	Desert Creek	5477-82'	4
5 1/2"	5557'	Desert Creek	5450-5460'	4

Formation Treatment:

<u>Type</u>	<u>Volume (gal)</u>	<u>Formation</u>
28% HCL	700	D.C. - 5477-82'
28% HCL	1500	D.C. - 5450-5460'

SUMMARY:

FOUR CORNERS AREA U.S.A.  
WELL DATA CARD

WELL NAME: Lizard 4-M

The Chuska Lizard 4-M well was drilled just east of the Gothic Mesa Field to test a Desert Creek anomaly. The top of the Desert Creek was prognosed at -848' subsea.

The top of the Desert Creek was encountered 20 feet high at -828'. There was a double mound sequence which produced an anomalously thick Desert Creek carbonate section of 123 feet.

The Lizard 4-M well was continuously cored throughout all but the uppermost 6 ft. of the Desert Creek section between 5381-5504 feet (log depth 5378-5501 feet). Beneath the Desert Creek Anhydrite, microcrystalline to cryptocrystalline, medium to dark brown dolomite were recovered in the upper 3.3 feet of core. A few fossils, including gastropods, indicate very shallow-water, slightly salinity-restricted low energy depositional conditions. This interval was completely anhydrite-plugged such that no visible porosity, stain or fluorescence was seen. The core next encountered 6.5 feet of dark gray, argillaceous dolomitic mudstone with extensive trace fossil and burrow development. No calcareous megafossils were seen except for a few thin-shelled brachiopods in black shaly sediments in the lowermost 0.5 feet. No visible porosity or staining were seen in the low energy, restricted subtidal facies.

The first zone of visible porosity occurred between C.D. 5392.8 - 5396.8' (4.0 ft.) where medium brown dolomitic packstones to grainstone exhibited measured porosities between 18.5 - 18.8% and permeabilities between 25.7 - 57.4 md in two plug analyses. However, no visible staining or fluorescence in the cores agreed with the absence of measurable oil saturation. Depositionally, this porous dolomite probably represent a moderate to high energy skeletal and peloidal accumulation capping a phylloid mound. The core then encountered 15 feet of upper Desert Creek phylloid algal mound between C.D. 5396.8 - 5411.9 ft. Preservation of phylloid algal plates within this very slightly dolomitized buildup is excellent. However, porosity and permeability were quite variable in the six plug samples analyzed, ranging from 4.5 - 13.7% (avg. - 8.4%) and 0.035 - 75.2 md. Porosity consists of small patches of primary shelter space between algal plates and very minor solution vugs. Unfortunately, most primary porosity has been plugged with white anhydrite and it exhibits poor oil saturation. Beneath the limestone mound section are alternating beds of tight dark gray to black, argillaceous, fossiliferous limestones and finely crystalline dolomitic wackestones to packstones with nodular anhydrite through a 37.4 ft. interval (C.D. = 5411.9 - 5449.3 ft.).

Post Well Audit

Lizard 4-M

Page 2

The Lizard well encountered a lower phylloid algal mound interval at 5449.3 ft. which exhibited very tight, anhydrite-plugging limestones (porosities ranged from 3.8 - 6.3% and permeabilities from 0.030 - 0.064 md in three plugs) to 5456.0 ft. Modest reservoir character was, however, present in the next 8.5 ft. (C.D. = 5456.0 - 5464.5 ft.) where porosities range from 6.0 - 11.8% (avg. = 8.6%) and permeabilities from 0.219 - 42.9 md in seven samples. Oil visually appeared to be in this system as confirmed by low water and reasonable oil measured saturations.

Visual porosity types included dissolution vugs, phylloid algal shelter pores and some intercrystalline pores. The attached diagram (entitled "The Rotten Core" Model) is an attempt to depict the two levels of phylloid algal mound development in which only a thin interval of the lower mound exhibits solution-enlarged porosity. We were impressed by the location of dissolution porosity beneath tight undissolved limestones, but felt that the origin of the aggressive, undersaturated dissolving fluids must have come from above the mounds. Therefore, we expect that dissolution vugs should be prevalent within a thicker mound core. The testing program for the Lizard well was predicated on the hypotheses that (1) the separate mounds encountered in the well were tongues of a thick stacked mound complex nearby, and that (2) anhydrite plugging would decrease within that thick mound core. In other words, we felt that with proper stimulation, the Lizard borehole might connect into a thicker mound core reservoir.

To that end, pipe was set and a stimulation program planned. A zone in the lower dolomites below the basal mound was tested first (5477-82'). Following treatment, the well swabbed 100% water after all treatment fluids were recovered.

We then came up to the mound zone (5450-60') that had exhibited porosity and permeability; that is, the zone we anticipated was laterally connected to a more porous and permeable "mound core".

Extensive swab testing was conducted for five days with only water being recovered. The well was shut-in awaiting further evaluation. It is difficult to accept that with the shows we had in zone (5450-60') there would not have been some oil or at least a show in the recovery. The concern is communication with the lower dolomite zone (5477-82'). In fact, the lower zone should have been left alone. Log and core analysis indicate a wet zone from this zone which has historically been a questionable producer.





**CORE LABORATORIES**

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**CORE ANALYSIS REPORT**

**for**

**Chuska Energy Company**

**Lizard No. 4-M Well**

**Wildcat**

**San Juan County, Utah**

**File Number: 57121-91CHU091**



September 26, 1991

Chuska Energy Company  
1775 Sherman Street, Suite 1880  
Denver, CO 80203

Attn: Mr. Herb Mosca

*Subject:*

*Core Analysis Project*

*Lizard No. 4-M Well*

*Wildcat*

*San Juan County, Utah*

*File Number: 57121-91CHU091*

Gentlemen:

Core Laboratories was requested to analyze core material obtained from the subject well. The following analyses were performed:

1. CMS-300 Plug Analysis -- Permeability and Porosity
2. Summation of Fluids -- Saturations
3. Spectral Gamma Ray Log

The results of these tests are presented in tabular and graphic formats within this report. Guidebands on the permeability-porosity crossplot represent three standard deviations. Laboratory test conditions have been included to better assist you in your evaluation of this data.

The objectives of the basic core analysis were to define permeability, porosity, grain density, residual fluids, gamma activity and the vertical variations of these properties for reservoir characterization. Additionally, the information provided by the core analysis was to be utilized for calibration and/or improved interpretation from downhole logs and for storage capacity and flow capacity of the interval represented. Recommendations for additional analysis have been included to assist you in further characterizing your reservoir.

Thank you for the opportunity to perform these tests for Chuska Energy Company. Should you have any questions pertaining to these test results or if we may be of further assistance, please contact us at (303) 751-9334.

Sincerely,

Phillip C. Dowling  
Laboratory Coordinator

PCD/tb

### Additional Testing Recommendations

Upon review of conventional core analyses results, the following special core analysis tests are recommended for further reservoir evaluation:

- 1) It is recommended that the mineralogy of a select group of samples be determined through Mineralog<sup>™</sup> and/or petrographic analyses to identify any problematic minerals which may be present. In addition, the abundances of the individual clay minerals can be provided by X-ray diffraction. Scanning electron microscopy will assist in defining the relative position of any deleterious minerals within the pore system to ascertain potential completion and/or production problems.
- 2) For an independent assessment of reservoir water saturation values, it is recommended that capillary pressure determinations be performed on a representative group of samples. Capillary pressure results will help define the distribution of hydrocarbons in the subsurface by characterizing the hydrocarbon column as a function of height above the free water level, as defined in the literature ( $P_c = 0$ ). Information may also be developed concerning seal and barrier rock capacity, secondary migration and entrapment, and up-dip and down-dip limits of hydrocarbon accumulation, all useful in field development.
- 3) Waterflood tests, in which actual reservoir water-oil viscosity ratios are matched in the laboratory, are recommended to provide accurate values of residual oil saturations. In order to define any possible relationship between rock wettability and laboratory oil production, as determined through waterflood tests, we recommend aging several core samples in reservoir crude under reservoir temperature conditions prior to testing. It has been well established in the literature that the wettability of a core will strongly affect its waterflood behavior, specifically the residual oil saturation. Relative permeability analyses will provide incremental fluid saturation versus relative fluid permeability values, as well as initial and terminal fluid saturation parameters.
- 4) Critical velocity analyses are recommended in order to determine optimum flow rates for production and injection, and to assess the potential for reservoir damage due to excessive rates of flow.

**Additional Testing Recommendations (Continued)**

5) Formation resistivity analyses are recommended for definition of "a", "m", and "n" parameters, which are used in the equation to calculate formation water saturations from downhole log response. Values are obtained at simulated reservoir stress conditions.

6) Rock (pore volume) compressibility analyses are recommended in order to compute pore volume reduction during pressure depletion of a reservoir.

Please contact us at (303) 751-9334 for additional information or to discuss any of the above recommendations.

CORE MEASUREMENT SYSTEM (CMS) - 300

- $K_{\infty}$  = Equivalent non-reactive liquid permeability determined by the CMS at up to eight designated net overburden confining stresses. This is an improved flow capacity indicator as gas slippage effects present at low laboratory pore pressure (and not in the reservoir) have been eliminated.
- $K_{\text{air}}$  = An estimated air permeability approximating historically furnished core analysis permeability. (This is an optimistic value. Low pore pressures in historical laboratory measurements result in gas slippage not present at reservoir conditions, and hence high permeability values.)
- b = A term dependent on (1) pore geometry and (2) gas utilized in the permeability measurement that links  $K_{\infty}$  and  $K_{\text{air}}$  as follows:

$$K_{\text{air}} = K_{\infty} \left( 1 + \frac{b_{\text{air}}}{P_{\text{mean}}} \right)$$

- $P_{\text{mean}}$  = The mean pore pressure which is equivalent to the average of the upstream and downstream pressure of the core being tested. This value is lower in a typical laboratory determination than in the reservoir.
- Beta = Forchheimer inertial term, needed to account for lost flow rate due to gas inertial and/or kinetic effects as gas flows through rock pores.

## CORE LABORATORIES

Company : Chuska Energy Company  
 Well : Lizard No.4-M  
 Location : Sec.4 T40S R23E  
 Co,State : San Juan, Utah

Field : Wildcat  
 Formation : Desert Creek  
 Coring Fluid : LSND  
 Elevation : 4497'GL 4510'KB

File No.: 57121-91chu091  
 Date : 25-Sep-1991  
 API No. :  
 Analysts: SM DW MW PD

### CORE ANALYSIS RESULTS (HYDROSTATIC CONFINEMENT)

SAMPLE NUMBER	DEPTH ft	NET OVERBURDEN (800 psi)			POROSITY (HELIUM) %	SATURATION		GRAIN DENSITY gm/cc	DESCRIPTION
		K <sub>∞</sub>	K <sub>air</sub>	b(He)		(PORE VOLUME)			
		md	md	psi		OIL %	WATER %		
Core No.1 Desert Creek 5381.0'-5386.0' Cut 5.0' Recovered 5.0'									
	5381.0- 86.0								Do1 - Not analysed by request
Core No.2 Desert Creek 5386.0'-5446.0' Cut 60.0' Recovered 59.5'									
	5386.0- 93.0								Do1 - Not analysed by request
1	5393.0- 94.0	23.3	25.7	4.58	18.5	0.0	83.2	2.83	Do1 brn m xln sli sucrl calc pp vugs
2	5394.0- 95.0	52.1	57.4	4.33	18.8	0.0	95.8	2.85	Do1 brn m xln sli sucrl calc pp vugs
	5395.0- 96.0								Do1 - Not analysed by request
3	5396.0- 97.0	0.021	0.035	49.59	5.2	0.0	66.0	2.75	Ls bu f xln pp vugs anhy mrl
	5397.0- 00.0								Ls - Not analysed by request
4	5400.0- 01.0	0.143	0.191	21.21	4.5	0.0	57.5	2.73	Ls bu f xln vug anhy mrl
	5401.0- 03.0								Ls - Not analysed by request
5	5403.0- 04.0	3.31	4.09	11.94	7.6	0.4	3.9	2.78	Ls bu mrl anhy vug
	5404.0- 05.0								Ls - Not analysed by request
6	5405.0- 06.0	57.8	75.2	12.77	10.6	0.2	55.8	2.78	Ls bu mrl anhy vug
	5406.0- 08.0								Ls - Not analysed by request
7	5408.0- 09.0	0.065	0.094	29.95	8.6	0.0	65.1	2.70	Ls tn-bu f xln vug
8	5409.0- 10.0	0.994	1.33	18.93	13.7	0.0	49.6	2.70	Ls tn-bu f xln v vug
	5410.0- 18.0								Ls - Not analysed by request
	5418.0- 25.0								Do1 - Not analysed by request
9	5425.0- 26.0	0.038	0.045	12.87	13.7	0.0	67.0	2.69	Ls tn-bu f xln pp vug
	5426.0- 27.0								Do1 - Not analysed by request

# CORE LABORATORIES

Company : Chuska Energy Company  
Well : Lizard No.4-M

Field : Wildcat  
Formation : Desert Creek

File No.: 57121-91chu091  
Date : 25-Sep-1991

## CORE ANALYSIS RESULTS (HYDROSTATIC CONFINEMENT)

SAMPLE NUMBER	DEPTH ft	NET OVERBURDEN (800 psi)			POROSITY (HELIUM) %	SATURATION		GRAIN DENSITY gm/cc	DESCRIPTION
		K <sub>∞</sub>	K <sub>air</sub>	b(He)		(PORE VOLUME)			
		md	md	psi		OIL %	WATER %		
10	5427.0- 28.0	0.004	0.009	92.15	5.1	0.0	34.6	2.68	Ls lt brn vf xln pp vug
	5428.0- 29.0								Dol - Not analysed by request
11	5429.0- 30.0	<.001	<.001		4.0	0.0	12.5	2.68	Ls lt brn vf xln pp vug
	5430.0- 31.0								Ls - Not analysed by request
12	5431.0- 32.0	0.023	0.044	66.24	9.4	0.0	28.7	2.70	Ls brn vf xln pp vug
	5432.0- 45.5								Ls - Not analysed by request
	5445.5- 46.0								Lost core
Core No.3 Desert Creek 5446.0'-5506.0' Cut 60.0' Recovered 60.0'									
	5446.0- 47.0								Dol - Not analysed by request
13	5447.0- 48.0	0.006	0.011	82.44	4.6	0.0	80.8	2.79	Ls dk brn vf xln sli dol
	5448.0- 50.0								Dol & Ls - Not analysed by request
14	5450.0- 51.0	0.019	0.030	42.43	3.8	0.0	10.4	2.71	Ls lt gry vf xln
	5451.0- 53.4								Ls - Not analysed by request
15	5453.4- 54.2	0.008	0.017	84.96	5.8	13.3	32.0	2.70	Ls lt gry vf xln foss por
	5454.2- 56.0								Ls - Not analysed by request
16	5456.0- 56.5	0.048	0.064	22.74	6.3	10.7	26.2	2.70	Ls lt gry vf xln vug foss
17	5456.5- 57.0	11.5	17.3	23.74	11.6	9.6	21.4	2.75	Ls lt gry vf xln v vug foss
	5457.0- 58.0								Ls - Not analysed by request
18	5458.0- 59.0	31.0	42.9	16.90	11.8	6.1	34.7	2.70	Ls lt gry f xln v vug
	5459.0- 60.0								Ls - Not analysed by request
19	5460.0- 60.5	0.025	0.044	54.68	6.1	10.2	24.5	2.71	Ls lt gry vf xln vug
20	5460.5- 61.0	10.6	13.1	11.46	10.7	6.3	15.2	2.73	Ls lt gry vf xln v vug
21	5461.0- 62.0	0.139	0.219	37.03	7.6	11.1	41.4	2.75	Ls lt gry vf xln v vug
22	5462.0- 63.0	0.953	1.11	8.92	6.0	7.8	18.7	2.73	Ls lt gry vf xln vug
23	5463.0- 64.0	0.359	0.480	20.24	6.7	10.1	8.6	2.75	Ls lt gry vf xln vug
24	5464.0- 65.0	0.026	0.040	39.43	5.5	11.3	19.4	2.70	Ls lt gry vf xln pp vug

# CORE LABORATORIES

Company : Chuska Energy Company  
Well : Lizard No.4-M

Field : Wildcat  
Formation : Desert Creek

File No.: 57121-91chu091  
Date : 25-Sep-1991

## CORE ANALYSIS RESULTS

### (HYDROSTATIC CONFINEMENT)

SAMPLE NUMBER	DEPTH ft	NET OVERBURDEN (800 psi)			POROSITY (HELIUM) %	SATURATION		GRAIN DENSITY gm/cc	DESCRIPTION
		K <sub>o</sub>	K <sub>air</sub>	b(He)		(PORE VOLUME)			
		md	md	psi		OIL %	WATER %		
25	5465.0- 66.0	<.001	<.001		2.4	0.0	17.8	2.71	Ls lt gry vf xln
	5466.0- 68.0								Ls & Dol - Not analysed by request
26	5468.0- 69.0	0.028	0.054	69.08	12.5	0.0	87.0	2.77	Dol brn f xln styl
	5469.0- 70.0								Ls - Not analysed by request
27	5470.0- 71.0	0.002	0.006	169.31	2.6	0.0	81.6	2.72	Ls brn f xln foss
	5471.0- 74.0								Ls - Not analysed by request
28	5474.0- 75.0	<.001	<.001		2.0	0.0	40.6	2.74	Ls brn f xln foss
	5475.0- 82.0								Ls & Sh - Not analysed by request
29	5482.0- 83.0	0.459	0.578	15.18	15.5	4.4	69.4	2.79	
	5483.0- 84.0								Dol, Ls & Sh - Not analysed by request
30	5484.0- 85.0	1.06	1.51	23.61	16.6	7.0	60.4	2.81	
31	5485.0- 86.0	0.161	0.252	35.97	9.6	7.2	56.2	2.81	
	5486.0- 94.0								Dol, Ls & Sh - Not analysed by request
	5495.0- 06.0								Sh - Not analysed by request

# CORE LABORATORIES

Company : Chuska Energy Company  
Well : Lizard No.4-M

Field : Wildcat  
Formation : Desert Creek

File No.: 57121-91chu091  
Date : 25-Sep-1991

## ANALYTICAL PROCEDURES AND QUALITY ASSURANCE

### HANDLING & CLEANING

Core Transportation : Core Lab Rep / Hotshot  
Solvent : Toluene  
Extraction Equipment : Centrifuge  
Extraction Time : 12 Hours  
Drying Equipment : Vacuum Oven  
Drying Time : 6 Hours  
Drying Temperature : 185 Degrees Fahrenheit

### ANALYSIS

Grain volume measured by Boyle's Law in a matrix cup using He  
Bulk volume measured by calipering  
Fluid saturations by retort  
Permeabilities measured on 1.0 in. diameter drilled plugs  
Core Gamma Spectral

### REMARKS

The cores were retrieved by a Core Laboratories' Field Representative and transported to the Aurora, Colorado lab by Monarch Hot Shot Service and a Core Lab Rep. 31 one-inch diameter plugs were selected by Peter Moreland of Chuska Energy. The plugs were cleaned in a centrifuge, using toluene as a solvent, for 12 hours. The plugs were then dried in a vacuum oven for six hours. Two full-diameter samples were preserved with CoreSeal for possible later analysis. The cores were picked up by Triple-0 Slabbing.

Note: Cleaning and drying times were abbreviated from Core Laboratories' standard procedures due to the urgency of data requirements.

# CORE LABORATORIES

Company : Chuska Energy Company  
Well : Lizard No.4-M

Field : Wildcat  
Formation : DESERT CREEK

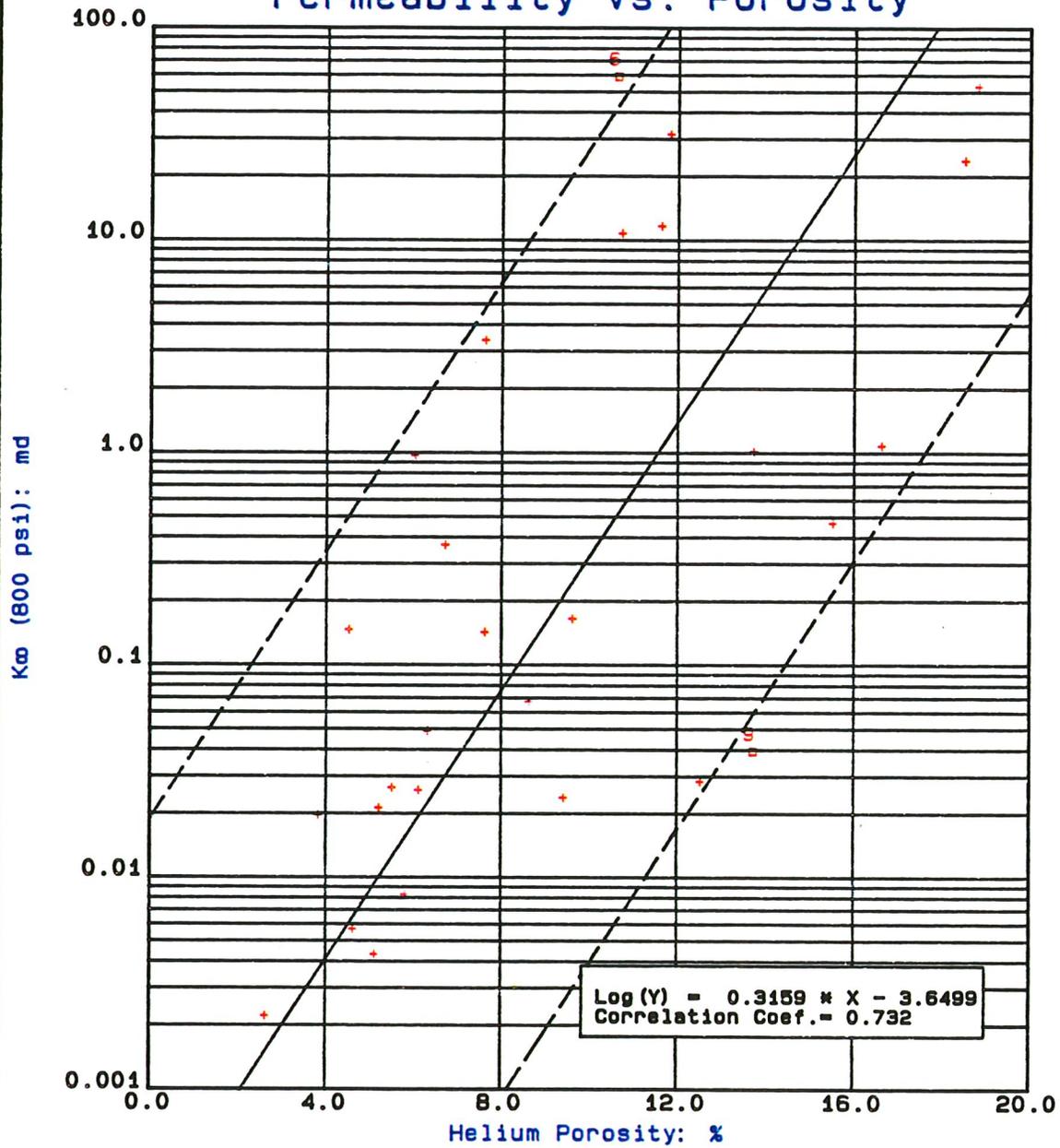
File No.: 57121-91chu091  
Date : 25-Sep-1991

## TABLE I

### SUMMARY OF CORE DATA

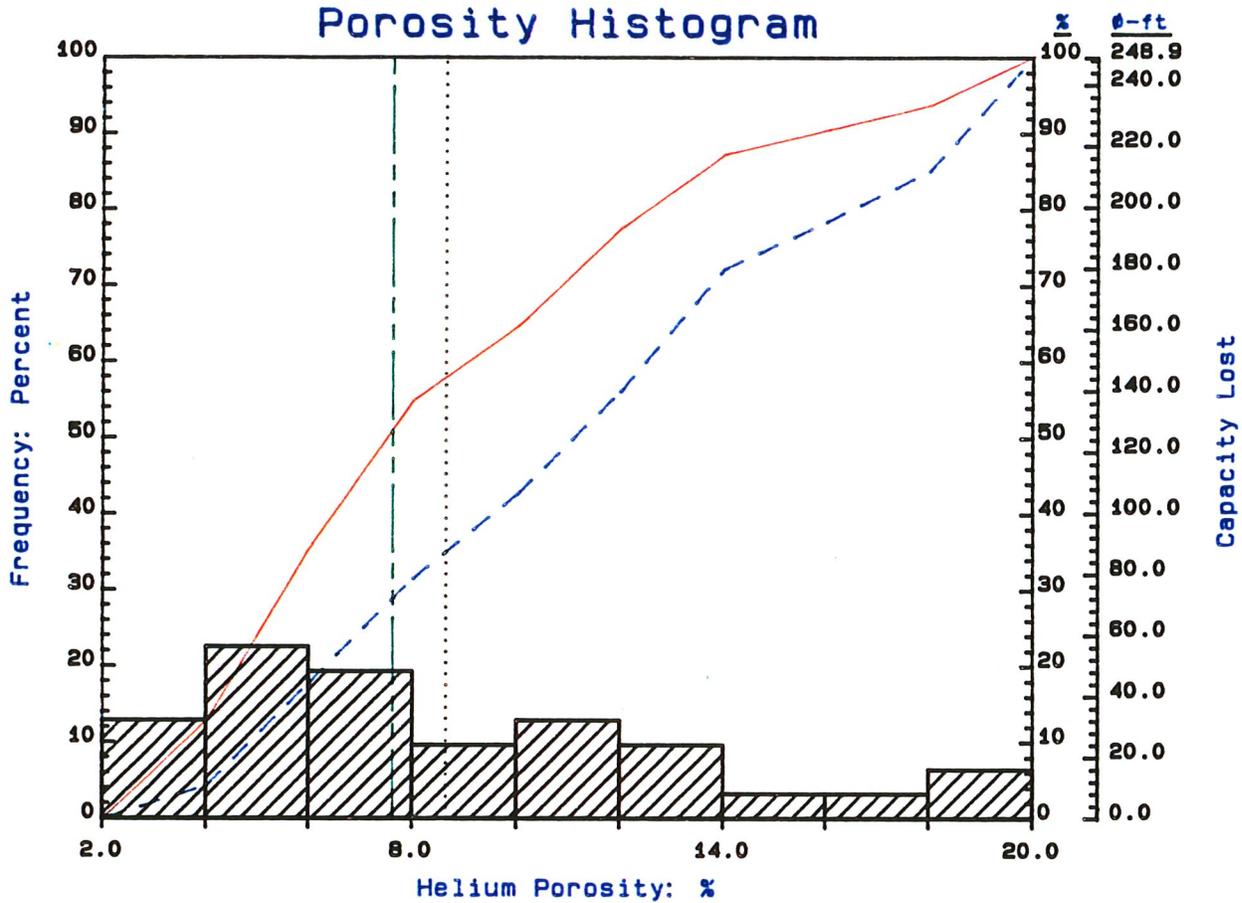
ZONE AND CUTOFF DATA	CHARACTERISTICS REMAINING AFTER CUTOFFS	
<b>ZONE:</b>	<b>ZONE:</b>	<b>PERMEABILITY:</b>
Identification ----- Desert Creek	Number of Samples ----- 31	Flow Capacity ----- 183.0 md-ft
Top Depth ----- 5393.0 ft	Thickness Represented - 28.8 ft	Arithmetic Average ---- 6.35 md
Bottom Depth ----- 5486.0 ft		Geometric Average ----- 0.120 md
Number of Samples ----- 31	<b>POROSITY:</b>	Harmonic Average ----- 0.004 md
	Storage Capacity ----- 248.9 $\phi$ -ft	Minimum ----- 0.001 md
<b>DATA TYPE:</b>	Arithmetic Average ---- 8.6 %	Maximum ----- 57.8 md
Porosity ----- (HELIUM)	Minimum ----- 2.0 %	Median ----- 0.065 md
Permeability ----- K <sub>w</sub> (800 psi)	Maximum ----- 18.8 %	Standard Dev. (Geom) -- K-10 $\pm$ 1.493 md
	Median ----- 7.6 %	
<b>CUTOFFS:</b>	Standard Deviation ---- $\pm$ 4.7 %	<b>HETEROGENEITY (Permeability):</b>
Porosity (Minimum) ----- 0.0 %		Dykstra-Parsons Var. -- 0.961
Porosity (Maximum) ----- 100.0 %	<b>GRAIN DENSITY:</b>	Lorenz Coefficient ---- 0.792
Permeability (Minimum) --- 0.0000 md	Arithmetic Average ---- 2.74 gm/cc	
Permeability (Maximum) --- 100000. md	Minimum ----- 2.68 gm/cc	<b>AVERAGE SATURATIONS (Pore Volume):</b>
Water Saturation (Maximum) 100.0 %	Maximum ----- 2.85 gm/cc	Oil ----- 3.2 %
Oil Saturation (Minimum) - 0.0 %	Median ----- 2.73 gm/cc	Water ----- 53.0 %
Grain Density (Minimum) -- 2.00 gm/cc	Standard Deviation ---- $\pm$ 0.05 gm/cc	
Grain Density (Maximum) -- 3.00 gm/cc		
Lithology Excluded ----- NONE		
<p>** Permeabilities less than 0.001 or greater than 3000 md exceed current CMS capabilities. Values exceeding **</p> <p>** limits are assigned permeabilities of 0.0005 and 3500 md respectively for statistical and graphical purposes. **</p>		

# Permeability vs. Porosity



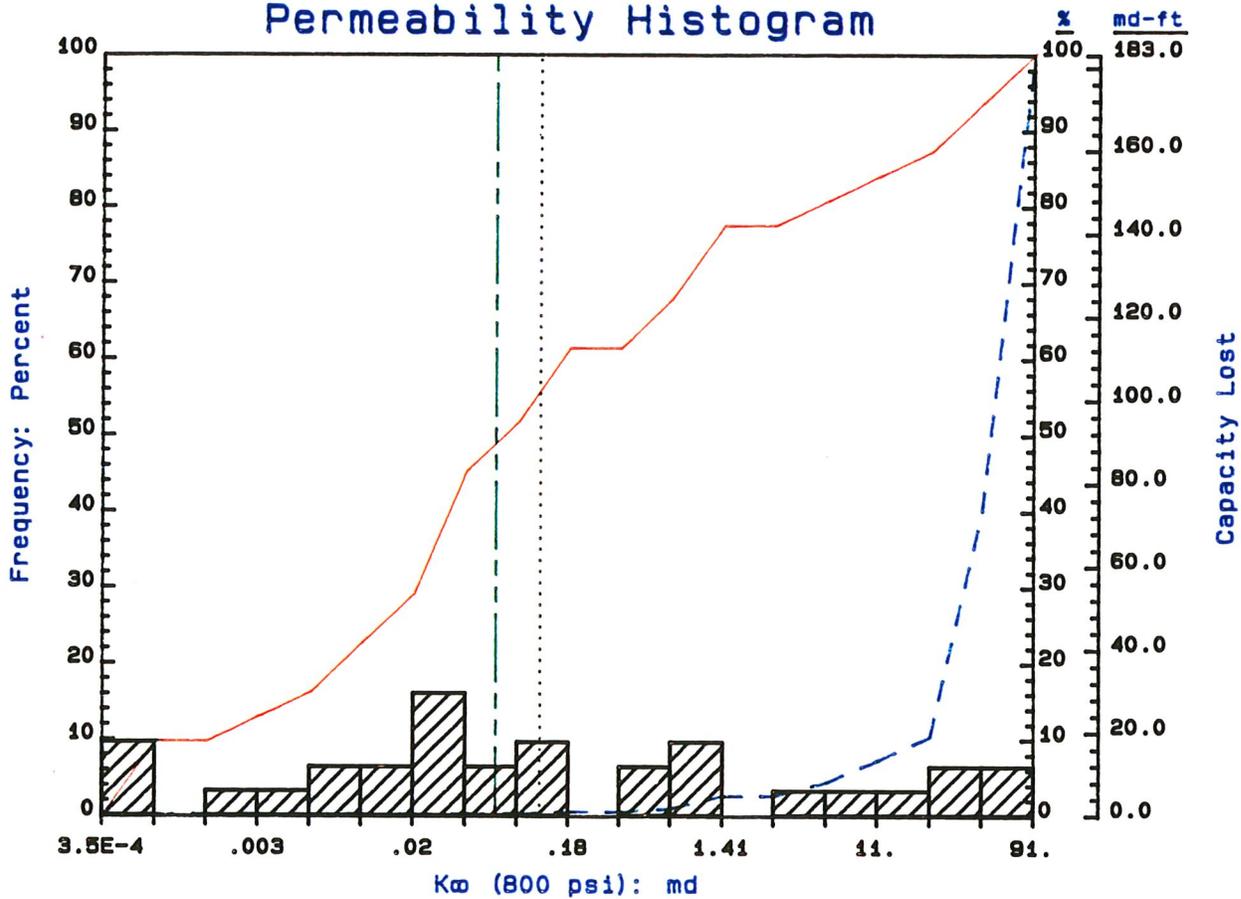
<p><b>Chuska Energy Company</b>          Lizard No. 4-M          Wildcat          San Juan County, Utah          Desert Creek Fm. 5393.0'-5486.0'</p>	<p>- LEGEND -  <span style="color: red;">Desert Creek</span></p>
<p>Core Laboratories                      25-Sep-1991</p>	<p>▣ Selected</p>

# Porosity Histogram



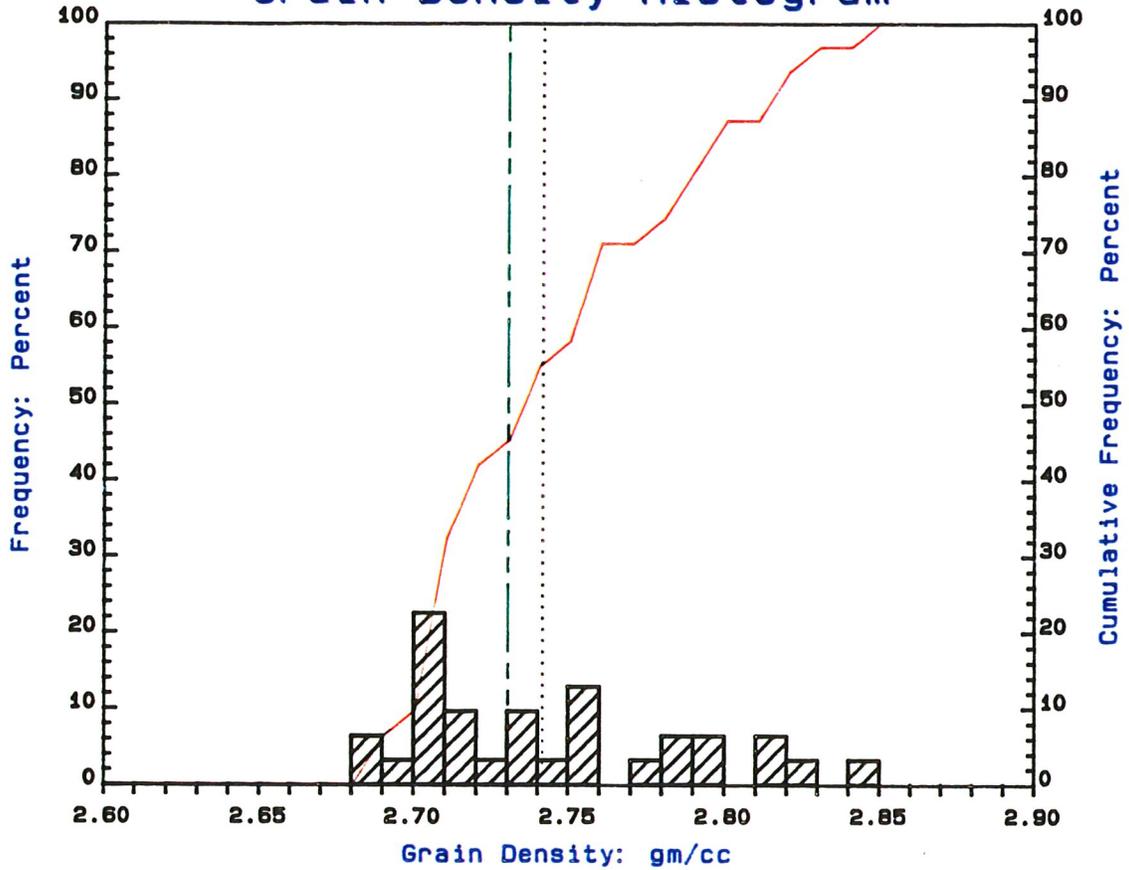
<p style="text-align: center;"><b>Chuska Energy Company</b>                  Lizard No. 4-M                  Wildcat                  San Juan County, Utah                  Desert Creek Fm. 5393.0'-5486.0'</p> <p style="font-size: small;">Core Laboratories <span style="float: right;">25-Sep-1991</span></p>	<p style="text-align: center;">- LEGEND -</p> <ul style="list-style-type: none"> <li><span style="color: green;">—</span> Median Value (7.6)</li> <li><span style="color: black;">⋯</span> Arith. Average (8.6)</li> <li><span style="color: red;">—</span> Cumulative Frequency</li> <li><span style="color: blue;">- - -</span> Cumulative Capacity Lost</li> </ul> <p style="text-align: center; font-weight: bold;">31 Samples</p>
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# Permeability Histogram



<p><b>Chuska Energy Company</b>                  Lizard No. 4-M                  Wildcat                  San Juan County, Utah                  Desert Creek Fm. 5393.0'-5486.0'</p> <p>Core Laboratories                      25-Sep-1991</p>	<p align="center">- LEGEND -</p> <p>— Median Value (0.065)</p> <p>..... Geom. Average (0.120)</p> <p>— Cumulative Frequency</p> <p>- - - Cumulative Capacity Lost</p> <p align="center">31 Samples</p>
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# Grain Density Histogram



<p><b>Chuska Energy Company</b>                  Lizard No. 4-M                  Wildcat                  San Juan County, Utah                  Desert Creek Fm. 5393.0'-5486.0'</p>	<p>- LEGEND -</p> <p>— Median Value (2.73)                  ..... Arith. Average (2.74)                  — Cumulative Frequency</p> <p><b>31 Samples</b></p>
<p>Core Laboratories</p>	<p>25-Sep-1991</p>

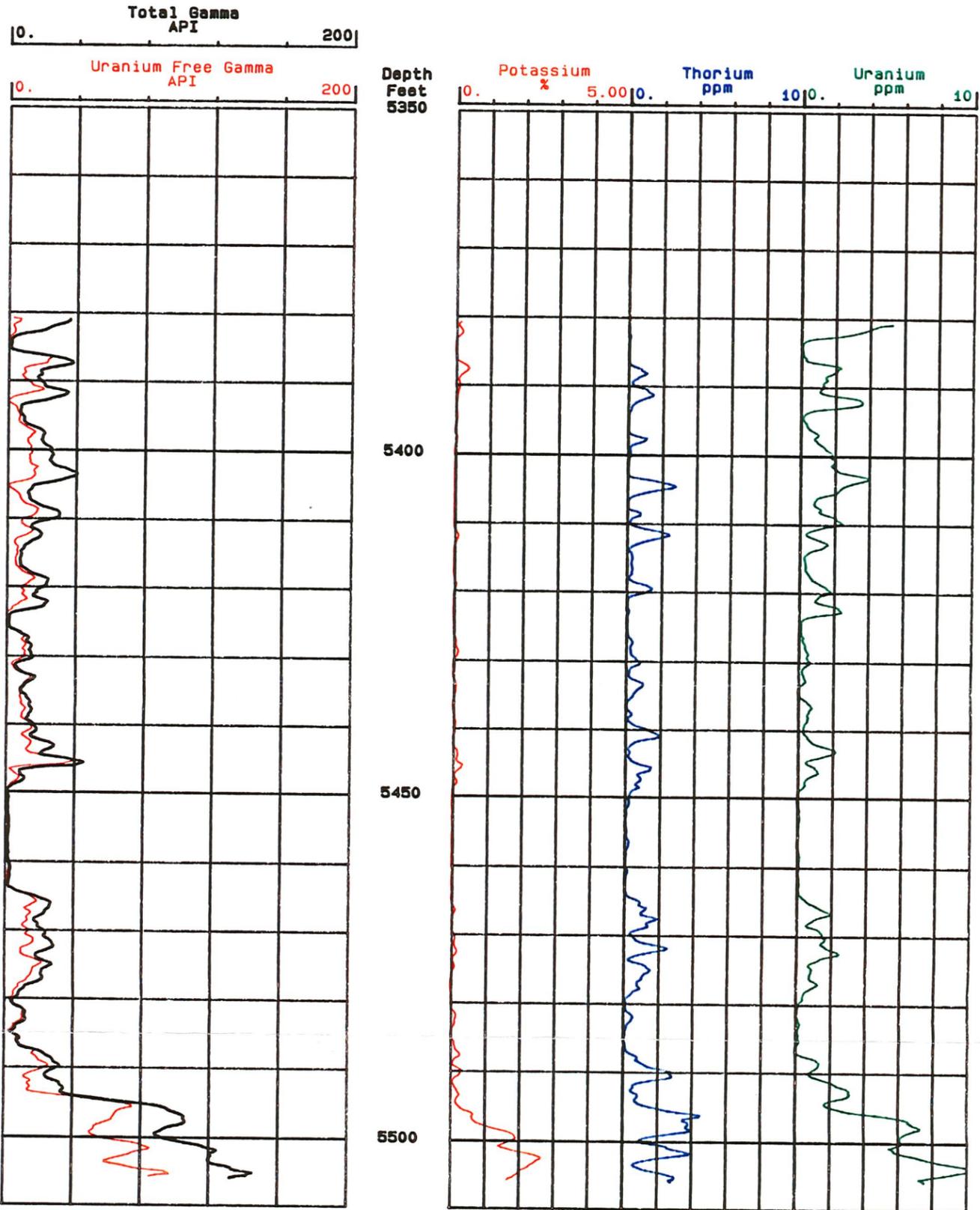
# CORE LAB SPECTRAL GAMMA-RAY PLOT

**Chuska Energy Company**  
Lizard No. 4-M  
Wildcat  
San Juan County, Utah  
Desert Creek Fm. (5381.0'-5506.0')

Vertical Scale  
5.00 in = 100.0 ft

Core Laboratories

18-Sep-1991



# CORE LAB CORRELATION COREGRAPH

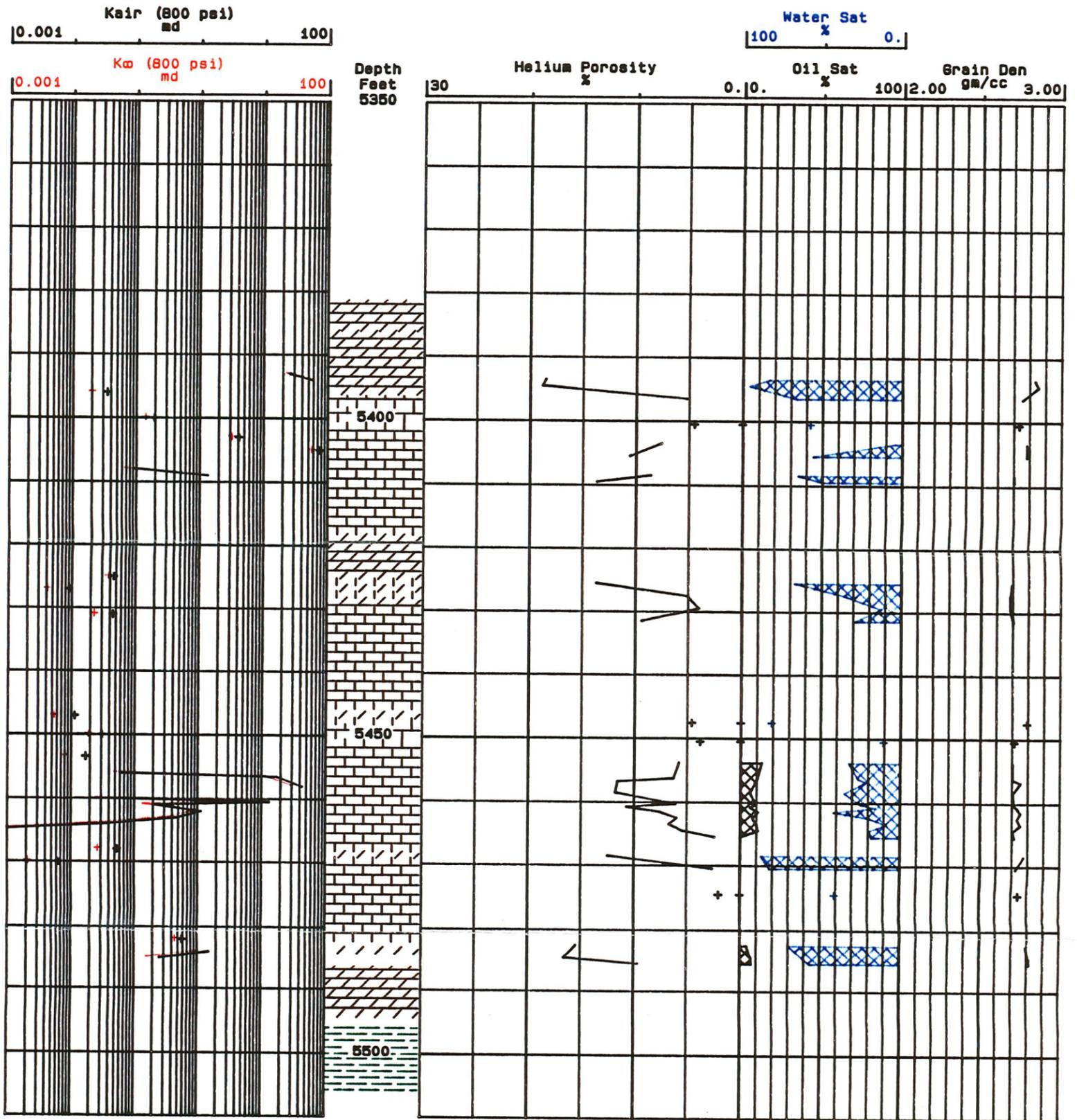
**Chuska Energy Company**  
 Lizard No. 4-M  
 Wildcat  
 San Juan County, Utah  
 Desert Creek Fm. 5393.0'-5486.0'

Vertical Scale  
 5.00 in = 100.0 ft

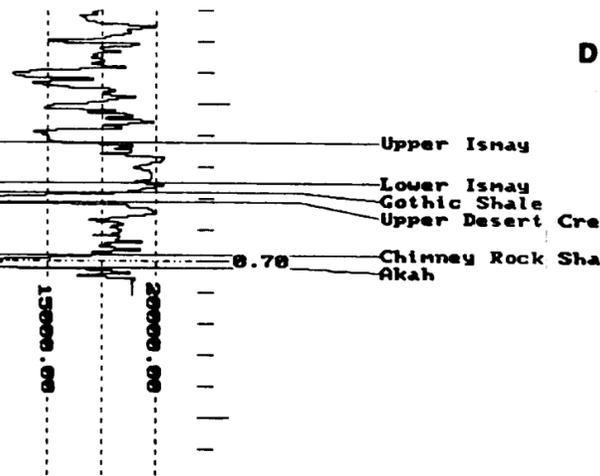
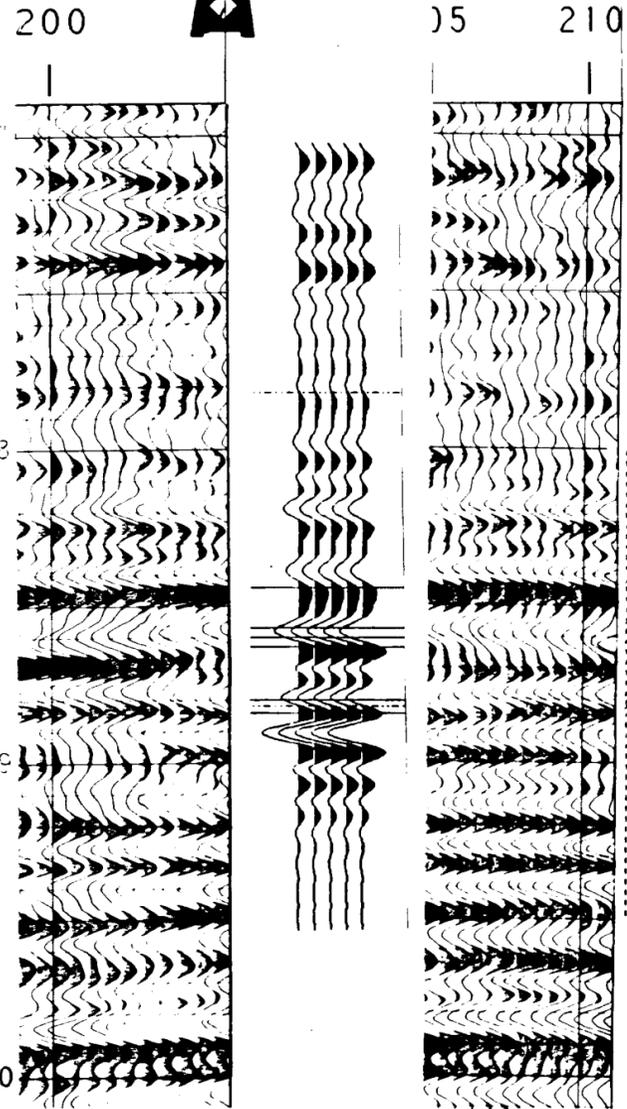
Core Laboratories

25-Sep-1991

- Lithology Legend -



LIZARD 4-M



**PROGRAM 6**  
**SEISMIC LINE 600-6**

