

NORTHERN MINERALS, INC.
SANTA FE PACIFIC NO. 20
SEC. 20, T.16N., R.6W.
McKINLEY COUNTY, NEW MEXICO

SUMMARY WELL REPORT

MARK E. WEIDLER
CONSULTANT PETROLEUM GEOLOGIST

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NORTHERN MINERALS, INC.

SANTA FE PACIFIC NO. 20
SEC. 20, T.16N., R. 6W.
MCKINLEY COUNTY, NEW MEXICO

I N D E X

	PAGE NO.
Summary Data	1
Formation Tops	2
Core Times	3
Core Descriptions	4
Core Analysis	5
Deviation Survey	6
Chronological Well History	7
Sample Descriptions	10
Geological Summary	13

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NEW MEXICO OIL CONSERVATION COMMISSION

Form C-101
Revised 1-4-65

5A. Indicate Type of Lease	
STATE <input type="checkbox"/>	FEE <input checked="" type="checkbox"/>
5. State Oil & Gas Lease No.	

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work		DRILL <input type="checkbox"/>		DEEPEN <input type="checkbox"/>		PLUG BACK <input type="checkbox"/>	
b. Type of Well		OIL WELL <input checked="" type="checkbox"/>		GAS WELL <input type="checkbox"/>		OTHER <input type="checkbox"/>	
2. Name of Operator		Northern Minerals, Inc.		7. Unit Agreement Name			
3. Address of Operator		P. O. Box 2182, Santa Fe, New Mexico 87501		8. Farm or Lease Name		SFPRR Co.	
4. Location of Well		UNIT LETTER <u>G</u> LOCATED <u>1650</u> FEET FROM THE <u>North</u> LINE		9. Well No.		20	
AND <u>1650</u> FEET FROM THE <u>East</u> LINE OF SEC. <u>20</u> TWP. <u>16N</u> RGE. <u>6W</u> NMPM				10. Field and Pool, or Wildcat		Miguel Creek - Gall	
				12. County		McKinley	
				19. Proposed Depth		1100'	
				19A. Formation		Hospah	
				20. Rotary or C.T.		Rotary	
21. Elevations (Show whether DF, RT, etc.)		21A. Kind & Status Plug. Bond		21B. Drilling Contractor		22. Approx. Date Work will start	
6760'		Statewide		Chesney Drilling		Upon Approval	

23. PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
6 1/4"	4-3/4"	16#	1100'	Suff. to Circ.	

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. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Signed Lloyd Davidson Title President Date 9-26-75

(This space for State Use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-4-65

All distances must be from the outer boundaries of the Section.

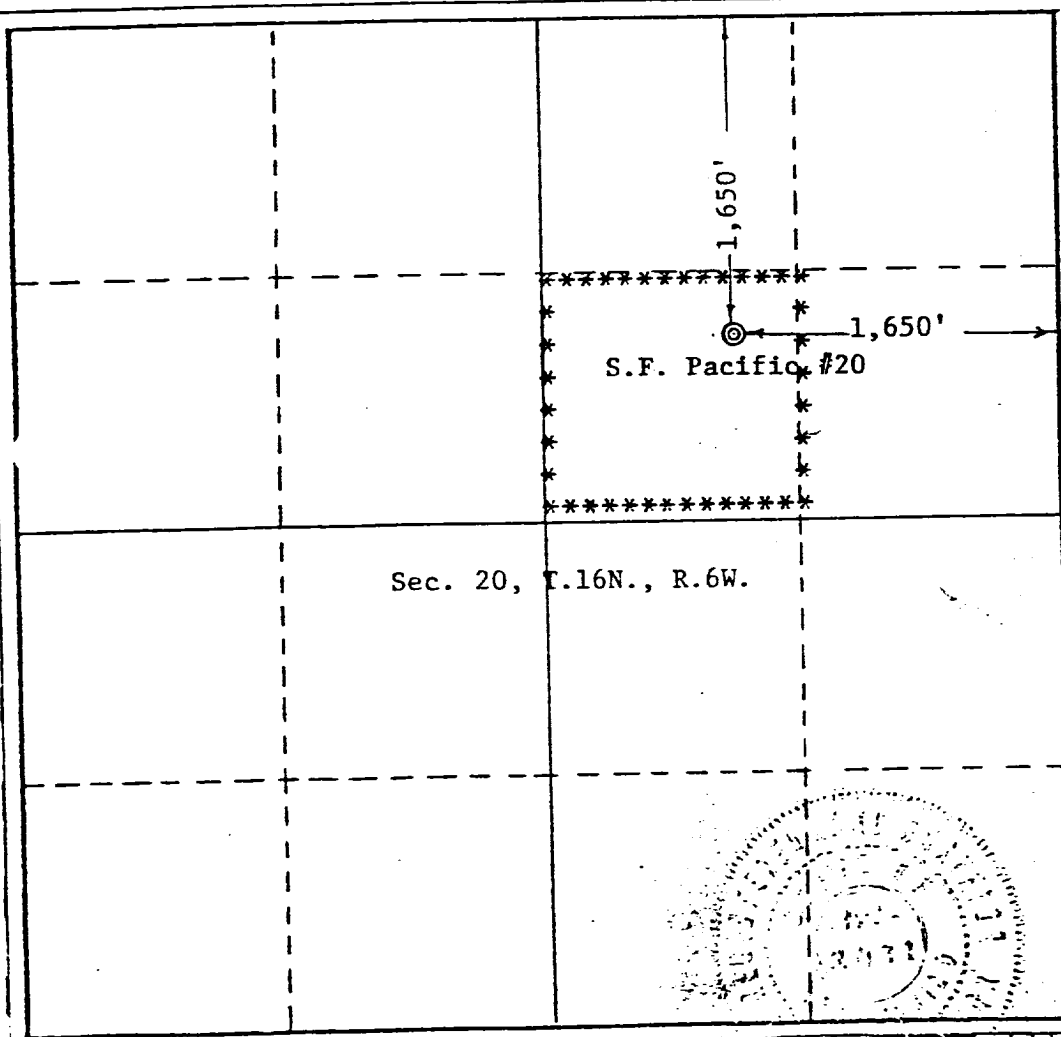
Operator Northern Minerals, Inc.			Lease SFPRR Co.		Well No. 20
Unit Letter G	Section 20	Township T.16N.	Range R.6W.	County McKinley	
Actual Footage Location of Well: 1650 feet from the North line and 1650 feet from the East line					
Ground Level Elev. 6760	Producing Formation Hospah		Pool Miguel Creek - Gallup		Dedicated Acreage: 40 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).
3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.

Lloyd Davidson

Name

Lloyd Davidson

Position

President

Company

Northern Minerals, Inc.

Date

September 26, 1975

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

September 22, 1975

Registered Professional Engineer and/or Land Surveyor

Fred D. Marmon

Fred D. Marmon

Certificate No.

2031

NORTHERN MINERALS, INC.
SANTA FE PACIFIC NO. 20

SUMMARY DATA

Location: 1,650' FNL & FEL, Sec. 20, T16N, R6W
McKinley County, New Mexico

Elevation: 6,760' Ground Level

Rig: McCarty Drilling Company - Grants, New Mexico
Failing 1000

Driller & Owner: Jerry McCarty

Spud: December 7, 1975

T.D. Reached: December 17, 1975

Casing Run: December 20, 1975

Plug Drilled: December 31, 1975

Surface Casing: None

Production casing: 3½", 7.70#, R₁ W/1 - jt 4½" 10.50#, R₁ as landing
joint for drilling out. Casing shoe @ 1173' below
G.L./10 sx "B" (850' fillup)

Tubing: 1½" integral jt, 2.76#, R₂ hung @ 1174' below G.L.

Pump: USI-Axelson 1½" x 10'.

Sucker rods: 5/8"

Cementing: Fleet Cementers - Grants, New Mexico

Electric Log: Wilson's logging Services - Grants, New Mexico

Wellsite Supervision: Mark E. Weidler & R. T. Atteberry
Farmington, New Mexico

FORMATION TOPS

<u>Formation</u>	<u>Depth</u>	<u>Datum</u>
Upper Hosta ss (Point Lookout)	Surface	6760'
Satan Tongue of Upper Mancos shale	150'	6610'
(Lower Hosta sandstone	<u>450'</u>	6300')
Upper Mancos shale	640'	6120')
Dalton sandstone	900'	5860'
Hospah zone marker	1160'	5600'
Hospah sandstone	1172'	5588'

CORE TIMES

Core No. 1 - 1160-70

1160-61	3 min.
1161-62	6 min.
1162-63	8 min.
1163-64	9 min.
1164-65	9 min.
1165-66	11 min.
1166-67	11 min.
1167-68	5 min.
1168-69	6 min.
1169-70	11 min.

Core No. 3 - 1180-90

1180-81	2 min.
1181-82	4 min.
1182-83	3 min.
1183-84	2 min.
1184-85	2 min.
1185-86	2 min.
1186-87	1 min.
1187-88	2 min.
1188-89	3 min.
1189-90	2 min.

Core No. 2 - 1170-80

1170-71	5 min.
1171-72	12 min.
1172-73	6 min.
1173-74	5 min.
1174-75	6 min.
1175-76	2 min.
1176-77	3 min.
1177-78	2 min.
1178-79	2 min.
1179-80	2 min.

Core No. 4 - 1190-1200

1190-91	1 min.
1191-92	1 min.
1192-93	1 min.
1193-94	1 min.
1194-95	1 min.
1195-96	4 min.
1196-97	3 min.
1197-98	4 min.
1198-99	5 min.
1199-1200	11 min.

CORE DESCRIPTIONS

Core No. 1 - 1160-70, cut 10', recovered 9'.

- | | | |
|------------|------|--|
| 1160-1164' | 4' | ss, gry-wh, vf-f, interbedded with shale, all highly bioturbated. Shale is dark gry, carbonaceous in part. Ss has limey matrix. |
| 1164-1167' | 2.3' | shale, dk gry to blk, pokerchip, carbonaceous, sandy in part with clay matrix. |
| 1167-1169' | 2.7' | Predominantly ss, vf-f, gry with interbeds of shale, dk gry, pokerchip, all lightly burrowed & churned. No shows? Clay matrix in ss, last inch had limey matrix. |

Core No. 2 - 1170-80, cut 10', recovered 9'

- | | | |
|------------|----|--|
| 1170-1173' | 3' | shale, sdy, bioturbated, shale is dark gry to black. At bottom of this section was a very soft, dense, clay bed 6" thick. |
| 1173-1174' | 1' | ss, vfg-fg, fairly tite, moderately sat. w/oil. |
| 174-1179' | 5' | ss, fg, porous, heavy yellow fluor, oil saturated. Massive, friable, clear qtz grains, some dark, section generally has a very few tite zones with no oil saturation |

Core No. 3 - 1180-90, cut 10', recovered 8'

- | | | |
|---------|----|--------------------------------|
| 1180-82 | 2' | shale, sandy, pokerchip |
| 1182-87 | 5' | sandstone, shaly oil saturated |
| 1187-88 | 9" | dense gry clay |
| | 6" | oil saturated sandstone |

Core No. 4 - 1190-1200, cut 10', recovered

- | | | |
|------------|-----|--|
| 1190-1195' | 5' | ss, gf, subrnd, well sorted, loose grains, great porosity, oil saturated |
| 1195-1196' | 1½' | ss, fg, well sorted, barren, carbonaceous, tight |

NO. THERN MINERALS, INC.
SALTA FE PACIFIC NO. 20
WILDCAT
MC KINLEY COUNTYFORMATION : HOSPAH
DRLG. FLUID: WATER BASE MUD
LOCATION : SW NE SEC 20-T16N-R6W
STATE : NEW MEXICODATE : 12-18-75
FILE NO. : RP-3-2754
ANALYSTS : SS
ELEVATION: 7163' GL

CONVENTIONAL CORE ANALYSIS

SAMP. NO.	DEPTH	PERM. TO HORZ.	AIR (MD) VERTICAL	POR. FLD.	FLUID SATS.		GR. DNS.	DESCRIPTION
					OIL	WATER		
1	1175-76	372		28.7	24.1	38.2		SS GY MG SHY CLAY
2	1176-77	343		25.7	23.1	44.3		SS GY MG SHY CLAY
3	1177-78	202		27.6	12.8	48.7		SS GY MG SHY CLAY
4	1178-79	173		28.1	16.6	45.7		SS GY MG SHY CLAY
5	1179-80							NO ANALYSIS
	1180-81	374		20.8	6.7	74.2		SS GY MG SHY CLAY
	1181-82							NO ANALYSIS
6	1182-83	245		23.1	12.6	58.5		SS GY MG SHY CLAY
7	1183-84	202		27.0	20.7	42.1		SS GY MG SHY CLAY
8	1184-85	392		26.2	16.9	54.5		SS GY MG SHY CLAY
9	1185-86	692		24.8	22.8	43.7		SS BRN M/CG CLAY
	1186-87							NO ANALYSIS
10	1187-88	1270		25.9	28.6	32.5		SS BRN M/CG CLAY
	1188-90							NO ANALYSIS
11	1190-91	1345		28.8	28.6	38.8		SS BRN M/CG CLAY
12	1191-92	1355		26.2	32.9	32.9		SS BRN M/CG CLAY
13	1192-93	1390		24.9	25.8	39.1		SS BRN M/CG CLAY
14	1193-94	1540		24.5	25.5	29.7		SS BRN M/CG CLAY
15	1194-95	990		23.6	22.5	29.0		SS BRN M/CG CLAY

The figure is a geological map plotted on a grid. A fault line is shown as a dashed line with a bearing of 270° and a distance of $1000'$. A bearing of 90° is also indicated. A data table is located in the upper left corner, and a legend is in the upper right corner.

depth	bearing	distance
500	147°	$29'$
1000	170°	$96'$
1100	179.5°	$129'$

Wilson's Logging Co.
Hole No. 5FP-20
Date - 12-17-75
Area - Miguel Creek

Northeyay Minerals
 Hole No. SEP-20
 date - 12-17-75
 area - Miguel Creek
 county - Mackinlev, N.M.
 scale - 10 feet/inch

CHRONOLOGICAL WELL HISTORY

- 12/7/75 Moved in rig. Air drilled to 60' (in dry sand)
- 12/8/75 T.D. 60'. Air drilled to 560 feet & shut down @ 5:30 p.m.
Hit water in lower Hosta sand at 460 feet.
- 12/9/75 T.D. 560'. Hauled water & mix mud. Drilled 560-570' and
mud pump failed. Shut down to repair pump.
- 12/10/75 T.D. 570'. Repaired mud pump. Resumed drilling @ 1:30 p.m.
Drilled to 760' and shut down @ 5:30 p.m. S/T Dalton @ 500'.
- 12/11/75 T.D. 760'. Resumed drilling @ 8:30 a.m. Drilled to 1020' @
4:00 p.m. Kelly swivel leaking. Tripped out to run E-Log.
First 140' off bottom tite. Rigged up to log @ 6:00 p.m. Ran
E-Log to 897' (Hit bridge). Finished logging @ 7:30 p.m. Pro-
jected core point 1159'.
- 12/12/75 T.D. 1020'. Crew did not show up. Couldn't find repair parts
for swivel. Returned to Farmington @ 2:00 p.m.
- 12/13/75 T.D. 1020'. Did not drill. Crew repaired swivel and hauled
additional drill pipe to location.
- 12/14/75 T.D. 1020'. Resumed drilling in a.m. Drilled to 1160' (core
point), circ. hole and shut down w/pipe in hole.
- 12/15/75 T.D. 1160'. Circulated hole, tripped out to pick up core barrel.
Did not have sub to get from drill string to core barrel. SD
for night.
- 12/16/75 T.D. 1160'. Went in hole with core barrel. Started coring @
1160' @ 10:40 a.m.
Cut Core No. 1 1160-1170, cut 10, rec. 9' (no oil sand)
Cut Core No. 2 1170-1180, cut 10' rec, 9' (6' oil sand)
Cut Core No. 3 1180-1190, cut 10', rec. 8' (5.5' oil sand)
Shut down @ 5:45 pm
- 12/17/75 T.D. 1190' Started in hole @ 8:30 a.m. Cut Core No. 4 1190-
1200, cut 10', rec. 6.5' (5' oil sand) Reamed core hole 1160-
1200 w/5" bit. Called logger. Logger on location @ 3:15 p.m.
Ran E-Log & drifted hole. Finished @ 6:15 p.m. Shut down for
night.
- 12/18/75 T.D. 1200'. Flew cores to Farmington for core analysis. Ordered
float & cementing equipment for 3½" casing through Franklin Sup-
ply. Beasley Hot Shot picked up 3½" casing at Red Mountain and
drove to Grants.

- 12/19/75 T.D. 1200'. Casing truck and crew to location in a.m. To Albuquerque forcementing equipment. Only cement baskets arrived as scheduled. Took to Milan Airport for Jerry McCarty to pick-up. Core analysis results from Core Lab.
- 12/20/75 T.D. 1200'. Lloyd picked up remaining cementing equipment and delivered to Jerry McCarty.
- 12/22/75 T.D. 1200'. Went in hole with bit and cleaned out hole. Ran 46 joints of 3½", 7.70# casing and 1 joint 4½", 10.50# casing on top. Total string 1173.50'. cemented w/Fleet Cementers w/50 sacks Class "B" cement (850' ± fillup). Plug down @ 6:15 p.m. Shut down WOC.
- 12/31/75 T.D. 1200'. Drilled out plug, cement & show and washed to bottom with clear water.
- 1/2/76 T.D. 1200'. Tried to swab w/McCarty rig. Couldn't get swab to go without sinker bar.
- 1/3/76 Took 100' 5/8" sucker rods from Miguel Creek for sinker bar. Could only swab to 300' because of short swab line. Released McCarty rig.
- 1/17/76 T.D. 1200'. Big "A" Well Service moved rig from Miguel Creek to SFP-20 and rigged up. Ran 1½" IJ tubing.
- 1/18/76 T.D. 1200. Swabbed well w/tubing. Making only trace of oil.
- 1/19/76 T.D. 1200. Swabbed well w/tubing swab.
- 1/20/76 Shut down
- 1/21/76 Pulled 1½" tubing. Ran casing swab. Swab down in one hour, filled up in 15" cutting 10% oil. Dropped 6 acid sticks in hole over night.
- 1/22/76 Continued w/casing swab. Oil cutting 10-15%, water cleaning up.
- 1/23/76 Re-ran 1½" tubing (1173.86' with 1½" seating nipple on bottom). Ran 10' x 1½" plunger pump (new from Axelson) on 5/8" sucker rods with 1- 1/8" polish rod and set. Nippled up pumping Tee & stuffing box, ready to put on pump.
- 1/26/76 Ira moved American pump Jack from SFP-11 to SFP-20
- 2/3/76 Got Wauhesha & Fairbanks Morse Engines running @ Miguel Creek,

loaded on to pickup w/winch truck.

- 2/4/76 500- barrel bolted, skid mounted tank delivered & set on pad built by Ferris Mines.
- 2/5/76 Ira to SFP-20 w/Engines. Mark to Miguel Creek. Loaded 3 joints of 2" Line pipe, pump weights and fittings on winch truck & drove to SFP-20. Leveled and set pump jack. Mounted Fairbank's engine and rigged up. Set polish rod. Checked tank for holes, none. Started engine @ 3:00 p.m. Fluid not @ surface. Took 20 minutes to get fluid to surface. Pump not working properly. Laid temporary flow line to sump & left pumping on small propane bottle.
- 2/12/76 Ira & crew rigged flow line from pump to tank. Mark to SFP-20. Removed 2 counter-weights from pump jack. Re-set polish rod tug. Started pump. Not lifting fluid after 45 minutes. Left pump running to see if it would clean up.
- 2/13/76 Ira checked well. 1½" fluid + in tank. Tank leaking around bottom in several places. Pump not pumping fluid but left running.

SAMPLE DESCRIPTIONS

700-10	ss, subrnd, gry (med grn) calcitic, dark accessories, clayey.
710-20	aa
720-30	aa w/blk shale partings
730-40	aa
740-50	aa
750-60	90% ss, clr-gry, fg, subrnd, mostly tite, well sorted, w/wht calc and clayey matrix; 10% shale, carb, blk, embedded in ss; tr dk acc. (stain w/porosity in 1% ss)
760-70	aa
770-80	90% ss, clr-gry, fg, subrnd, well sorted, mostly tite, w/wht calc matrix and embedded blk shale partings & drk acc. (stain w/no porosity in 1% ss); 10% shale, gry w/swelling clay.
780-90	aa w/trace yellow ls
790-800	aa, but ss is vfg
800-10	aa
810-20	aa
820-30	aa, with slight increase in gry shale, ss grading in gry siltstone
830-40	aa with 50% gry siltstone & 50% gry shale
840-50	aa
850-60	50% ss gry, vfg-silt, clayey calc matrix, some dark acc; 50% shale, gry, silty, clayey
860-70	aa
870-80	aa w/some carb. shale partings pyritized partially
880-90	80% ss, gry, vfg-silt; 20% shale, gry; drills-up platy
890-900	aa

900-10	Dalton ss - aa with trace clear-wht fg ss
910-20	aa
920-30	aa with 20% clear-wht fg ss
930-40	aa with 50% clear wht fg ss (1% stain)
940-50	70% ss, fg-vfg, clr-wht, w/wht calc. matrix; 30% ss, fg, gry
950-60	90% ss, vfg, clr wht-gry, w/calc matrix, sl clay, some frags laminated, drk acces; 10% shale, drk, med grn.
960-70	aa w/frag w/fluor & cut on shale frag, no porosity
970-80	20% ss, vfg, gry, tr wht-clr, limey, clayey, dk acces; 80% shale, gry, soft, silty
980-90	aa
990-1000	80% ss, vfg-siltsize, limey, drk acc; 20% shale, gry, soft, silty; tr wht hrd min.
1000-10	aa
1010-20	aa
1020-30	aa
1030-40	aa
1040-50	aa; with little more ss
1050-60	aa; 60% ss; 40% shale
1060-70	aa
1070-80	aa
1080-90	aa
1090-1100	aa; 50% ss; 50% shale
1100-10	10% ss, gry, vfg; 90% shale, silty, drk gry, lt gry, tr rust colored
1110-20	aa

1120-30	aa
1130-40	aa
1140-50	aa, some loose vfg-fg qtz ss grains
1150-60	aa

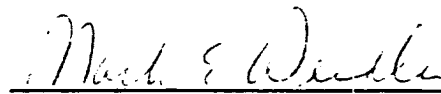
GEOLOGICAL SUMMARY

Northern Minerals, SFP No. 20 was drilled as a one-mile, northward outstep from Miguel Creek Gallup field. The test is situated on top the Point Lookout rimrock on the north plunge of Miguel Creek Dome so drilling depths run about 400 feet deeper.

The Hospah zone was encountered 89 feet structurally lower than in the Sinclair SFP No. 1 in the southeast quarter of section 20 and 97 feet structurally lower than the marker in Northern Minerals, SPF No. 11 in the northeast quarter of section 29.

SFP No. 20 encountered an unusually thick section of oil-bearing Hospah sand; nearly 20 feet overall with 16.5' of net pay. Core analysis permeabilities were unusually high throughout. The bottom 7 feet had permeabilities hanging from 990 md to 1,540 md. Oil saturations are comparable to slightly higher than those in Miguel Creek field. All indications are that the well should make a good producer when finally completed on pump.

This test greatly enlarges the potential area of oil accumulation which is still undefined to the north, east and west.



Mark E. Weidler,
Consultant Petroleum Geologist
AIPG No. 2488