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JUN 24

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**WELL HISTORY**  
**ENSIGN OPERATING COMPANY**  
**NO. 1-13 JOHNSON**  
**KAHOONA PROSPECT**  
**SE SE SE SEC. 13, T20S, R26W**  
**NESS COUNTY, KANSAS**

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**SEP 6 1994**

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**BY**  
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**CONSULTING GEOLOGIST**

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**STRIP LOG (WITH DRILL TIME, LITHOLOGY AND HOT WIRE  
MEASUREMENTS)**

ATTACHED

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**SYNOPSIS**

The Ensign Operating Co. No. 1-13 Johnson, SE SE SE Sec. 13, T20S, R26W, Ness County, Kansas was 4535-foot wildcat well to test the Kahoona Prospect for commercial oil production. The primary objective of this wildcat well was the Mississippian Warsaw. Secondary objectives were the Pennsylvanian Cherokee Sandstones. The basis for the prospect was an interpretation of seismic and subsurface data.

The Cherokee C interval had a thin sandstone which had good oil shows and good intergranular porosity. This sandstone was drill-stem tested. The test recovered oil and muddy oil and water. Pressures taken during the test were normal for the area.

The Mississippian Warsaw formation had fair-good visual porosity in a buff fine crystalline dolomite. This porosity had an associated fair-good oil show. This show interval was drill-stem tested. The test recovered watery mud with a slight show of oil. There was a 200 psi pressure differential between the initial and final shut-in pressures. Based on the visual porosity and the quality of the oil show in the lithologic samples the test was disappointing.

After a review of the lithologic samples examinations, an evaluation of the wireline logs, two drill-stem tests and considerations of other factors the decision was made to set production casing and further test the well for commercial oil production.

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## GENERAL WELL INFORMATION

**Operator:** Ensign Operating Co.

**Well Name:** No. 1-13 Johnson      API 15-135-23,747

**Prospect:** Kahoona

**Location:** SE SE SE Sec. 13, T20S, R26W, 330' FEL, 330' FSL

**County:** Ness

**State:** Kansas

**Elevation:** G.L. 2471' K.B. 2480'

**Spudded:** April 27, 1993 @ 8:25 A.M..

**Completed:** May 4, 1993 @ 1:00 P.M.

**Total Depth:** Driller 4535' Logger 4536'

**Status:** Ran Production Casing

**Drill-Stem Tests:** Drillstem Test No. 1 4486'-4501' Mississippian, Straddle Test  
30-60-30-60

I.O. Weak Blow Building To 1" In 30 Min.  
F.O. No Blow

Recovery: 15' Watery Mud w/ Show Oil.

Sampler: 2500 Ml Mud, 1500 Ml Water, Trace Oil @ 124 psi  
Rw 1.1 @ 59° F.

Hydrostatic Pressures 2311-2261 psi  
Flow Pressures 19-29:38-38 psi  
Shut-in Pressures 1089-837 psi  
Bottom Hole Temperature 106° F

Drillstem Test No. 2 4450'-4466' Cherokee, Straddle Test  
30-60-60-60

I.O. Weak Surface Blow Increasing To 2 1/2" in 30 Min.  
F.O. No Blow, 4 Min Weak Surface Blow Increasing To 4 1/4" In 60 Min.

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Recovery: 100' Oil, 39° API @ 70° F  
34' Water Cut Muddy Oil, 70% Oil, 7% Water, 23% Mud.

Sampler: 3520 MI Oil, 480 ML Mud @ 28 psi

Hydrostatic Pressures 2427-2187 psi  
Flow Pressures 24-34:48-72 psi  
Shut-in Pressures 1111-1088 psi  
Bottom Hole Temperature 118° F

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**Logging Program:**

DI/SP/GR  
CND/GR/Cal

0' - 4534'  
3500' - 4513'  
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ELI Wireline Services, Inc., Terry Spiller, Engineer

**Sample Program:**

Ten foot samples from 3485' - 4535'.  
Samples were examined and described at wellsite. Samples were caught on depth intervals by rig crews. Samples were lagged by geologist. All depths reported herein are lagged depths. The quality of the samples was good.

**Mud Logging:**

None

**Mud Program:**

MSI, Rick Hughes, Engineer

**Lost Circulation:**

3250'-3265', 20 Bbls

**Contractor:**

Duke Drilling Company, Jay Schneider, Toolpusher

**Bit Record:**

No.	Size	Make	Type	Depth Out	Feet	Hours
1	12.250	Sec	S33SF	320'	320'	2.5
2	7.875	W-Mc	51PF RR	1955'	1635'	10
3	7.875	W-Mc	51PCF	4535'	2589'	87

**Total Rotating Hours 99.5. Average 45.57 Ft/Hr**

**Deviation Record:**

3/4° @ 320'  
3/4° @ 1987'  
1/4° @ 4535'

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## DAILY DRILLING REPORT

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No. 1-13 Johnson  
SE SE SE Sec. 13, T20S, R20W  
Ness County, Kansas

### 7:00 A.M. Reports

1	April 27 1992	0' (0')	Rig up rotary tools. Spud @ 8:25 A.M..
2	Wed	1485' (1485')	Set 8 5/8" @ 315', Plug Down @ 2:10 P.M. Drill Plug @ 10:25 P.M.
3	Thru 29	2525' (1040')	
4	Fri 30	3210' (685')	
5	May 1	3810' (600')	
6	Sun 2	4320' (510')	
7	Mon 3	4535' DST No. 1 4486'-4501',	Logging
8	Tue 4	Logging, DST No. 2 4450'-4466'	
9	Wed 5	Ran Production Casing.	

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# FORMATION TOPS

Ensign Operating Co.

No. 1-13 Johnson

SE SE SE Sec 13, T20S, R26W

Ness County, Kansas

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G.L. 2471'

K.B. 2480'

Comparison Well

SE NW 24-20S-26W And Samples

K.B. 2446'

Surface +2441'

Drill Time

And Samples

Surface +2471'

Wire Line

Logs

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Surface +2471'

## Tertiary

### Cretaceous

#### Cenomanian

Greenhorn

103' +1866'

146' +2334'

144' +2336'

Graneros

252' +2194'

292' +2188'

294' +2186'

#### Albian

Dakota

290' +1904'

334' +2146'

336' +2144'

Kiowa

580' +1866'

599' +1881'

599' +1881'

Cheyenne

738' +1708'

782' +1698'

782' +1698'

### Permian

#### Glaudalupian

Tologa

837' +1609'

878' +1602'

874' +1606'

Day Creek

900' +1546'

951' +1521'

938' +1542'

White Horse

960' +1486'

1006' +1474'

999' +1481'

#### Leonardian

Nipewalla Gr.

Blaine

1031' +1415'

1078' +1402'

1074' +1406'

Cedar Hills

1050' +1296'

1195' +1285'

1191' +1289'

Sumner Gr.

Stone Corral

1670' +776'

1717' +763'

1717' +763'

Ninnescah

1708' +728'

1731' +749'

1756' +724'

Wellington

Hutchinson

2108' +338'

2136' +344'

2132' +348'

#### Wolfcampian

Chase Gr.

Herington

2407' +39'

2458' +22'

2456' +24'

Krider

2445' -1'

2493' -13'

2492' -12'

Winfield

2499' -53'

2547' -67'

2546' -66'

Gage Shale

2524' -78'

2580' -100'

2579' -99'

Towanda

2570' -124'

2622' -142'

2620' -140'

Fort Riley

2620' -174'

2672' -192'

2673' -193'

Wreford

2750' -304'

2808' -328'

2806' -326'

Council Grove Gr.

2779' -333'

2831' -351'

2834' -354'

Neva

2948' -502'

3009' -529'

3004' -524'

Red Eagle

3010' -564'

3070' -590'

3066' -586'

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G.L. 2471' K.B. 2480'	Comparison Well SW SE 2-19S-20W K.B. 2446'	Drill Time And Samples	Wire Line Logs
Foraker Admire Gr.	3050' -604'	3102' -622'	3104' -624'
Pennsylvanian			
Virgilian			
Wabaunsee Gr.			
Root Shale			
Shawanee Gr.			
Topeka	3450' -1004'	3505' -1025'	3504' -1024'
Douglas Gr.			
Heebner	3774' -1328'	3826' -1346'	3824' -1344'
Toronto	3794' -1348'	3845' -1365'	3846' -1366'
Missourian			
Lansing Gr.	3818' -1376'	3869" -1389'	3872' -1392'
Kansas City Gr.			
Bonner Spgs			
Base KC			
Demoinesian			
Marmaton Gr.			
Pawnee	4296' -1850'	4340' -1860'	4340' -1860'
Labette	4336' -1890'	4378' -1898'	4377' -1897'
Fort Scott	4342' -1896'	4384' -1904'	4384' -1904'
Cherokee Gr.			
A Interval	4370' -1922'	4410' -1930'	4410' -1930'
B Interval	4401' -1954'	4441' -1961'	4441' -1961'
C Sandstone	4418' -1971'	4455' -1975'	4452' -1972'
Mississippian			
Meramecian			
Warsaw	4456' -2110'	4488' -2008'	4484' -2004'
Total Depth	4475' -2029'	4535' -2055'	4536' -2056'

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Sample examination commenced at 3485 feet and continued to 4535 feet. Samples were caught by crews on depth intervals and lagged by geologist. All depths reported herein are lagged depths. A 10 foot sample interval was used from 3485 feet to 4535 feet.

3485 - 3490 Limestone (90%), gray, grayish tan, wackestone, mudstone. Shale (10%), gray. Displacing natural mud in hole with drilling mud. Sample quality poor due to hole cleaning.

3490 - 3502 Shale (75%), gray, black. Limestone, (25%), gray, grayish tan, wackestone, mudstone. Sample quality and quantity reflecting drilling-mud displacement operation.

**Topeka 3505' -1025'**

3502 - 3515 Shale (65%), gray, black. Limestone (35%), gray, grayish tan, wackestone, mudstone. Sample quality and quantity reflecting drilling-mud displacement operation. Sample is 80% cavings.

3515 - 3522 Limestone (70%), gray, grayish tan, wackestone, mudstone. Shale (30%), gray, black. Sample is 50% cavings.

3522 - 3530 Limestone (90%), grayish tan, wackestone, mudstone, some wackestone with dark gray-black pellets and fragments. Shale (10%), gray, black. Sample is 20% cavings.

3530 - 3534 Limestone (90%), grayish tan, wackestone, mudstone, dolomitic. Shale (10%), gray, black. Sample is 20% cavings.

3534 -3542 Limestone (95%), grayish tan, tan, wackestone, mudstone, dolomitic. Shale (5%), gray, black.

3542 - 3566 Limestone (90%), tan, grayish tan, wackestone, mudstone, fine grained oolitic packstone with oomoldic porosity. Shale (10%), gray, black. Sample adjusted to correct lag time.

3566 - 3574 Limestone (95%), tan, grayish tan, wackestone, mudstone, fine grained oolitic packstone with oomoldic porosity. Shale (5%), gray, black.

3574 - 3580 Limestone (95%), tan, grayish tan, wackestone, mudstone, some fine grained oolitic packstone with oomoldic porosity. Shale (5%), gray, black.

3580 - 3588 Limestone (95%), tan, grayish tan, wackestone, fine grained oolitic packstone with oomoldic porosity, mudstone. Shale (5%), gray, black.

3588 - 3594 Limestone (100%), tan, grayish tan, wackestone, mudstone with some fine grained oolitic packstone. Shale (trace), gray, black. Chert (trace), gray.

3594 - 3606 Limestone (95%), tan, grayish tan, wackestone, mudstone, some fine grained oolitic packstone. Shale (5%), gray, black. Chert (trace), gray.

3606 - 3612 Limestone (100%), tan, grayish tan, wackestone, mudstone, some tan fine grained oolitic packstone with oomoldic porosity. Shale (trace), gray, black. Chert (trace), light gray.

3612 - 3626 Limestone (40%), tan, grayish tan, wackestone, mudstone, some fine grained oolitic packstone with oomoldic porosity. Dolomite (55%), tan, fine crystalline, sucrosic, some yellow fluorescence, no cut. Shale (5%), gray, black.

3626 - 3642 Limestone (60%), tan, wackestone, packstone. Dolomite (40%), tan, fine crystalline, sucrosic. Shale (trace), gray, black.

3642 - 3656 Limestone (55%), tan, wackestone, packstone. Dolomite (45%), tan, fine crystalline, sucrosic. Shale (trace), gray, black.

3656 - 3664 Limestone (70%), tan, wackestone, packstone. Dolomite (30%), tan, fine crystalline, sucrosic. Shale (trace), gray, black.

3664 - 3670 Limestone (90%), tan, wackestone, packstone. Dolomite (20%), tan, fine crystalline, sucrosic. Shale (trace), gray, black.

3670 - 3679 Limestone (100%), buff, light tan, wackestone, mudstone. Shale (trace), gray, black. Chert (trace), tan, light gray.

3679 - 3690 Limestone (100%), buff, light tan, wackestone, mudstone. Shale (trace), gray, black. Chert (trace), tan, light gray.

3690 - 3706 Limestone (100%), tan, packstone, wackestone. Shale (trace), gray, black.

3706 - 3716 Limestone (95%), tan, wackestone, packstone, light gray mudstone. Shale (5%), gray, black. Chert (trace), tan, light gray.

3716 - 3722 Limestone (95%), tan, wackestone, packstone, some light gray mudstone. Shale (5%), gray, black. Chert (trace), tan, gray.

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- 3722 - 3727 Limestone (95%), tan, light gray, mudstone, wackestone. Shale (5%), gray, black. ~~CONFIDENTIAL~~
- 3727 - 3730 Limestone (95%), tan, light grayish tan, mudstone, wackestone. Shale (5%), gray, black.
- 3730 - 3745 Limestone (95%), tan, light grayish tan, wackestone, packstone, mudstone. Shale (5%), gray, black.
- 3745 - 3750 Limestone (100%), tan, packstone, wackestone, dolomitic. Shale (trace), gray, black.
- 3750 - 3756 Limestone (100%), tan, light grayish tan, packstone, wackestone, dolomitic. Shale (trace), gray, black.
- 3756 - 3761 Limestone (100%), tan, light grayish tan, wackestone, packstone, mudstone, dolomitic. Shale (trace), gray, black. Chert (trace), gray, tan.
- 3761 - 3771 Limestone (100%), tan, light grayish tan, wackestone, packstone, some oolitic packstone, fusulinids. Shale (trace), gray, black. Chert (trace), tan, gray.
- 3771 - 3786 Limestone (100%), tan, light grayish tan, oolitic packstone with oomoldic porosity, packstone, wackestone. Chert (trace), gray, grayish tan. Shale (trace), gray, black.
- 3786 - 3804 Limestone (100%), tan, light grayish tan, packstone, wackestone, oolitic packstone with oomoldic porosity. Chert (trace), gray, tan. Shale (trace), gray, black.
- 3804 - 3824 Limestone (100%), tan, light grayish tan, packstone, wackestone, trace tan oolitic packstone. Shale (trace), gray, black.

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**Heebner 3826' -1346'**

- 3824 - 3834 Limestone (70%), tan, light grayish tan, packstone, wackestone, fossiliferous, fusulinids. Shale (30%), black, gray. Chert (trace), gray, tan. ~~FROM CONFIDENTIAL~~
- 3834 - 3840 Limestone (75%), tan, light grayish tan, packstone, wackestone, fossiliferous. Shale (25%), black, gray.

**Toronto 3845' -1365'**

- 3840 - 3858 Limestone (85%), tan, light grayish tan, wackestone, packstone, some limestone with black, dark gray pellets and fragments. Shale (15%), black, gray.
- 3858 - 3866 Limestone (95%), buff, tan, packstone, wackestone some with vuggy porosity, fossiliferous. Shale (5%), black, gray. Note: Sample caught late, this sample is top of Lansing.

**Lansing 3869' -1389'**

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- 3866 - 3880 Limestone (90%), buff, tan, packstone, wackestone, trace vuggy porosity. Sample has light brown mottled staining due to high concentration of lignite in drilling mud. Shale (10%), black, gray. Chert (trace), gray, white.
- 3880 - 3888 Limestone (60%), buff, tan, wackestone, some packstone and mudstone. Shale (40%), gray, black. Chert (trace), white, gray.
- 3888 - 3895 Limestone (70%), buff, tan, wackestone, packstone, mudstone. Shale (30%), gray, black. Chert (trace), gray, white.
- 3895 - 3903 Shale (50%), black, gray. Limestone (50%), tan, buff, wackestone, packstone, some mudstone. Chert (trace), white, gray.
- 3903 - 3918 Limestone (75%), tan, buff, wackestone, packstone, some mudstone. Shale (25%), gray, black. Chert (trace), gray, white.
- 3918 - 3926 Limestone (80%), tan, light grayish tan, buff, wackestone, packstone, fossiliferous. Shale (20%), gray, black. Chert (trace), white.
- 3926 - 3936 Limestone (70%), tan, light grayish tan, wackestone, mudstone, fossiliferous. Shale (30%), gray, black. Chert (trace), tan, white.
- 3936 - 3944 Limestone (80%), tan, light grayish tan, wackestone, mudstone, fossiliferous. Shale (20%), gray, black. Chert (trace), white.
- 3944 - 3953 Limestone (90%), tan, light grayish tan, wackestone, some packstone and mudstone. Shale (10%), gray, black. Chert (trace), white.
- 3953 - 3962 Limestone (95%), light grayish tan, wackestone, packstone, fossiliferous. Shale (5%), gray, black. Chert (trace), tan, white.
- 3962 - 3974 Limestone (95%), light grayish tan, mudstone, wackestone. Shale (5%), gray, black. Chert (trace), tan, white.
- 3974 - 3980 Limestone (95%), buff, tan, wackestone, packstone. Shale (5%), gray, black. Chert (trace), white, tan.
- 3980 - 3990 Limestone (100%), buff, tan, wackestone, packstone. Shale (trace), gray, black. Chert (trace), white, tan.
- 3990 - 4006 Limestone (100%), buff, packstone, wackstone. Shale (trace), gray. Chert (trace), tan, white.
- 4006 - 4013 Limestone (100%), buff packstone, wackstone, fossiliferous. Shale (trace), gray. Chert (trace), tan, white.
- 4013 - 4023 Limestone (95%), light tan, packstone, wackstone, fossiliferous. Shale (5%), gray, black. Chert (trace), tan, white.

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- 4023 - 4035 Limestone (80%), tan, wackestone, packstone, fossiliferous. Shale (20%), gray, black. Chert (trace), tan, white.
- 4035 - 4046 Limestone (90%), light grayish tan, tan, mudstone, wackestone. Shale (10%), gray, black. Chert (trace), tan, gray.
- 4046 - 4057 Limestone (90%), buff, tan, wackestone, mudstone. Shale (10%), gray, black. Chert (trace), tan, white, light gray.
- 4057 - 4066 Limestone (95%), buff, tan, wackestone, mudstone. Shale (5%), gray, black. Chert (trace), tan, white, light gray.
- 4066 - 4078 Limestone (95%), buff, tan, wackestone, mudstone. Shale (5%), gray, black. Chert (trace), tan, white, light gray.
- 4078 - 4090 Limestone (95%), buff, tan, wackestone, mudstone. Shale (5%), gray, black. Chert (trace), tan, white, light gray.
- 4090 - 4096 Limestone (100%), buff, tan, wackestone, mudstone, some packstone. Shale (trace), gray, black. Chert (trace), tan, white, light gray.
- 4096 - 4104 Limestone (100%), buff, tan, wackestone, mudstone, some packstone. Shale (trace), gray, black. Chert (trace), tan, white, light gray.
- 4104 - 4110 Limestone (100%), tan, buff, mudstone, wackestone. Shale (trace), gray, black. Chert (trace), tan, white.
- 4110 - 4128 Limestone (100%), tan, packstone, oolitic packstone some with oomoldic porosity, wackestone. Shale (trace), gray, black. Chert (trace), tan, white.
- 4128 - 4137 Limestone (100%), tan, light grayish tan, mudstone, wackestone, some oolitic packstone with oomoldic porosity. Shale (trace), black, gray. Chert (trace), tan, white.
- 4137 - 4143 Limestone (100%), tan, light grayish tan, wackestone, mudstone, some oolitic packstone. Shale (trace), gray, black. Chert (trace), white, tan.
- 4143 - 4156 Limestone (75%), tan, light grayish tan, wackestone, mudstone, some packstone. Shale (25%), black, gray. Chert (trace), tan, gray.
- 4156 - 4166 Limestone (100%), tan, mudstone, wackestone, some packstone. Shale (trace), gray, black. Chert (trace), light gray, white.
- 4166 - 4180 Limestone (75%), grayish tan, tan, brown, mudstone, wackestone. Shale (25%), black, gray. Chert (trace), tan, light gray, white.
- 4180 - 4187 Limestone (90%), tan, light grayish tan, brown, wackestone, mudstone. Shale (10%), black, gray. Chert (trace), light gray, white, tan.

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- 4187 - 4198 Limestone (75%), light grayish tan, light gray, mudstone, wackestone. Shale (25%), black, gray.
- 4198 - 4210 Limestone (95%), light grayish tan, light gray, mudstone, wackestone. Shale (5%), black, gray.
- 4210 - 4218 Limestone (100%), light grayish tan, light gray, mudstone, wackestone. Shale (trace), gray, black.
- 4218 - 4230 Limestone (100%), light grayish tan, light gray, mudstone, wackestone. Shale (trace), gray, black.
- 4230 - 4240 Limestone (100%), light grayish tan, light gray, mudstone, wackestone. Shale (trace), black, gray. Chert (trace), light gray, tan, white.
- 4240 - 4245 Limestone (100%), light grayish tan, tan, wackestone, some mudstone. Shale (trace), gray, black. Chert (trace), tan, white.
- 4245 - 4254 Limestone (90%), light grayish tan, tan, wackestone, some mudstone. Shale (10%), gray, black. Chert (trace), tan, gray.
- 4254 - 4268 Limestone (90%), light grayish tan, tan, wackestone, some mudstone. Shale (10%), gray, black, greenish gray, trace red ?. Chert (trace), tan, white.
- 4268 - 4278 Limestone (95%), light grayish tan, tan, wackestone, mudstone. Shale (5%), black, gray. Chert (trace), tan, gray.
- 4278 - 4288 Limestone (80%), light grayish tan, tan, wackestone. Shale (20%), black, gray. Chert (trace), tan, brown.
- 4288 - 4296 Limestone (95%), light grayish tan, wackestone, mudstone, some packstone. Shale (5%), black, gray. Chert (trace), tan, white, light gray.
- 4296 - 4306 Limestone (100%), light grayish tan, wackestone, mudstone, some packstone. Shale (trace), gray, black. Chert (trace), tan, light gray, orange.
- 4306 - 4318 Limestone (95%), buff, tan, light grayish tan, wackestone, mudstone, some packstone. Shale (5%), black, gray, light greenish gray, green. Chert (trace), tan, light gray.
- 4318 - 4326 Limestone (90%), light tan, buff, light grayish tan, mudstone, wackestone. Shale (10%), gray, black, greenish gray. Chert (trace), tan, white, orange.
- 4326 - 4338 Limestone (70%), buff, tan, mudstone, some wackestone, trace limestone with red hematitic staining. Shale (30%), gray, black, red, green, greenish gray.

**Pawnee 4340' -1860'**

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- 4338 -4346 Limestone (60%), buff, tan, mudstone, some wackestone. Shale (40%), gray, black, green, red, dark brown, light gray carbonaceous. Chert (trace), white, red, tan.
- 4346 -4358 Limestone (90%), buff, tan, mudstone, some wackestone. Shale (10%), gray, black, red, green, light gray.
- 4358 - 4365 Limestone (80%), buff, light grayish tan, tan, mudstone, some wackestone. Shale (20%), gray, black, green, red, red-gray mottled.
- 4365 - 4374 Limestone (55%), buff, light grayish tan, tan, mudstone, some wackestone. Shale (45%), gray, black, red, red-green mottled, light gray carbonaceous. Sandstone (trace), light gray, fine grained.

**Labette 4378' -1898', Fort Scott 4384' -1904'**

- 4374 - 4389 Limestone (50%), tan, light grayish tan, mudstone, some wackestone. Shale (50%), black, gray, green, light gray carbonaceous.
- 4389 - 4397 Limestone (75%), grayish tan, grayish brown, wackestone, packstone, mudstone, trace gray oolitic packstone. Shale (25%), gray, black, green, light gray carbonaceous.
- 4397 - 4409 Limestone (80%), grayish tan, grayish brown, wackestone, packstone, mudstone, trace oolitic packstone. Shale (20%), black, gray, green, red, ochre, purple.

**Cherokee A 4410' -1930'**

- 4409 - 4416 Limestone (60%), grayish tan, grayish brown, mudstone, some wackestone. Shale (40%), gray, black, green, red, light gray carbonaceous.
- 4416 - 4428 Limestone (75%), grayish tan, tan, mudstone, wackestone. Shale (25%), gray, black, green, red, light gray carbonaceous.
- 4428 - 4438 Limestone (80%), tan, grayish tan, mudstone, wackestone. Shale (20%), gray, black, green, light gray carbonaceous, red.

**Cherokee B 4441' -1961'**

- 4438 - 4447 Limestone (80%), tan, grayish tan, mudstone, some wackestone, trace limestone with brown oil stain, yellow fluorescence, flash cut, good residual ring, no visible porosity. Shale (20%), gray, black red, green

**Cherokee C 4455' -1975**

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4447 - 4460 Limestone (80%), buff, tan, mudstone, some wackestone, some limestone with brown oil stain, yellow fluorescence, good flash cut, good residual ring, no visible porosity. Sandstone (10%), tan, gray, fine grained, good brown oil stain, flash cut, good residual ring, fair-good intergranular porosity. Shale (10%), gray, black, green.

4460 - 4468 Limestone (60%), buff, tan, mudstone, some wackestone. Sandstone (10%), gray, brown (oil stain), fine grained, good brown oil stain, yellow fluorescence, good flash cut, good residual ring, fair-good intergranular porosity, some gray sandstone with intergranular porosity and no oil stain. Shale (25%), gray, black, green, red. Chert (5%), white, tan, orange.

Drillstem Test No. 2 4450'-4466'

Cherokee, Straddle Test, Well At Total Depth, After Logs

30-60-60-60

I.O. Weak Surface Blow Increasing To 2 1/2" in 30 Min.

F.O. No Blow, 4 Min Weak Surface Blow Increasing To 4 1/4" In 60 Min.

Recovery: 100' Oil, 39° API @ 70° F

34' Water Cut Muddy Oil, 70% Oil, 7% Water, 23% Mud.

Sampler: 3520 Ml Oil, 480 ML Mud @ 28 psi

Hydrostatic Pressures 2427-2187 psi

Flow Pressures 24-34:48-72 psi

Shut-in Pressures 1111-1088 psi

Bottom Hole Temperature 118° F

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4468 - 4474 Limestone (65%), buff, tan, mudstone, some wackestone. Sandstone (15%), gray, brown (oil stain), fine grained, some sandstone with brown oil stain, yellow fluorescence, good flash cut, good residual ring. Shale (20%), gray, black, grayish green, green, red. Chert (trace), white, tan, orange.

4474 - 4479 Limestone (40%), buff, tan, mudstone, some wackestone. Sandstone (20%), gray, brown (oil stain), fine grained, some sandstone with brown oil stain, yellow fluorescence, flash cut, good residual ring. Shale (40%), gray, black, green. Chert (trace), white, tan, yellow, orange.

Mississippian 4488' -2008'

4479 - 4496 Dolomite (90%), buff, light tan, fine crystalline, some dolomite has good vuggy porosity, thirty percent of pieces have good brown oil stain, yellow fluorescence, good cut, good residual ring. Shale (10%), green, gray, black. Chert (trace), white, gray, orange.

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Drillstem Test No. 1 4486'-4501'  
Mississippian, Straddle Test, Well At Total Depth, Before Logs

30-60-30-60

I.O. Weak Blow Building To 1" In 30 Min.  
F.O. No Blow

Recovery: 15' Watery Mud w/ Show Oil.

Sampler: 2500 Ml Mud, 1500 Ml Water, Trace Oil @ 124 psi  
Rw 1.1 @ 59° F.

Hydrostatic Pressures 2311-2261 psi  
Flow Pressures 19-29:38-38 psi  
Shut-in Pressures 1089-837 psi  
Bottom Hole Temperature 106° F

- 4496 - 4506 Dolomite (80%), buff, light tan, fine crystalline, some dolomite has good vuggy porosity, thirth percent of pieces have good brown oil stain, yellow fluorescence, good cut, good residual ring. Shale (20%), green, gray, black. chert (trace), white, gray, orange.
- 4506 - 4509 Dolomite (85%), buff, light tan, fine crystalline, some dolomite has vuggy porosity but a decrease from sample above, some dolomite has brown oil stain, yellow fluorescence, good cut, good residual ring. Shale (15%), green, gray, black. Chert (trace), white, tan, gray.
- 4509 - 4526 Dolomite (95%), buff, tan, fine crystalline, some dolomite has vuggy porosity, brown oil stain, yellow fluorescence, good cut, good residual ring. Shale (5%), gray, green, black. Chert (trace), white. Circulated sample.
- 4526 - 4535 Dolomite (100%), buff, tan, fine crystalline, some dolomite has vuggy porosity, trace dolomite has brown oil stains, yellow fluorescence, good cut, good residual ring. Shale (trace). gray, green, black. Chert (trace), white. Circulated ssample.

Total Depth Driller 4535' -2055'.

Total Depth Logger 4536' -2056'.

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## SUMMARY

The Ensign Operating Co. No. 1-13 Johnson, SE SE SE Sec. 13, T20S, R26W, Ness County, Kansas was 4535-foot wildcat well to test the Kahoona Prospect for commercial oil production. The primary objective of this wildcat well was the Mississippian Warsaw. Secondary objectives were the Pennsylvanian Cherokee Sandstones. The basis for the prospect was an interpretation of seismic and subsurface data.

Two drill-stem tests were taken after the well had reached total depth. The Mississippian Warsaw was tested before logging. This test recovered watery mud with a slight show of oil. After logging a thin sandstone in the Cherokee C interval was drill-stem tested. This test recovered oil and slightly water and mud cut oil.

After a review of the lithologic samples examinations, an evaluation of the wireline logs, two drill-stem tests and considerations of other factors the decision was made to set production casing and further test the well for commercial oil production.

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