

NOTE - BE-"828" - ELEV. 828.7 MOUTH OF HOLLOW FROM N.; 21' N OF E OF MAIN ROAD ON TOP OF 2' OAK STUMP. COPPER NAIL AND WASHER.

Latitude 38° 20'

KANAWHA CITY CO.

THE COURTLAND CO.

Longitude 81° 35'

WALLER C. HARDY, JR. ET AL  
1-11-47-00834 9707.19 AC  
(BROOKS McCABE SURF.)

82  
4. ~~75~~ S,  
2. ~~88~~ W.  
35

THE ACCURACY OF THIS MAP IS WITHIN THE LIMITS PRESCRIBED BY THE ACT OF MARCH 3, 1907, OF THE DEPARTMENT OF MINES.

New Location   
Drill Deeper   
Abandonment

85C(J-5-2)

Company CITIES SERVICE OIL COMPANY  
Address Box 873 CHARLESTON, W.VA.  
Farm WALLER C. HARDY, JR. ET AL  
Tract \_\_\_\_\_ Acres 9707.19 Lease No. 1-11-47-00834  
Well (Farm) No. 21 Serial No. GW-1559  
Elevation (Spirit Level) 866.48'  
Quadrangle CHARLESTON-8-5477 W252  
County KANAWHA District LOUDON  
Engineer \_\_\_\_\_  
Engineer's Registration No. 2113  
File No. \_\_\_\_\_ Drawing No. W-20-65  
Date 25 JUNE 65 Scale 1" = 1320'

STATE OF WEST VIRGINIA  
DEPARTMENT OF MINES  
OIL AND GAS DIVISION  
CHARLESTON

WELL LOCATION MAP  
FILE NO. KAN-2049

+ Denotes location of well on United States Topographic Maps, scale 1 to 62500 latitude and longitude lines being represented by border lines as shown.

- Denotes one inch spaces on border line of original tracing.

66 305  
Deep Well

Samples 4400' - 5345' (27-J)



STATE OF WEST VIRGINIA  
DEPARTMENT OF MINES  
OIL AND GAS DIVISION

Rotary   
Spudder   
Cable Tools   
Storage

Quadrangle Charleston 8 SW

Permit No. Kan-2049

**WELL RECORD**

Oil or Gas Well Gas  
(KIND)

Company Cities Service Oil Company  
Address Box 873, Charleston, W. Va., 25323  
Farm W. C. Hardy, Jr., et al Acres 9707.19  
Location (waters) Kanawha Fork  
Well No. 21 - GW-1559 Elev. 866.48'  
District Loudon County Kanawha  
The surface of tract is owned in fee by B. F. McCabe  
Box 1692 Address Charleston, W. Va.  
Mineral rights are owned by W. C. Hardy, Jr., et al  
5100 2nd Avenue Address Vienna, W. Va.  
Drilling commenced 8-27-65  
Drilling completed 9-17-65  
Date Shot not shot From \_\_\_\_\_ To \_\_\_\_\_  
With \_\_\_\_\_

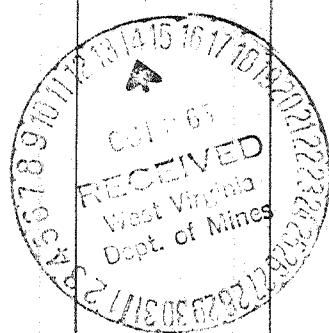
Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
<del>20"</del> 20" 91.4#	31'	31'	Kind of Packer
13 3/8" 48#	358'	358'	none
<del>5 1/8"</del> 5 1/8" 32.3#	1520'	1520'	Size of
8 1/4"			
6 5/8"			Depth set
5 3/16"			
4 1/2" 11.6#	5382'	5382'	
3"			Perf. top
2 3/8" 4.7#	5302'	5302'	Perf. bottom
Liners Used	with cage		Perf. top
			Perf. bottom

Open Flow /10ths Water in \_\_\_\_\_ Inch  
/10ths Merc. in \_\_\_\_\_ Inch  
Volume \_\_\_\_\_ Cu. Ft.  
Rock Pressure \_\_\_\_\_ lbs. \_\_\_\_\_ hrs.  
Oil \_\_\_\_\_ bbls., 1st 24 hrs.  
WELL ACIDIZED (DETAILS) not acidized  
WELL FRACTURED (DETAILS) see attached sheet

Attach copy of cementing record.  
CASING CEMENTED \_\_\_\_\_ SIZE \_\_\_\_\_ No. Ft. \_\_\_\_\_ Date \_\_\_\_\_  
Amount of cement used (bags) \_\_\_\_\_  
Name of Service Co. see reverse side  
COAL WAS ENCOUNTERED AT none FEET \_\_\_\_\_ INCHES \_\_\_\_\_  
FEET \_\_\_\_\_ INCHES \_\_\_\_\_ FEET \_\_\_\_\_ INCHES  
FEET \_\_\_\_\_ INCHES \_\_\_\_\_ FEET \_\_\_\_\_ INCHES

RESULT AFTER TREATMENT (Initial open Flow or bbls.) 23,260 MCF (Newburg Sand)  
ROCK PRESSURE AFTER TREATMENT 92 HOURS Tubing 1990# - B. H. 2060#  
Fresh Water \_\_\_\_\_ Feet \_\_\_\_\_ Salt Water \_\_\_\_\_ Feet \_\_\_\_\_  
Producing Sand Newburg Sand Depth 5285-5310'

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Sand and Clay			0	50			
Sand			50	90			
Sand and Shale			90	205			
Shale			205	230			
Sand			230	245			
Sand and Shale			245	260			
Shale			260	287			
Sand			287	310			
Sand and Shale			310	330			
Sand			330	400			
Shale			400	470			
Sand			470	600			
Shale			600	640			
Sand			640	750			
Sand and Shale			750	800			
Shale			800	840			
Sand and Shale			840	900			
Sand			900	960			
Sand and Shale			960	1015			
Lime and Dolomite			1015	1090			
White Salt Sand			1090	1170			
Sand - MZ			1170	1190			
Lime - L.L?			1190	1210			
Sand - MZ - B. M. ...			1210	1250			
Sand and Shale			1250	1260			
Shale - P.C.			1260	1280			



Formation	Color	Hard or Soft	Top 4	Bottom	Oil, Gas or Water	Depth Found	Remarks
Big Lime			1280	1435			
Big Injun Sand - 365			1435	1470			
Shale - Macphady			1470	1522			
Shale and Sand			1522	1900			
Sandy Shale			1900	3140			
Shale			3140	4510			
Lime			4510	5105			
Shale and Lime			5105	5115			
Lime			5115	5122			
Lime and Shale			5122	5130			
Lime			5130	5185			
Lime and Shells			5185	5190			
Lime			5190	5284			
Sand Newburg			5284	5315			
Lime - McKenzie			5315	5345			
Total depth-----				5345' Drillers' Meas. =			
Plugged back depth-----				5346' Schlumberger's Meas.			
				5337'			
<u>Schlumberger's Log showed</u>							
Big Lime			1196	1433			
Big Injun			1433	1474			
Newburg Sand			5285	5310			
<u>CASING RECORD</u>							
8-30-65	Set and cemented 13-3/8" 48# H-40 new casing with steel shoe at 354' RTM. Cemented with 100 sacks regular Portland Cement mixed 3% with Calcium Chloride. Pumped plug to 344'. Good circulation - by Halliburton.						
9-3-65	Set and cemented 9-5/8" 32.3# H-40 casing with Guide Shoe at 1522' RTM. Cemented with 100 sacks regular cement with 3% Calcium Chloride. Pumped plug to 1516'. Centralizers at 1491, 1427' and 1362'. Pumped 24 sacks Gel and 200# Flocele with 121 bbls. water to kill gas. Good Circulation - by Halliburt on						
9-18-65	Set and cemented 4-1/2" 11.6# J-55 new casing with Baker Cement Whirler Guide shoe at 5345' RTM. Run centralizers at 5343', 5312', 5280', 5205', 5130' and 5055'. Ran Baker Hinge Lok Wall Scratchers on 12' centers 5345' to 5093'. Float collar at 5337'. Cemented with 140 sacks Pozmix Cement mixed with 3% Calcium Chloride. Pumped 500 gallons mud flush ahead of cement. By Halliburton						
9-3-65	Ran Schlumberger Logs thru the Big Injun: Gamma Ray, Density and Caliper.						
9-17-65	Ran Schlumberger Logs through T. D. - Drillers' T. D. 5345' - Schlumberger's 5, 346'. Ran Gamma Ray, Caliper, Density and Induction Logs.						
9-20-65	Ran Cement Bond Log, Gamma Ray Correlation Log and Collar Locator Log. Bond Log indicates fair bonding 5321-5352' - good bonding 5252-5206' - fair 5206-5154' and good 5154' to indicated top of cement at 4,068'						

DEVELOPMENT OF WELLS Date \_\_\_\_\_, 19\_\_

APPROVED \_\_\_\_\_, Owner

By \_\_\_\_\_ (Title)

Formation	Color	Hard or Soft	Top 9A	Bottom	Oil, Gas or Water	Depth Found	Remarks
GW-1559,	W. C. Hardy, Jr., et al #21						
9-20-65	Perforated Newburg Sand 5286-5292' with 3 cone shots/foot.						
9-21-65	Killed well with mud and ran tubing with cage to 5,268'. Gas gauging 1,209 MCF/day.						
10-4-65	Fraced Newburg Sand						
	Pumped 1,000 gallons regular 15% and 500 gallons mud acid down tubing and spotted on bottom. Fractured down the annulus. Pumped acid into formation at 3,500#. Followed with 13,000# 20-40 sand in 18,000 gallons of gelled water. Maximum treating pressure 5,000#. Average treating pressure 4,683#. Average injection rate 12.5 bbls/minute. Used 486 bbls. frac and load water. Opened well immediately and started flowing back. Gas gauging 20,369 MCF/day after blowing 3-1/2 hours - gas wet.						
10-8-65	92 hour shut in pressure tubing 1990# - Braden head 2,060#. Blew 4 hours. FOF 23,260 MCF with very light mist of fluid.						



Date October 13, 19 65

APPROVED Cities Service Oil Company, Owner

By L. D. Todd, District Sup't  
(Title)