OBVERSE HIGHLANDER RESOURCE	ES.INC		State Cour	ity Permit
LLOYD BLAKE	, ,	Date: I	December 5,	, 19 83
BLAKE-WOLF RUN WA-5		Operator Well No.	One (1) Wolf 784	m-Blake
DEPARTNE Big Stone	IA OIL AND GAS IN ENT OF LABOR AND DIVISION OF MINE 219 Wood Avenue Gap, Virginia Phone 703-523-033	INDUSTRY S 24219-2799	DEC 1983 MINES ABINGUUN, 14	WA-5
REPORT O	OF COMPLETION OF	WELL WORK		
Pursuant to Regulation Gas Act, the undersigned well ope work specified below on the refer Washington County	erator reports corenced well in	ompletion of	of the type(s)	
WELL TYPE: Oil / Gas x / End If "Gas", Production	nanced recovery_x/ Underground	_/ Waste l storage_	disposal/ /	
Exempt by Code § 45.2 gas conservation law			and	
WELL WORK: Drillx/ / Deepen	on/ Perforate	e new form		
The well work was done type(s) of well work involved. well, the certification of the l	If the well work	included	the drilling of	
CONFIDENTIALITY STATUS UNDER COD		*		
Ninety days from the fi	ling of this rep	ort,		
Two years from the referenced well was well as defined in Code	s completed, the	well being		у
APPLICANT:	By Rock	er Resource	es, Irq.	
Address:	P. O. Bo	x 1018 * Gr	caham, Txas 760	146
Telephone:	817+549-	5490		

API Well No. 45 - County Permit

FORM 17 (Draft 07-09-82)

- OBVERSE INCHIANDS P.

ORM 17 (Draft	07-09-82)	
APPENDIXTYPE	A, SHEET 1 (C	BVERSE)

API Well No	. 45	
	State County	Permit
Date:	December 5,	19_83
Operator's	One(1) Wolf Ru	n-Blake

REPORT OF COMPLETION OF WELL WORK IF DRILLING, REDRILLING OR DEEPENING IS INVOLVED

DRILLING CONTRACTOR Ray Resources, Inc.
Charlston, West Virginia Address: Telephone:
GEOLOGICAL TARGET FORMATION Top/Devonian
DEPTH OF COMPLETED WELL 7140' feet Che mung
DRILLING RIG Rotary X / Cable tool/
GEOLOGICAL DATA Depth Thickness Top Bottom
Fresh water: refer to geologic report of Charles S. Bartlett, Jr., attached 240',398; 3809'
Salt water:
MINING IN AREA
Coal seams: NoNE
Name
0il and gas: 1525' Show of gas (Fido) 1640' 4528' (Little Valley)
4528
The data on depth of strata is based on the source(s) checked below: Applicant's own drilling experience in the area Information supplied by the coal operator in the area Information already in the possession of the Inspector As follows: electric log correlation with well sample returns

FORM 17 (Draft 07-09-82)
APPENDIX--TYPE A, SHEET 1 (REVERSE)

OTHER GENERAL INFORMATION

- An electric log survey was x/ was not / conducted pursuant to Code of Virginia § 45.1-333.B.2, at the coal owner's or operator's request.
- An electric log survey was **/ was not__/ run for other purposes. This survey did__/ did not **/ disclose the vertical location of a coal seam.
 - Note: If a coal seam was located, the part of the survey from the surface through the coal is attached in accordance with Code of Virginia § 45.1-333.B.3.
- Deviation surveys were __/ were not x_/ required under Code of Virginia \$45.1-333.C "to the bottom of the lowest published coal seam depth".
 - Note: If deviation surveys were required, the survey results are attached.
- A continuous survey was __/ was notx_/ required under Code of Virginia § 45.1-333.C.
 - Note: If a continuous directional survey was required, the survey results are attached.

CHANGES IN THE PERMITTED WELL WORK

The well operator did / did not \underline{x} / make any change(s) in the permitted well work, verbally approved by the Inspector or Assistant Inspector under Regulation 4.03 of the Regulations under the Virginia Oil and Gas Act, for the purpose of insuring successful completion of the well work.

Note: The nature and purpose of each such change, if any, is set out below or on additional sheets if such are required.

will /

will not

ALL	Well	No.	45		-
			-		
			State	County	Permit

CASING AND TUBING PROGRAM

PRELIMINARY IN	FORMATION					
Is the subject well If "Yes", was a coa	underlaid I protection	by the red s	shales? Yes_t to the red s	_/ No_x_/shales? Yes	/ No	/ .
PROGRAM DETAIL	LS .	a was		Perf	orated	
Size	Тор	Bottom	Length	From	То	
Conductor 11-3/4"	ground	598				
Casing circulated a	and camenta	in to the	syrface:		* : :	
obsing circulated a	ind Cemented	I III to the	surrace.			
7 7/8"	14'	4180	4166'	top of ceme	nt at 4120'	
Coal protection cas	sing set und	der the spec	ial rule of C	ode of Virgi	nia § 45.1-	334.
	N/A					
Other casing and to	ubing left	in the well:		× (*) ×		
	•					
	none					. •
Liners left in wel	1, under Co	de of Virgin	ia § 45.1-336	or otherwis	e:	,
	none					
Other casing used	in drilling	but not lef	t in the well	:		
N.K.	none	** *				
		*** 1	6:			
Packers or bridge	plugs:	Kind	Size	26	et At	- 1
	none			, ,		
REMARKS (SHUT	DOWN DEPTH	IS, DATES; F	ISHING JOB DEI	PTHS, DATES;	CAVING; ET	C.)
well is now tempora	arily abando	oned, pending	casing remova	l and fiaal p	olugging	
SAMPLES AND	CUITINGS					

will not__/ be available for examination by a member of the

be furnished the Virginia Geological Survey upon

Virginia Geological Survey; .

request;

rORN 17 (Draft 07-09-82)
APPENDIX--TYPE A, SHEET 2 (REVERSE)

DRILLER'S LOG

Compiled by C.S.Bartlett, Jr., Phd.

General Depth (feet)
Geologic Age Formation Lithology Color Top Bottom Thickness Remarks



BARTLETT & ASSOCIATES

GEDLOGICAL CONSULTANTS

102 S. COURT STREET
ABINGDON, VIRGINIA 24210
703/628-333833
4136

Top 1877' low to Early Grove #2 Ridgeway.

TO: Mr. W. D. Hale
Highlander Resources
P.O. Box 1123
Graham, Texas 76046

FROM: Charles S. Bartlett, Jr., Ph.D.

RE: Summary and completion recommendations - Highlander #1 Blake, Wolf Run Prospect, Washington County, Virginia.

7054'

7090'

FORMATION TOPS:

Berea Sand

FORMATION TOPS:			
NAME	TOP	BASE	NOTES
Pennington Formation	spud in	515'	H20 @ 240, mist drill_1" flow H20 @ 398'.
Cove Creek Limestone	515'	1530'	
Fido Sandstone	1530'	1587'	Gas show @ 1525', @ 1640' continuous flare, estimated 500 MCF gradual blow down to gas on conn. in 2 days.
Gasper Limestone	1587'	2615'	Top 889' low to Early Grove #1 Dorton.
Ste. Genevieve Limestone	2615'	3940'	Top 869' low to #1 Dorton. H20 @ 3809', mud up.
St. Louis (Hillsdale) Fm.	3940 '	4355'	Top 897' low to #1 Dorton. Lost circulation @ 3964'. Est 8500 BBL. wtr. lost. Set 8 5/8" @ 4180'. ? wtr. @ 4319', squeeze w/150 sacks, Mist drill.
Little Valley Formation	4355'	5030'	Top 894' low to #1 Dorton. Gas flare @ 4528', continuous blow w/ slugs of H2O, est.500 + MCI H2O increase @ 4630' mud up @ 4665', gas kick in mud @ 4885'.
McCrady Formation	5030'	6300 '	Top 754' low to #1 Dorton, gas kick in mud @ 5101'.
Price Formation Hayters Sand Mbr. Greendale Mbr. Big Stone Gap Shale	6300' 6350' 6425' 7050'	7090' 6425' 7050' 7054'	Top 1734' low to #1 Dorton
2 0 1	70541	70001	T 10771 1 4- F1- C #2 D: 1

DRILLER'S LOG

Compiled by C.S.Bartlett, Jr., Phd.

Geologic Age Formation Lithology Color Top Bottom Thickness Remarks



BARTLETT & ASSOCIATES GEOLOGICAL CONSULTANTS

ABINGDON, VIRGINIA 24210 703/628-3381 4136

TO: Mr. W. D. Hale
Highlander Resources
P.O. Box 1123
Graham, Texas 76046

FROM: Charles S. Bartlett, Jr., Ph.D.

RE: Summary and completion recommendations - Highlander #1 Blake, Wolf Run Prospect, Washington County, Virginia.

FORMATION TOPS:

NAME	TOP	BASE	NOTES
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Cove Creek Limestone	515'	1530'	
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Price Formation Hayters Sand Mbr. Greendale Mbr. Big Stone Gap Shale Berea Sand	6300' 6350' 6425' 7050' 7054'	7090' 6425' 7050' 7054' 7090'	Top 1734' low to #1 Dorton Top 1877' low to Early Grove #2 Ridgeway.
Chemung Formation	7090	7140' T.	D.

BLAKE (

FLUI	ID SA	MPLE DAT	٨	Dote 4-21-	-81	Ticket Numbe	15129	96	Sec 1	
Sompler Pressure_ Recovery: Cu. Ft.	-	P.S.I.0	G. at Surface	Kind of D.S.T. OPE	N HOLE T	EST Hallibu		RSON	Location Twp Rng	
cc. Oil									-135	
· cc. Wo	iter			Tester STE	VE RAINW	IATER Witness	DAVES	HREVE		Lease Name
cc. Mu				Drilling	DAV DECO	UDCEC.	-		E	S Z
					RAY RESO			TJH S	WALLAC	ome .
Gos/Oil Ratio		• API @	*F _cu. ft./bbl.	Formation Teste	UIPMEN	Mc Cready	DATA		-AC	
				Elevation		2123'		Ft.	E	
		C	HLORIDE ONTENT	Net Productive				Ft.		
Recovery Water		@ •F		All Depths Mea		Kelly Bush	ing	, ,,	DR.	
Recovery Mud		@ •F		Total Depth		5184'		Ft.	AN	
Recovery Mud Fil		@ •F		Main Hole/Casi	-	7 7/8"			31E	1
Mud Pit Somple		@ °F	ppm	Drill Collar Len			2.0	26"	1	. €
Mud Pit Sample F	iltrate	@ •F		Drill Pipe Lengt Pocker Depth(s)_		4770' I.D 4802' - 48			1	Well No.
Mud Weight		10.0 vis	3/	Depth Tester Vo		4786'	1.02	I t.	1	.
TYPE	AMOUNT		Depth Back		Surface	Bo	ttom		1	1
			Pres. Valve		Choke	./5	noke .75	<u> </u>	1—	Test No.
Recovered	1260	Feet of salt	water.						Field	, Z
D								1.	-	'
Recovered		Feet of						From		1
Recovered		Feet of						Tester	Σ	
			1:							
Recovered		Feet of						Volve	WILDCAT	
									1	4
Recovered		Feet of							-	Teste.
Remarks 5	SEE DDOF	DUCTION TEST	DATA SHEE	т						
, chora	SLL PROL	OCTION IEST	DAIN SHEE							Intervo
					×					200
										- 84
									County	
				*					nty	
	6 11	0550	I C N	2551	C No.				_	
TEMPERATURE	Gauge No.		Gauge No.	2551 4838 _{F1}	Gauge No.			1ME 14:00 hrs.)	AS	1
	Depth:	4787 Ft. 24 Hour Clock	Depth:	24 Hour Clock	Depth:	Hour Clock	Tool		H	
Est. 110 °F.	Blanked O		Blanked Off	YES	Blanked Of			0829	WASHINGTON	=
110 7.	Didriked O		Diotined Oil		Didinico Oi		01	1308	0.1	16
Actual °F.		Pressures	Pre	ssures	Pr	ressures	Bypass	1300		
	Field	Office	Field	Office	Field	Office	Reported	Computed		Lease
nitial Hydrostatic	2498	2503.2	2556	2539.4			Minutes	Minutes	100	
Flow Initial	525	521.3	543	557.1		-	35	36	State	T. R.
Flow Final	607	616.7	935	650.3 936.2			63	62		RESOURCES
Closed in	920 689	904.5	690	687.9					<	N R
Flow Final	706	703.9	722	735.2			91	87	IR	CE
Closed in	920	896.3	935	926.4			90	94	VIRGINIA	Owner/Company Name
Initial									AIA	
Flow Final									-	
Closed in			0507	2521.3					1	
Final Hydrostatic	2/102	2485 3	2507	1 2521 7	1	1			4	1 1

FORM. 17	(Draft	07-09-82)
OBVERSE		

API Well No. 45 - State County Permit

Date: December 5, , 1983

Operator's

VIRGINIA OIL AND GAS INSPECTOR
DEPARTMENT OF LABOR AND INDUSTRY
DIVISION OF MINES
219 Wood Avenue

Big Stone Gap, Virginia 24219-2799 Phone 703-523-0335

Permit No. One (1) No. 15 Februs Blake Permit No. DEC 1983 PECTOR NDUSTRY ASIA-GUENE 4219-2799

	REPORT OF COMPLETION OF WELL WORK
Gas Act, th work specif	ursuant to Regulation 4.06 of the Regulations under the Virginia Oil and e undersigned well operator reports completion of the type(s) of well ied below on the referenced well in
WELL TYPE:	Oil/ Gas * / Enhanced recovery/ Waste disposal/ If "Gas", Production x / Underground storage/
	Exempt by Code § 45.1-300.B.1 from general oil and gas conservation law: Yes/ No_x/
WELL WORK:	Drill x / Deepen / Redrill / Stimulate x / Plug off old formation / Perforate new formation x / Plug x / Replug / Other physical change in well (specify)
type(s) of well, the confidential	The well work was done as shown in the Appendix(es) applicable to the well work involved. If the well work included the drilling of a new certification of the location is on the reverse hereof. ALITY STATUS UNDER CODE OF VIRGINIA § 45.1-332: Inety days from the filing of this report,
tl	wo years from 4/17, 19 81, the date on which he referenced well was completed, the well being an exploratory hell as defined in Code of Virginia § 45.1-288.21.
	APPLICANT: Highlander Resources, Inc. By Occup Llll Its Corporate Secretary - Rocky Arrell
	Address: P. O. Box 1018 * Graham, T xas 76046
	817+549-5490

Telephone:

FORM	17	(Draft	07	-09-82))	
APPEN	DI	TYPE	Λ.	SHEET	1	(OBVERSE)

WIT WELL WO	. 47		
K	State	County	Permit
Date:	Decembe	r 5,	19_83
Operator's Well No.	One(1)	Wolf Ru	n-Blake

REPORT OF COMPLETION OF WELL WORK IF DRILLING, REDRILLING OR DEEPENING IS INVOLVED

DRILLING CONTRACTOR	Ray Resources, Inc.		
Address	Charlston, West Virgi	inia	
GEOLOGICAL TARGET I	FORMATION Top/Devonian	1	POSTATA STATUT TO BOOK TO AND AN AND AND AND AND AND AND AND AND
DEPTH OF COMPLETED	WELL 7140' feet	Che mung	
	ary x / Cable tool/	•	
GEOLOGICAL DATA	Depth Thickness Top Bottom	<u>ss</u>	
Fresh water:	refer to geologic report of 240',398;380	of Charles S. Bartlett,	Jr., attached
Salt water:			
			MINING IN AREA? Nined
Coal seams: NON	E	Name	Yes No Out
Oil and gas:	1525' show of gas (Fid 1640' 4528' (Litt	Name Name	
-	ta on depth of strata is Applicant's own drilling Information supplied by Information already in As follows: electric lo	g experience in the are the coal operator in t the possession of the I	he area nspector

OTHER GENERAL INFORMATION

- An electric log survey was x/ was not / conducted pursuant to Code of Virginia § 45.1-333.B.2, at the coal owner's or operator's request.
- An electric log survey was **/ was not / run for other purposes. This survey did / did not **/ disclose the vertical location of a coal seam.
- Note: If a coal seam was located, the part of the survey from the surface through the coal is attached in accordance with Code of Virginia § 45.1-333.B.3.
 - Deviation surveys were / were not x / required under Code of Virginia § 45.1-333.C "to the bottom of the lowest published coal seam depth".
 - Note: If deviation surveys were required, the survey results are attached.
 - A continuous survey was __/ was notx_/ required under Code of Virginia § 45.1-333.C.

Note: If a continuous directional survey was required, the survey results are attached.

CHANGES IN THE PERMITTED WELL WORK

The well operator did $_/$ did not \underline{x} / make any change(s) in the permitted well work, verbally approved by the Inspector or Assistant Inspector under Regulation 4.03 of the Regulations under the Virginia Oil and Gas Act, for the purpose of insuring successful completion of the well work.

Note: The nature and purpose of each such change, if any, is set out below or on additional sheets if such are required.

ALI	Well	No.	45		-	
			-	County		Permit

CASING AND TUBING PROGRAM

PRELIMINAR	Y	INFORMATION

Is the subject well underlaid If "Yes", was a coal protect	d by the red	shales? Yes_t to the red s	/ Nox/ hales? Yes_/ No_/
			•
PROGRAM DETAILS	in section in		Perforated
Size Top	Bottom	Length	From To
Conductor 11-3/4" ground	598 •		*
Casing circulated and cement	ed in to the	surface:	*
7 7/8" 14'	4180	4166'	top of cement at 4120'
Coal protection casing set u	under the spec	cial rule of Co	de of Virginia § 45.1-334.
N/A			
Other casing and tubing left	t in the well	<u>.</u>	
none			
Liners left in well, under	Code of Virgi	nia § 45.1-336	or otherwise:
none			
Other casing used in drilli	ng but not le	ft in the well	
none	*** *		
Packers or bridge plugs:	Kind	Size	Set At
none			
REMARKS (SHUT DOWN DEP	THS, DATES; F	ISHING JOB DEP	THS, DATES; CAVING; ETC.)
well is now temporarily aban	doned, pending	g casing removal	and fimal plugging
SAMPLES AND CUITINGS			
will/ will not/ be	available fo	or examination	by a member of the
will/ will not/ be	e furnished th	gical Survey; ne Virginia Geo	ological Survey upon
will/ will not/ re samples are being held by Ch	equest; equire sacks marles S. Bart	to be furnished lett, Jr.'s off	l by the Survey. ice in Abingdon, VA

DRILLER'S LOG

Compiled by C.S.Bartlett, Jr., Phd.

Geologic Age Formation Lithology Color Top Bottom Thickness Remarks



BARTLETT & ASSOCIATES GEOLOGICAL CONSULTANTS

102 S. COURT STREET
ABINGDON, VIRGINIA 24210
703/628-328
4136

TO: Mr. W. D. Hale Highlander Resources P.O. Box 1123 Graham, Texas 76046

FROM: Charles S. Bartlett, Jr., Ph.D.

RE: Summary and completion recommendations - Highlander #1 Blake, Wolf Run Prospect, Washington County, Virginia.

FORMATION TOPS:

Chemung Formation

FORMATION TOPS:		
NAME	TOP BASE	NOTES
Pennington Formation	spud in 515'	H20 @ 240, mist drill,1" flow H20 @ 398'.
Cove Creek Limestone	515' 1530'	
Fido Sandstone	1530' 1587'	Gas show @ 1525', @ 1640' continuous flare estimated 500 MCF gradual blow down to gas on conn. in 2 days.
Gasper Limestone	1587' 2615'	Top 889' low to Early Grove #1 Dorton.
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St. Louis (Hillsdale) Pm.	3940' 4355'	Top 897' low to #1 Dorton. Lost circulation 3964'. Est 8500 BBL. wtr. lost. Set 8 5/0 4180'. ? wtr. @ 4319', squeeze w/150 sac Mist drill.
Little Valley Formation	4355' 5030'	Top 894' low to #1 Dorton. Gas flare @ 45 continuous blow w/ slugs of H2O, est.500 + H2O increase @ 4630' mud up @ 4665', gas k in mud @ 4885'.
McCrady Formation	5030' 6300'	Top 754' low to #1 Dorton, gas kick in mud 5101'.
Price Formation Hayters Sand Mbr. Greendale Mbr. Big Stone Gap Shale Berea Sand	6300' 7090' 6350' 6425' 6425' 7050' 7050' 7054' 7054' 7090'	Top 1877' low to #1 Dorton Top 1877' low to Early Grove #2 Ridgeway.
20200 0000		

7090' 7140' T.D.

9"		DIE DAT	T 1	1					
FL	JID SAM				-81	Ticke Numl		296	- 1
Sampler Pressur Recovery: Cu.		isino, di sariace		Kind of D.S.T. OP	EN HOLE	Hallib	ourton		
cc. (J. 2.3.1. OF	LIV HOLE	IEST Locat	ion HENL	DERSON	-	
' cc. V			Tester ST	EVE RAIN	WATER Witne	DAVE	SHREVE	19	
cc. A				Drilling		WITH WITH	ESS DAVE	SHKLVE	\dashv
	Liquid cc			Contractor	RAY RES	DURCES		TJH S	
		API @	°F.	E (QUIPME	NT & HOL			7
Gos/Oil Ratio_			cu. ft./bbl.	Formation Test	ed	Mc Cready			
	RES	SISTIVITY C	HLORIDE	Elevation		2123'		F	t.
Recovery Water		@ °F	ppm	Net Productive		Kelly Bus	hina	F	t. - t. - t. -
Recovery Mud	-	@ °F	ppm	All Depths Med Total Depth		5184'	ning		- 1
Recovery Mud I	Filtrote	@ °F	ppm	Main Hole/Cas		7 7/8"			t.
Mud Pit Somple	-	@ °F	ppm	Drill Collar Ler	-		D		- ;
Mud Pit Sample				Drill Pipe Leng		47701		826"	_
Mud Weight		0 0	37	Packer Depth(s)			810-1		t.
		0.0 vis	sec.	Depth Tester V	alve	4786'		F	t.
TYPE Cushion	AMOUNT	F+	Depth Back Pres. Valve		Surface Choke		Bottom	r 11	
			. Ties. Valve		Choke	./5	Choke .7	5"	\dashv _
Recovered	1260 Fe	et of salt	twater.						Area
									Mea
Recovered	Fe	et of							From
D	_				*			1	
Recovered	re	et of							2
	Faceured								
Recovered	Fee	et of						1	
Recovered	Fee	et of							WILUCA!
Recovered		et of						40	LUCAI
Recovered	Fee	et of						40.40	LUCAI
	Fee		DATA SHEE	T					LDCAI
Recovered	Fee	et of	DATA SHEE	I				4 6	LUCAI
Recovered	Fee	et of	DATA SHEE	I				4 6	LUCAI
Recovered	Fee	et of	DATA SHEE	I				9 0 0	LUCAI
Recovered	Fee	et of	DATA SHEE	I				0 0	
Recovered	Fee	et of	DATA SHEE	I				4 0	
Recovered	Fee	et of	DATA SHEE	I				4 C V V V V V V V V V V V V V V V V V V	LUCAI County
Recovered	SEE PRODUC	ETION TEST							County
Recovered	SEE PRODUC	ETION TEST	Gauge No.	2551	Gauge No.		100.00	IME	County
Recovered Remarks	SEE PRODUC	2552 4787 Ft.		2551 4838 _{Ft.}	Gauge No.	Ft.	(00:00-2		County
Recovered Remarks TEMPERATURE	SEE PRODUC	2552 4787 Ft.	Gauge No. Depth:	2551 4838 _{Ft.} 24 Hour Clock	Depth:	Hour Clock	Tool	IME 24:00 hrs.)	County
Recovered Remarks TEMPERATURE	SEE PRODUC	2552 4787 Ft.	Gauge No.	2551 4838 _{Ft.}		Hour Clock	Tool Opened	IME 24:00 hrs.)	County
Recovered Remarks TEMPERATURE	SEE PRODUC Gauge No. Depth:	2552 4787 Ft. 24 Hour Clock	Gauge No. Depth: Blanked Off	2551 4838 _{Ft.} 24 Hour Clock YES	Depth: Blanked Of	Hour Clock	Tool Opened	IME 24:00 hrs.)	
Recovered Remarks TEMPERATURE st. 110 °F.	SEE PRODUC Gauge No. Depth:	2552 4787 Ft.	Gauge No. Depth: Blanked Off	2551 4838 _{Ft.} 24 Hour Clock	Depth: Blanked Of	Hour Clock	Tool Opened Opened	IME 24:00 hrs.)	County
Recovered Remarks TEMPERATURE st. 110 °F.	Gauge No. Depth:	2552 4787 Ft. 24 Hour Clock NO	Gauge No. Depth: Blanked Off Pres	2551 4838 Ft. 24 Hour Clock YES ssures Office 2539.4	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass	IME 24:00 hrs.) 0829 1308	County WASHINGTON
Recovered Remarks TEMPERATURE st. 110 °F.	Gauge No. Depth: Blanked Off Pres Field 2498 525	2552 4787 Ft. 24 Hour Clock NO	Gauge No. Depth: Blanked Off Pres	2551 4838 Ft. 24 Hour Clock YES ssures 0ffice 2539.4 557.1	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass Reported Minutes	1ME 24:00 hrs.) 0829 1308 Computed Minutes	County WASHINGTON
Recovered Remarks TEMPERATURE st. 110 °F.	Gauge No. Depth: Blanked Off Pres Field 2498 525 607	2552 4787 Ft. 24 Hour Clock NO sources Office 2503.2	Gauge No. Depth: Blanked Off Pres Field 2556 543 624	2551 4838 Ft. 24 Hour Clock YES ssures Office 2539.4 557.1 650.3	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass Reported Minutes 35	1ME 24:00 hrs.) 0829 1308 Computed Minutes	County
Recovered Remarks TEMPERATURE st. 110 °F.	Gauge No. Depth: Blanked Off Pres Field 2498 525 607 920	2552 4787 Ft. 24 Hour Clock NO sures 0ffice 2503.2 521.3 616.7 904.5	Gauge No. Depth: Blanked Off Pres Field 2556 543 624 935	2551 4838 Ft. 24 Hour Clock YES ssures 0ffice 2539.4 557.1 650.3 936.2	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass Reported Minutes	1ME 24:00 hrs.) 0829 1308 Computed Minutes	County WASHINGTON State
TEMPERATURE st. 110 °F. Actual °F. mitial Hydrostatic Final Closed in	Gauge No. Depth: Blanked Off Pres Field 2498 525 607 920 689	2552 4787 Ft. 24 Hour Clock NO sures 2503.2 521.3 616.7 904.5 649.6	Gauge No. Depth: Blanked Off Pres Field 2556 543 624 935 690	2551 4838 Ft. 24 Hour Clock YES ssures 0ffice 2539.4 557.1 650.3 936.2 687.9	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass Reported Minutes 35 63	0829 1308 Computed Minutes 36 62	County WASHINGTON State
TEMPERATURE st. 110 °F. ctual °F. itial Hydrostatic Flow Initial Final Closed in	Gauge No. Depth: Blanked Off Pres Field 2498 525 607 920 689 706	2552 4787 Ft. 24 Hour Clock NO sures 0ffice 2503.2 521.3 616.7 904.5 649.6 703.9	Gauge No. Depth: Blanked Off Pres Field 2556 543 624 935 690 722	2551 4838 _{Ft.} 24 Hour Clock YES ssures 0ffice 2539.4 557.1 650.3 936.2 687.9 735.2	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass Reported Minutes 35 63	1ME 24:00 hrs.) 0829 1 308 Computed Minutes 36 62 	County WASHINGTON State
TEMPERATURE st. 110 °F. actual °F. Titial Hydrostatic Final Closed in Initial Final Closed in	Gauge No. Depth: Blanked Off Pres Field 2498 525 607 920 689	2552 4787 Ft. 24 Hour Clock NO sures 2503.2 521.3 616.7 904.5 649.6	Gauge No. Depth: Blanked Off Pres Field 2556 543 624 935 690	2551 4838 Ft. 24 Hour Clock YES ssures 0ffice 2539.4 557.1 650.3 936.2 687.9	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass Reported Minutes 35 63	0829 1308 Computed Minutes 36 62	County WASHINGTON State
TEMPERATURE st. 110 °F. ctual °F. initial Hydrostatic Final Closed in Initial Final Closed in Initial Final Closed in	Gauge No. Depth: Blanked Off Pres Field 2498 525 607 920 689 706	2552 4787 Ft. 24 Hour Clock NO sures 0ffice 2503.2 521.3 616.7 904.5 649.6 703.9	Gauge No. Depth: Blanked Off Pres Field 2556 543 624 935 690 722	2551 4838 _{Ft.} 24 Hour Clock YES ssures 0ffice 2539.4 557.1 650.3 936.2 687.9 735.2	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass Reported Minutes 35 63	1ME 24:00 hrs.) 0829 1 308 Computed Minutes 36 62 	County WASHINGTON State
TEMPERATURE st. 110 °F. Setual °F. Setual Flow Initial Final Closed in Initial Final Final Final Final Final Final Final Final Final	Gauge No. Depth: Blanked Off Pres Field 2498 525 607 920 689 706	2552 4787 Ft. 24 Hour Clock NO sures 0ffice 2503.2 521.3 616.7 904.5 649.6 703.9	Gauge No. Depth: Blanked Off Pres Field 2556 543 624 935 690 722	2551 4838 _{Ft.} 24 Hour Clock YES ssures 0ffice 2539.4 557.1 650.3 936.2 687.9 735.2	Depth: Blanked Off	Hour Clock	Tool Opened Opened Bypass Reported Minutes 35 63	1ME 24:00 hrs.) 0829 1 308 Computed Minutes 36 62 	County WASHINGTON State
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FORM ISI-E2 - PRINTED IN U.S.A

VLI	Kell	No.	45	-	-
			State	County	Permit

December 5, 19 83 Date:

Operator's

Well No. One (1) Wolf Bun-Blake

Permit No.

VIRGINIA OIL AND GAS INSPECTOR DEPARTMENT OF LABOR AND INDUSTRY DIVISION OF MINES 219 Wood Avenue Big Stone Gap, Virginia 24219-2799 Phone 703-523-0335



	PEDODA OF	COMPLETION OF HELL HODY	
	KEPORT OF	COMPLETION OF WELL WORK	
Gas Act, th work specif	e undersigned well oper ied below on the refere	.06 of the Regulations under the Virginia rator reports completion of the type(s) of enced well in Dis Virginia:	
WELL TYPE:		anced recovery/ Waste disposal/ x_/ Underground storage/	
	Exempt by Code § 45.1 gas conservation law:	-300.B.1 from general oil and Yes/ No_x/	
WELL WORK:		Redrill/ Stimulate x / n/ Perforate new formation_x / in well (specify)	
CONFIDENTI		of VIRGINIA § 45.1-332: ing of this report,	
	or		
t	he referenced well was	4/17, 19 81, the date on which completed, the well being an exploratory of Virginia § 45.1-288.21.	
	APPLICANT:	Highlander Resources, Inc.	
		By Its Corporate Secretary - Rocky Arrell	
	Address:	P. O. Box 1018 * Graham, T xas 76046	
	Telephone:	817+549-5490	1 1
	rerephone.		

CERTIFICATION OF LOCATION OF A NEW WELL

I, the undersigned, hereby certify that I am fashowing the permitted location of the new well referenced and that I am the engineer/ surveyor/ who verified location of the replaced stake/ well/, after the readied, does in fact comply with the standard of Regular	d on the object that the e well site	verse hereof; actual surface was cleared and
Regulations under the Virginia Oil and Gas Act, as follow		· ·
		*
within three feet of the location designated on the well plat in an area underlain	n í	
by known coal seams identified by the Chie		* *
of the Division of Mines pursuant to Code	55	* · · ·
of Virginia § 45.1-333, or		
within ten feet of the location designated		
by the well plat in other areas.	4	
	,	
(Name)		

FORM	17	(Draft	07	-09-82)	1	
APPEN	CDI	YTYPE	Α.	SHEET	1	(OBVERSE)

W	A-5
V	

API	Well	No.	45		
				County	Permit

Operator's

Well No. One(1) Wolf Run-Blake

REPORT OF COMPLETION OF WELL WORK IF DRILLING, REDRILLING OR DEEPENING IS INVOLVED

DRILLING CONTRACT	OR Ray Resources, Inc.		
Addres Telephon			
	X		
GEOLOGICAL TARGET	FORMATION Top/Devonian		
DEPTH OF COMPLETE	ED WELL 7140' feet Ch	s mon 9	
DRILLING RIG RO	otary X / Cable tool/		
GEOLOGICAL DATA	Depth Thickness Top Bottom		
Fresh water:	refer to geologic report of Char	cles S. Bartlett	, Jr., attached
Salt water:			
		N	MINING IN AREA? Nined
Coal seams:		Name	Yes No Out
		Nama	
Oil and gas:		Name	- 1
The c	Applicant's own drilling expe Information supplied by the control in the pool of the control of the pool of the po	rience in the a oal operator in ssession of the	rea the area Inspector

FORM 17 (Draft 07-09-82)
APPENDIX--TYPE A, SHEET 1 (REVERSE)

OTHER GENERAL INFORMATION

- An electric log survey was x/ was not / conducted pursuant to Code of Virginia § 45.1-333.B.2, at the coal owner's or operator's request.
- An electric log survey was * / was not _ / run for other purposes. This survey did _ / did not * / disclose the vertical location of a coal seam.
- Note: If a coal seam was located, the part of the survey from the surface through the coal is attached in accordance with Code of Virginia § 45.1-333.B.3.
 - Deviation surveys were __/ were $not \times$ / required under Code of Virginia § 45.1-333.C "to the bottom of the lowest published coal seam depth".
 - Note: If deviation surveys were required, the survey results are attached.
 - A continuous survey was __/ was notx_/ required under Code of Virginia § 45.1-333.C.

Note: If a continuous directional survey was required, the survey results are attached.

CHANGES IN THE PERMITTED WELL WORK

The well operator did $_/$ did not \underline{x} / make any change(s) in the permitted well work, verbally approved by the Inspector or Assistant Inspector under Regulation 4.03 of the Regulations under the Virginia Oil and Gas Act, for the purpose of insuring successful completion of the well work.

Note: The nature and purpose of each such change, if any, is set out below or on additional sheets if such are required.

DRILLER'S LOG

Compiled by C.S.Bartlett, Jr., Phd.

General Depth (feet)
Geologic Age Formation Lithology Color Top Bottom Thickness Remarks



BARTLETT & ASSOCIATES GEOLOGICAL CONSULTANTS

ABINGDON, VIRGINIA 24210 703/628-3x8x 4136

TO: Mr. W. D. Hale
Highlander Resources
P.O. Box 1123
Graham, Texas 76046

FROM: Charles S. Bartlett, Jr., Ph.D.

RE: Summary and completion recommendations - Highlander #1 Blake, Wolf Run Prospect, Washington County, Virginia.

FORMATION TOPS:

Chemung Formation

TOP	BASE	NOTES
spud in	515'	H20 @ 240, mist drill_1" flow H20 @ 398'.
515'	1530'	
1530'	1587'	Gas show @ 1525', @ 1640' continuous flare, estimated 500 MCF gradual blow down to gas on conn. in 2 days.
1587'	2615'	Top 889' low to Early Grove #1 Dorton.
2615'	3940'	Top 869' low to #1 Dorton. H20 @ 3809', mud up
3940'	4355'	Top 897' low to #1 Dorton. Lost circulation @ 3964'. Est 8500 BBL. wtr. lost. Set 8 5/8" @ 4180'. ? wtr. @ 4319', squeeze w/150 sacks, Mist drill.
4355'	5030'	Top 894' low to #1 Dorton. Gas flare @ 4528' continuous blow w/ slugs of H2O, est.500 + MC H2O increase @ 4630' mud up @ 4665', gas kick in mud @ 4885'.
5030'	6300'	Top 754' low to #1 Dorton, gas kick in mud @ 5101'.
6300' 6350' 6425' 7050' 7054'	7090' 6425' 7050' 7054' 7090'	Top 1734' low to #1 Dorton Top 1877' low to Early Grove #2 Ridgeway.
	spud in 515' 1530' 1587' 2615' 3940' 4355' 5030' 6300' 6350' 6425' 7050'	spud in 515' 515' 1530' 1530' 1587' 1587' 2615' 2615' 3940' 3940' 4355' 4355' 5030' 5030' 6300' 6300' 7090' 6350' 6425' 6425' 7050' 7050' 7054'

7140' T.D.

7090'

API	Well	No.	45	-	
			-		
			State	County	Permit

CASING AND TUBING PROGRAM

PRELIMINARY INFORMAT	LON
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Is the subject well underland	id by the red	shales? Yes	/ No.x /	
If "Yes", was a coal protect	tion string se	t to the red s	hales? Yes	/ No/
PROGRAM DETAILS	i, ways,			
Size Top	Bottom	Length	Perfora	To
Conductor 11-3/4" ground	598			
Casing circulated and cemen	ted in to the	surface:		
14'	4180	4166	top of cement	at 4120'
				, ×
Coal protection casing set	under the spe	cial rule of Co	ode of Virginia	a § 45.1-334
N/A				
Other casing and tubing lef	ft in the well		1. 2	
	t in the well	·		
none				
Liners left in well, under	Code of Virgi	nia § 45.1-336	or otherwise:	
none				
Other casing used in drill	ing but not le	eft in the well	•	
none				
Packers or bridge plugs:	Kind	Size	Set	Λt
MA.			-	
none				
REMARKS (SHUT DOWN DE	PTHS, DATES;	FISHING JOB DE	PTHS, DATES; C.	AVING; ETC.)
well is now temporarily aba	ndoned, pendin	g casing remova	and final plu	ıgging
SAMPLES AND CUITINGS				
will / will not / N	be available f	or examination	by a member o	f the
	Virginia Geold	gical Survey;		
	request;			
will/ will not/	require sacks Tharles S. Bart	to be furnished	d by the Surve	n, VA

FLU						Numbe	15129		egal
		P.S.I.G		Kind	N 1101 F 7F	Hallibu	rton		Twp Rng.
Recovery: Cu. Ft				of D.S.T. OPE	N HOLE TE	ST Location	HENDE	RSON	Ran
cc. Oil					WE DATABLE	TED	DAVE O		150
cc. Wo	-			Tester STE	VE RAINWA	IER Witness	DAVE S	HREVE	1
cc. Mu				Drilling	DAY DECOL	DCEC	-	711. 6	E
					RAY RESOU			JH S	1=
		* API @				Mc Cready	DATA	\	WALLACE
Sus/Oll Ratio				Formation Teste		2123'			
	K	CC	ILORIDE ONTENT	Net Productive I		2123		Ft.	9
ecovery Water	-	_ @ °F	ppm	All Depths Meas		Kelly Bush	ina	Ft.	QUADRANGLE
ecovery Mud	-	_ @ °F	ppm	Total Depth		5184'	9	Ft.	S
ecovery Mud Fil	trote	_ @ °F	ppm	Main Hole/Casi		7 7/8"			19
Aud Pit Sample		. @ °F	ppm	Drill Collar Leng		I.D			l im
Aud Pit Sample F	iltrate	@ °F	ppm	Drill Pipe Lengt				26"	
		10.0	37 500	Packer Depth(s)_		4802' - 48	10-'	I t.	
ud Weight	<u> </u>	10.0 vis	sec.	Depth Tester Vo	lve	4786'		Ft.	
TYPE	AMOUNT	Ft.	Depth Back Pres. Valve	- Sa.	Surface Choke		ttom noke .75	n	
ecovered	1260 F	eet of salt	water.						>≖
						2		Mea	Field Area
ecovered	F	eet of						. From	
ecovered	F	eet of						Tester	N.
									0
V-13	-								
Recovered	F	eet of							A
							Y	Valve	WILDCAT
		eet of						olve	CAT
ecovered	F	eet of	DATA SHEE	T			Y	O Y	CAT
ecovered	F		DATA SHEE	J			*	0 < €	CAT
ecovered	F	eet of	DATA SHEE	T				0 0	CAT
Recovered	F	eet of	DATA SHEE	J				0.00	CAT
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Recovered	F	eet of	DATA SHEE	T				0 < 6	
ecovered	F	eet of	DATA SHEE	T				O C	CAT County
ecovered	F	eet of	DATA SHEE	J				O C	
Recovered	SEE PRODU	eet of							County
ecovered	SEE PRODU	eet of JCTION TEST	Gauge No.	2551	Gauge No.			ME	County
ecovered	SEE PRODU	2552 4787 Ft.		2551 4838 _{Ft.}	Gauge No.	Ft.	(00:00-2		County
ecovered emarks	SEE PRODU	2552 4787 Ft.	Gauge No. Depth:	2551 4838 _{Ft.} 24 Hour Clock	Depth:	Ft. Hour Clock	(00:00-2	ME 4:00 hrs.)	County
ecovered emarks	SEE PRODU	2552 4787 Ft.	Gauge No.	2551 4838 _{Ft.}			Tool Opened	ME 4:00 hrs.)	County
remarks TEMPERATURE	Gauge No. Depth:	2552 4787 Ft. 24 Hour Clock	Gauge No. Depth: Blanked Off	2551 4838 _{Ft.} 24 Hour Clock YES	Depth: Blanked Off	Hour Clock	Tool Opened Opened	ME 4:00 hrs.)	
ecovered emarks TEMPERATURE	Gauge No. Depth: Blanked Off	2552 4787 Ft. 24 Hour Clock NO	Gauge No. Depth: Blanked Off	2551 4838 _{Ft.} 24 Hour Clock YES	Depth: Blanked Off Pre	Hour Clock	Tool Opened	ME 4:00 hrs.)	County
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TEMPERATURE t. 110 °F.	Gauge No. Depth: Blanked Off Pr Field 2498	2552 4787 Ft. 24 Hour Clock NO ressures Office 2503.2	Gauge No. Depth: Blanked Off Pre Field 2556	2551 4838 Ft. 24 Hour Clock YES ssures Office 2539.4	Depth: Blanked Off Pre	Hour Clock	Tool Opened Opened Bypass	ME 4:00 hrs.) 0829 1308 Computed Minutes	County WASHINGTON
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TEMPERATURE St. 110 °F. Ctual °F. Ctual Final Closed in Initial Final Close	Gauge No. Depth: Blanked Off Pr Field 2498 525 607 920 689 706	2552 4787 Ft. 24 Hour Clock NO ressures Office 2503.2 521.3 616.7 904.5 649.6 703.9	Gauge No. Depth: Blanked Off Pre Field 2556 543 624 935 690 722	2551 4838 _{Ft.} 24 Hour Clock YES ssures Office 2539.4 557.1 650.3 936.2 687.9 735.2	Depth: Blanked Off Pre	Hour Clock	Tool Opened Opened Bypass Reported Minutes 35 63	ME 4:00 hrs.) 0829 1308 Computed Minutes ————————————————————————————————————	County WASHINGTON
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The second second				Date 5-1	5-81	Number	930	1210	Sec	1
Sampler Pressure		P.S.I.G		Kind		Hallibur		DEDOO	Location Twp Rng	
Recovery: Cu. Ft				of D.S.T. OP	EN HOLE	Location	HEN	DERSON	Res	
cc. Oil				- 51	AND.		CUD		18	
cc. Wo	-			Tester BL/	AND	Witness	SHK	EVE		Leose
cc. Mu		•		Drilling DAY	DECOUDE			NIM	5	2
	quid cc			Contractor RA				NM	WALLACE	Nome
		. API @				Price Sar		4	15	
Gas/Oil Ratio				Formation Teste		2123	iu		- CE	
	RESI	STIVITY CH	NTENT	Elevation				Ft		
Recovery Water	W	@ °F	nnm	Net Productive I		Kelly Bus	hina	F1	QUADRANGLE	
Recovery Mud		@ °F		All Depths Meas		6480 i	sning		-15	
to the first terms of the first				Total Depth	44			Ft	. \$	
Recovery Mud Fi		@ °F	77.10	Main Hole/Casi	-	7 7/8"		·	- 5	
Aud Pit Sample		@ °F		Drill Collar Leng		- I.D	2	0001	- im	1 3
Aud Pit Sample I	Filtrate	@ °F	ppiii	Drill Pipe Lengt		6262' I.D		.826"	-	Well No.
1.141.11.	10.5) vis	51	Packer Depth(s)_		6292' - 6	300	Ft	.	.0
lud Weight		VIS	sec.	Depth Tester Vo	lve	6276'		Ft		
TYPE	NONE	Ft.	Depth Back Pres. Valve	NONE	Surface Choke		ttom noke	.75"		-
Recovered	30' Fee	et of very sa	altv gassv	v cut drill	ling mud				Field	Test No.
8						•		380)	1
Recovered	Fee	et of								
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ecovered	Fee	et of						esie	\ X	
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Recovered	SEE.			A SHEET						Tested Interval
Recovered	SEE		TEST DATA	A SHEET 2551	Gauge No.			IME	County	Tested Interval
Recovered	SEE SEE	PRODUCTION	Gauge No.	2551 6319' Ft.	Gauge No. Depth:	Ft.			County	Tested Interval
ecovered	SEE SEE	PRODUCTION 2552	Gauge No.	2551 6319' Ft. Hour Clock		Ft. Hour Clock	(00:00-2	IME 24:00 hrs.)	County	lested Interval
Recovered	SEE SEE	PRODUCTION 2552 6277' Ft.	Gauge No.	2551 6319' Ft.			(00:00-2 Tool Opened 1	IME 24:00 hrs.)	County	Tested Interval
TEMPERATURE st. 121 •F.	SEE SEE Gauge No. Depth:	PRODUCTION 2552 6277' Ft. Hour Clock	Gauge No. Depth:	2551 6319' Ft. Hour Clock	Depth:		Tool Opened 1	IME 24:00 hrs.)	County	Tested Interval
Recovered	SEE SEE SEE SEE SEE SEE	PRODUCTION 2552 6277' Ft. Hour Clock	Gauge No. Depth: 24 Blanked Off	2551 6319' Ft. Hour Clock	Depth: Blanked Off		Tool Opened 1 Opened Bypass 1	IME 24:00 hrs.) 250		Tested Interval
TEMPERATURE st. 121 •F.	SEE SEE SEE SEE SEE SEE	PRODUCTION 2552 6277	Gauge No. Depth: 24 Blanked Off Pres	2551 6319 Ft. Hour Clock YES	Depth: Blanked Off	Hour Clock	Tool Opened 1	IME 24:00 hrs.)	County	Interval
TEMPERATURE st. 121 •F.	Gauge No. Depth: 24 Blanked Off	2552 6277' Ft. Hour Clock NO ssures Office 3495.0	Gauge No. Depth: 24 Blanked Off Pres Field 3511	2551 6319' Ft. Hour Clock YES ssures Office 3511.5	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1	IME 24:00 hrs.) 250	County	Interval
TEMPERATURE 121 •F. actual •F.	Gauge No. Depth: 24 Blanked Off Pres Field 3481 26	PRODUCTION 2552 6277' Ft. Hour Clock NO ssures Office 3495.0 27.8	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0	Depth: Blanked Off Pres	Hour Clock	Tool Opened Opened Bypass Reported Minutes	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON	Interval
TEMPERATURE 121 •F. ctual •F.	Gauge No. Depth: 24 Blanked Off Pres Field 3481	2552 6277 Ft. Hour Clock NO ssures Office 3495.0	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1 Reported Minutes 35	IME 24:00 hrs.) 250 625 Computed	County	Interval
TEMPERATURE 121 •F. ctual •F.	Gauge No. Depth: 24 Blanked Off Pres Field 3481 26	PRODUCTION 2552 6277' Ft. Hour Clock NO ssures Office 3495.0 27.8	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65 131	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0	Depth: Blanked Off Pres	Hour Clock	Tool Opened Opened Bypass Reported Minutes	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON	Interval
TEMPERATURE 121 •F. ctual •F. itial Hydrostatic Flow Initial Final Closed in	Gauge No. Depth: 24 Blanked Off Pres Field 3481 26 26	PRODUCTION 2552 6277' Ft. Hour Clock NO ssures 0ffice 3495.0 27.8 27.8	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1 Reported Minutes 35	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON State	Interval
TEMPERATURE 121 •F. ctual •F. itial Hydrostatic Flow Initial Final Closed in	Gauge No. Depth: 24 Blanked Off Pres Field 3481 26 26 114	2552 6277	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65 131	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1 Reported Minutes 35 60	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON State	Interval
TEMPERATURE 121 •F.	Gauge No. Depth: 24 Blanked Off Pres Field 3481 26 26 114 26	2552 6277' Ft. Hour Clock NO ssures 0ffice 3495.0 27.8 27.8 98.3 27.8 27.8	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65 131 65 65	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0 115.1 59.2	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1 Reported Minutes 35	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON State	Interval
TEMPERATURE 121 •F. St. 121 •F. St. 121 •F. Closed in Initial Final Closed in Initial	Gauge No. Depth: 24 Blanked Off Pre: Field 3481 26 26 114 26 26 26	2552 6277	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65 131 65	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0 115.1 59.2 49.3	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1 Reported Minutes 35 60	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON State	Interval
TEMPERATURE st. 121 • F. ctual • F. mitial Hydrostatic Initial Final Closed in Initial Final Closed in Initial Final Closed in	Gauge No. Depth: 24 Blanked Off Pre: Field 3481 26 26 114 26 26 26	2552 6277' Ft. Hour Clock NO ssures 0ffice 3495.0 27.8 27.8 98.3 27.8 27.8	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65 131 65 65	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0 115.1 59.2 49.3	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1 Reported Minutes 35 60	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON	Interval
TEMPERATURE st. 121 • F. Actual • F. Actual Final Closed in Initial	Gauge No. Depth: 24 Blanked Off Pre: Field 3481 26 26 114 26 26 26	2552 6277' Ft. Hour Clock NO ssures 0ffice 3495.0 27.8 27.8 98.3 27.8 27.8	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65 131 65 65	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0 115.1 59.2 49.3	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1 Reported Minutes 35 60	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON State	Interval
TEMPERATURE 121 •F. 121 •F.	Gauge No. Depth: 24 Blanked Off Pre: Field 3481 26 26 114 26 26 26	2552 6277' Ft. Hour Clock NO ssures 0ffice 3495.0 27.8 27.8 98.3 27.8 27.8	Gauge No. Depth: 24 Blanked Off Pres Field 3511 65 65 131 65 65	2551 6319' Ft. Hour Clock YES ssures Office 3511.5 46.0 46.0 115.1 59.2 49.3	Depth: Blanked Off Pres	Hour Clock	Tool Opened 1 Opened Bypass 1 Reported Minutes 35 60	IME 24:00 hrs.) 250 625 Computed	County WASHINGTON State	Tested Interval

DMQ Form 3

COMMONWEALTH OF VIRGINIA DEPARTMENT OF LABOR AND INDUSTRY DIVISION OF MINES AND QUARRIES BIG STONE GAP, VIRGINIA 24219 PHONE 703-523-0335

#1 Wolf Run Unit WILDCAT Washington Co., VA

APPLICATION FOR PERMIT TO (DRILL) (改造的数据制) (D进行的形) OIL OR GAS WELL

Section cited. To be submitted in duplicate, one	dollars and bond and surety therefor, as specified by
Section cired. To be submitted in dublicate, one	
	copy to be refurned to applicant after action by
Division of Mines and Quarries.	
TO: Division of Mines and Quarries	
Drawer V	Abingdon, Virginia 24210
Big Stone Gap, Virginia 24219	Place October 30, 1980 (Amended: 2/15/81)
	Date
Gentlemen:	
The undersigned hereby makes application for a Po	ermit to drill, redrill, or deepen (strike out two) a
	m, comprising 55 acres, in the Tyler
	, Virginia, having the fee title thereto, or as the
	mber 10, ,19 80 made by
L. Denver Blake et ux to W. D.	
and recorded on the 16th day of Septemb	per ,19 80 in the office of the County
Clerk for the said County in Book 632 pag	
	ocation plat or map submitted to the Division of Mines
	Notice of Intention to Drill, Redrill or Deepen a Wel
for Oil or Gas on the day of	19
The proposed well will be known as Well No.one	
(company, etc.) It is proposed to drill this well t	
	listant from the nearest property or lease line; about
	ng opening, or quarry (strike out words not applicable
	doilding, abandoned, productings x correspondent for (strike
out words not applicable) oil or gas (strike out wo	
	S. Postal Money Order, in the amount of twanty-five
(\$250), payable to the Treasurer of Virginia, cover	The state of the s
	ering fee fro a Permit to Drill a Well for Cil or Gas,
as required by Section 45.1-115, Code of Virginia	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1966 Cumulative Supplement.
as required by Section 45.1–115, Code of Virginia Bond and Surety therefor to insure compliance wit	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1966 Cumulative Supplement. h the provisions of Chapter 8, Title 45, Code of Vir-
as required by Section 45.1-115, Code of Virginia Bond and Surety therefor to insure compliance wit ginia, 1950 and the 1966 Supplement, for this we	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1966 Cumulative Supplement. h the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted here-
as required by Section 45.1-115, Code of Virginia Bond and Surety therefor to insure compliance wit ginia, 1950 and the 1966 Supplement, for this we	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1966 Cumulative Supplement. h the provisions of Chapter 8, Title 45, Code of Vir-
as required by Section 45.1-115, Code of Virginia Bond and Surety therefor to insure compliance wit ginia, 1950 and the 1966 Supplement, for this we with of (give status of) \$5,000.00 Stabilization Correspondence regarding this well should be addressed.	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1966 Cumulative Supplement. In the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted hereon Bond-DMQ5A + \$2,000.00 Indemnity Bond-DMQ5B ressed to
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as required by Section 45.1-115, Code of Virginia Bond and Surety therefor to insure compliance wit ginia, 1950 and the 1966 Supplement, for this we with of (give status of) \$5,000.00 Stabilization Correspondence regarding this well should be addressed to the status of the status	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1966 Cumulative Supplement. In the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted hereon Bond-DMQ5A + \$2,000.00 Indemnity Bond-DMQ5B ressed to
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as required by Section 45.1-115, Code of Virginia Bond and Surety therefor to insure compliance wit ginia, 1950 and the 1966 Supplement, for this we with of (give status of) \$5,000.00 Stabilization Correspondence regarding this well should be addressed to the status of the status	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1966 Cumulative Supplement. In the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted hereon Bond-DMQ5A + \$2,000.00 Indemnity Bond-DMQ5B ressed to B GRAHAM, TEXAS 76046 Very truly yours,
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Signature of officer or certifying party: Signature of officer or certifying party: Title Space below this line is f ACTION OF DIVISION	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1966 Cumulative Supplement. In the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted here on Bond-DMQ5A + \$2,000.00 Indemnity Bond-DMQ5B ressed to B GRAHAM, TEXAS 76046 Very truly yours, HIGHALNDER RESOURCES, INC. a/k/a HXR Company of Texas Drilling Company or Operator 102 South Court Street, Suite 200 Street "Abingdon, Virginia 24210 City or Town VIRGINIA
Signature of officer or certifying party: Signature of officer or certifying party: Title Space below this line is f ACTION OF DIVISION Received on Received on Rocky Area 1 Space below this line is f ACTION OF DIVISION December 29 1980	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1956 Cumulative Supplement. In the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted here-on Bond-DMQ5A + \$2,000.00 Indemnity Bond-DMQ5B ressed to GRAHAM, TEXAS 76046 Very truly yours, HIGHALNDER RESOURCES, INC. a/k/a HXR Company of Texas Drilling Company or Operator 102 South Court Street, Suite 200 Street Abingdon, Virginia 24210 City or Town VIRGINIA State Or the use of the Board only. OF MINES AND QUARRIES
Signature of officer or certifying party: Rocky Arrell Name Secretary-Treasurer Space below this line is for ACTION OF DIVISION Received on Approved and Permit (no. 395) granted of Virginia Bond and Surety therefor to insure compliance with ginia, 1950 and the 1966 Supplement, for this we with of (give status of) \$5,000.00 Stabilization \$5,000.00 Stabilization \$5,000.00 Stabilization \$1,000 Box 1018 Signature of officer or certifying party: Title	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1956 Cumulative Supplement. In the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted here-on Bond-DMQ5A + \$2,000.00 Indemnity Bond-DMQ5B ressed to GRAHAM, TEXAS 76046 Very truly yours, HIGHALNDER RESOURCES, INC. a/k/a HXR Company of Texas Drilling Company or Operator 102 South Court Street, Suite 200 Street Abingdon, Virginia 24210 City or Town VIRGINIA State Or the use of the Board only. OF MINES AND QUARRIES
Signature of officer or certifying party: Title Space below this line is f ACTION OF DIVISION Received on December 29 Approved and Permit (no. 395 Denied	ering fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1956 Cumulative Supplement. In the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted here-on Bond-DMQ5A + \$2,000.00 Indemnity Bond-DMQ5B ressed to GRAHAM, TEXAS 76046 Very truly yours, HIGHALNDER RESOURCES, INC. a/k/a HXR Company of Texas Drilling Company or Operator 102 South Court Street, Suite 200 Street Abingdon, Virginia 24210 City or Town VIRGINIA State Or the use of the Board only. OF MINES AND QUARRIES
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Signature of officer or certifying party: Title Space below this line is f ACTION OF DIVISION Received on December 29 Approved and Permit (no. 395 Denied	ring fee fro a Permit to Drill a Well for Cil or Gas, a, 1950, 1954 and the 1956 Cumulative Supplement. In the provisions of Chapter 8, Title 45, Code of Virll, in the amount of \$ 7,000.00 is submitted hereon Bond-DMQ5A + \$2,000.00 Indemnity Bond-DMQ5B ressed to 3
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Commonwealth of Virginia DEFARTMENT OF LABOR AND INDUSTRY Division of Mines Big Stone Gap, Virginia

#1 Wolf Run Unit WILDCAT Washington, Co., VA

REVISED APPLICATION

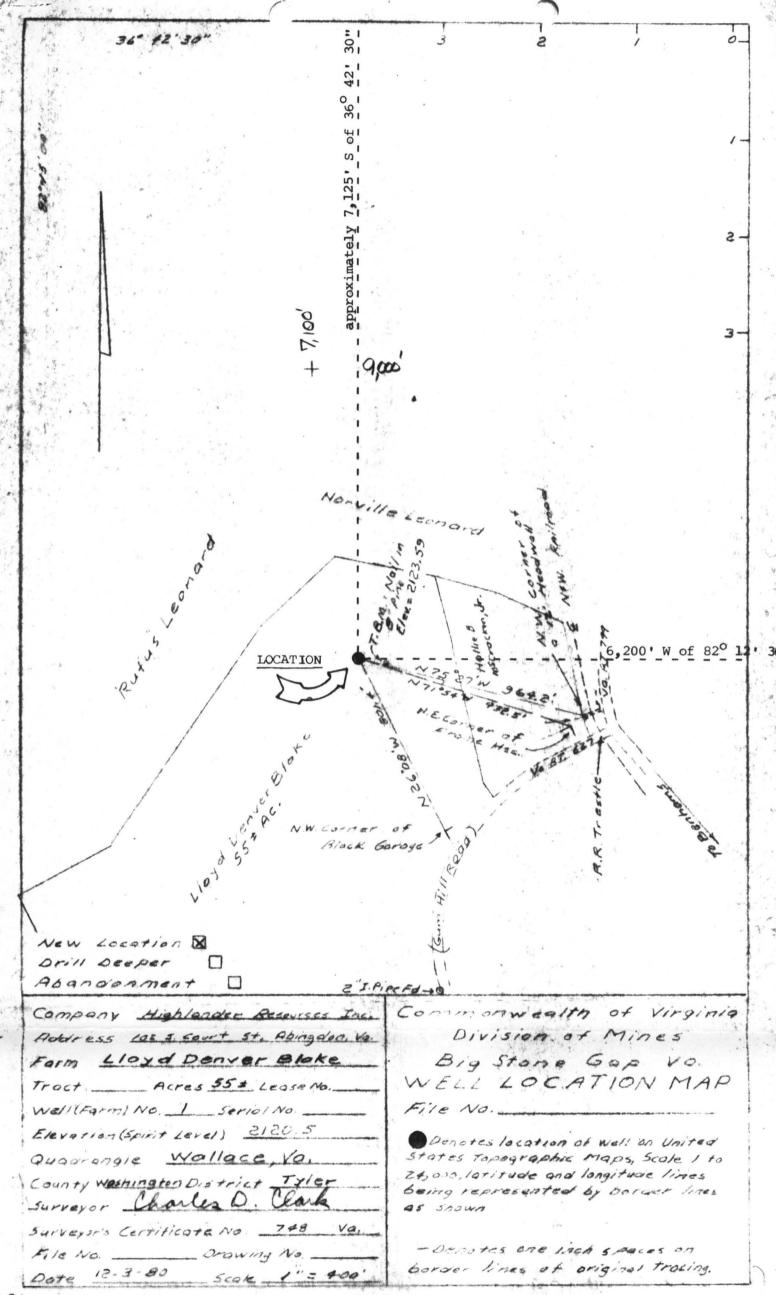
REDRILL

NOTICE OF INTENTION TO DRILL OIL OR GAS WELL

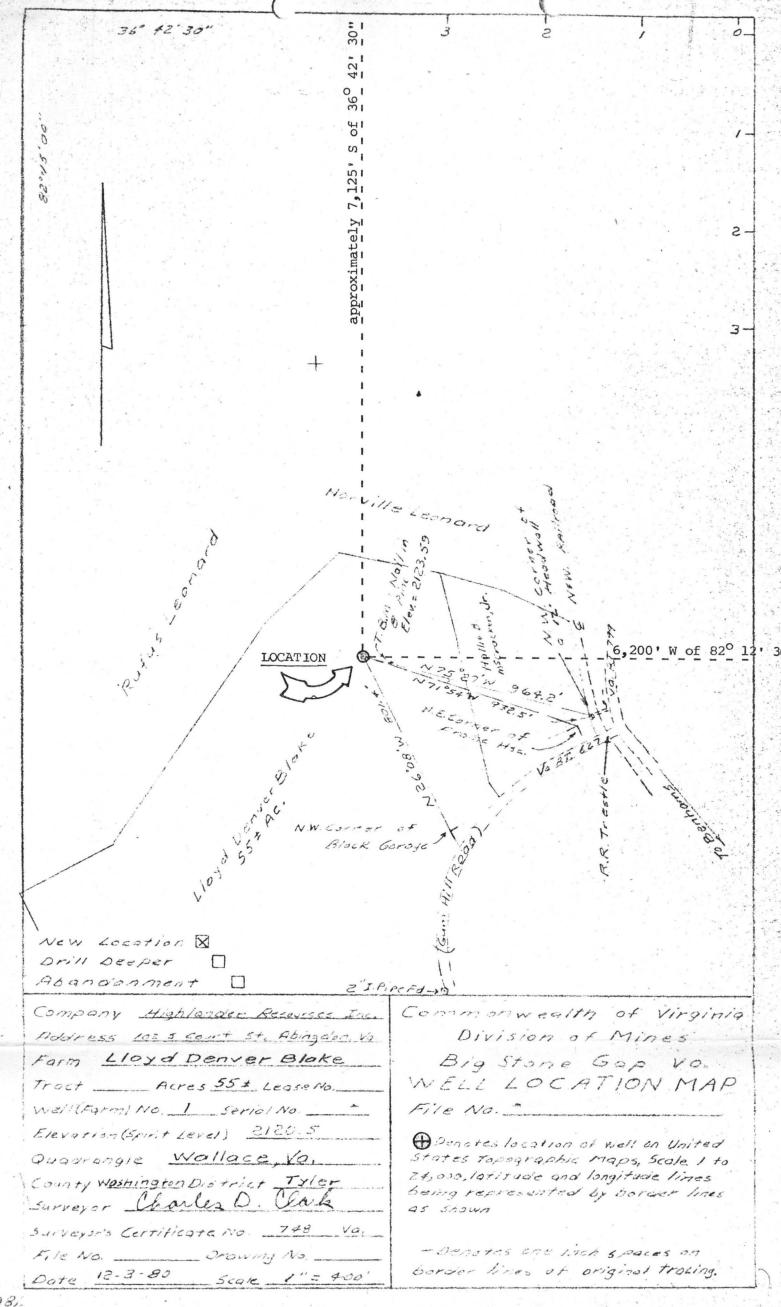
DEELEN

(One copy of this report and three identical copies of a plat or map, on a scale not smaller than 400 feet to the inch, and showing information required by Section 45-114, Code of Virginia, 1950, must be submitted to the Division of Mines, and copies sent by registered mail to all persons defined in above law, prior to obtaining a permit to drill.)

TO:	DIVISION OF MINES		Abingdon, Virginia 24210
	BIG STONE GAP, VII	RGINIA	October 30, 1980 , 19
Gen	tlemen:		Date (Amended: 2/15/81)
for the fee	m the Division of Mine oil or gas on the L. Tyler title thereto, or as September 10, 198 recorded on the	Denver Blake District of Wather Case may be be by L. De better better better between the bester between betwee	as soon as a permit therefor is obtained edrill or deepen (strike out two) a well Farm, comprising 55 acres, in ashington County, Virginia, having the e, under grant or lease dated enver Blake et ux to W. D. Hale day of September , 1980 in the nty in Book 632 , page 166.
	The proposed locat	ion of the well	, as shown on the attached plat or map, is
abo	ut 6,200 feet	West	of 82° 12' 30" and about
	7,125 feet	South	of 36° 42' 30"
a	andshar		
	It is proposed to	irill this well	to a depth of about feet. Samples
or	cuttings therefrom	ill biblixxxxxxt be ava	ilable for examination by a member of the
sta	ff of the Virginia Geo	ological Survey	. Cuttings will not be furnished the
Sur	vey.		
Sec not sen fol	h, showing the propose tion 45-114, Code of V ice of intention to do t to all interested pe	ed location of virginia, 1950, rill, redrill or ersons as requi	a scale not smaller than 400 feet to the the well and other information, required in is attached hereto. Copies of the plat and r deepen the aforementioned well have been red by Section 45-114, above cited, as each. Use back of sheet if additional
1.	L. Denver Blake	7420 Poplar A	venue Baltimore, Maryland 21224
2.	Norville E. Leonard	Route 2, Box	326 Bristol, VA 24201
3.	H. B. McCracken	Route 2	Bristol, VA 24201
4.	William A. Leonard	Route 2, Box	
5.	Sam McCracken	Route 2	Bristol, VA 24201
6.	Charles Almaroad	Route 2	Bristol, VA 24201
	. 1		Very truly yours,
	nature of officer or	certifying part	y: HIGHLANDER RESOURCES, INC. a/k/a HXR Company of Texas Diffiling Company or Operator
	toony in the		102 South Court Street, Suite 200
2	Secretary-Treasurer Title		Street Address Abingdon, VA 24210
			City or Town, and State
Fil	e WA-5	Date Received	December 29, 1980 Well No. HR-1



98/



98/2

FORM 2

Commonwealth of Virginia DEPARTMENT OF LABOR AND INDUSTRY Division of Mines

DEETEN

Big Stone Gap, Virginia

REDRILL NOTICE OF INTENTION TO DRILL OIL OR GAS WELL #1 Wolf Run Unit WILDCAT Washington, Co., VA

E and the same of the same of

REVISED APPLICATION

(One copy of this report and three identical copies of a plat or map, of	on
a scale not smaller than 400 feet to the inch, and showing information require	red
by Section 45-114, Code of Virginia, 1950, must be submitted to the Division	of
Mines, and copies sent by registered mail to all persons defined in above law	Υ,
prior to obtaining a permit to drill.)	

TO:	DIVISION OF MINES		Abingdon, Virginia 24210
	BIG STONE GAP, VII	RGINIA	October 30, 1980 , 19
Gent	tlemen:		Date (Amended: 2/15/81)
for the fee	of the Division of Mine oil or gas on the L. Tyler	Denver Blake District of Wa the case may be moderated by L. De	shington County, Virginia, having the enver Blake et ux to W. D. Hale ay of September , 1980 in the
		on of the well,	as shown on the attached plat or map, is
abou	at 6,200 feet	West	of 82° 12' 30" and about
	7,125 feet	South	of
	mides		7 500
			to a depth of about 7,500 feet. Samples
or o		ill Maxxxxt be avai	lable for examination by a member of the
sta	ff of the Virginia Geo	ological Survey.	Cuttings be furnished the will not
Sur	vey.		
Seconot:	h, showing the propose tion 45-114, Code of N ice of intention to do t to all interested po	ed location of the virginia, 1950, rill, redrill or errors as required.	a scale not smaller than 400 feet to the the well and other information, required in is attached hereto. Copies of the plat and deepen the aforementioned well have been red by Section 45-114, above cited, as each. Use back of sheet if additional
1.	L. Denver Blake	7420 Poplar Av	venue Baltimore, Maryland 21224
2.	Norville E. Leonard	Route 2, Box 3	Bristol, VA 24201
3.	H. B. McCracken	Route 2	Bristol, VA 24201
4.	William A. Leonard	Route 2, Box 4	145 Bristol, VA 24201
5.	Sam McCracken	Route 2	Bristol, VA 24201
6.	Charles Almaroad	Route 2	Bristol, VA 24201
			Very truly yours,
	nature of officer or	certifying party	HIGHLANDER RESOURCES, INC. a/k/a HXR Company of Texas Drilling Company or Operator
	Rocky Arrell Name		102 South Court Street, Suite 200
5	Secretary-Treasurer Title		Street Address Abingdon, VA 24210
	11110		City or Town, and State
	WA-5		December 29 1980 HR-1
Fil	e	Date Received	Well No.

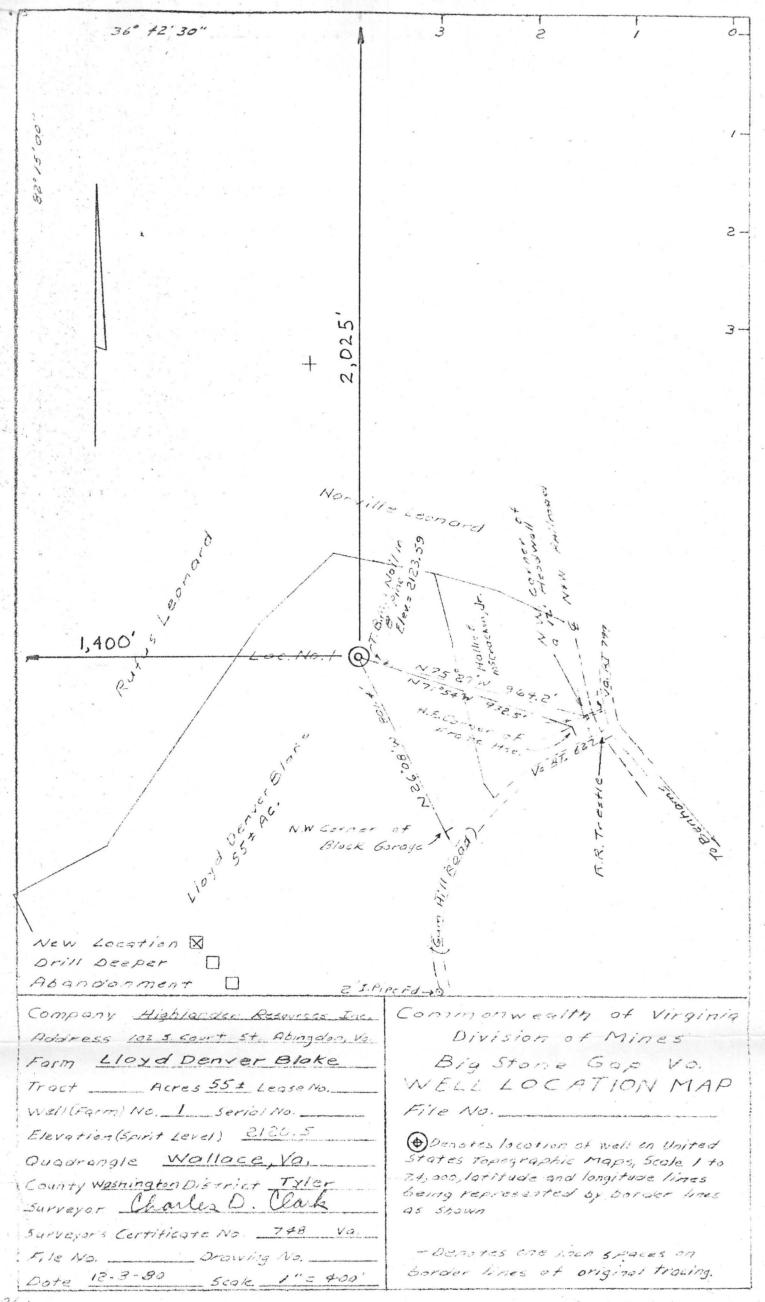
1Q Form 3

COMMONWEALTH OF VIRGINIA DEPARTMENT OF LABOR AND INDUSTRY DIVISION OF MINES AND QUARRIES BIG STONE GAP, VIRGINIA 24219 PHONE 703-523-0335

#1 Wolf Run Unit WILDCAT Washington Co., VA

APPLICATION FOR PERMIT TO (DRILL) (REDRIE) (DEEPEN) OIL OR GAS WELL

(Required by Section 45.1-115, Code of Virginia,	1950, 1954 and the 1966 Cumulative Suppleme	ent.
To be accompanied by Permit fee of twenty-five do	llars and bond and surety therefor, as specified	by
Section cited. To be submitted in duplicate, one of Division of Mines and Quarries.	copy to be refurned to applicant after action by	,
TO: Division of Mines and Quarries		
Drawer V	Abingdon, Virginia 24210	
Big Stone Gap, Virginia 24219	Place	
ong otono cap, trigima a tati	October 30, 1980 (Amended: 2/15/81)	
	Date	
Gentlemen:		
The undersigned hereby makes application for a Per		а
	comprising 55 acres, in the Tyler	
The state of the s	Virginia, having the fee title thereto, or as the	ie
	er 10, ,19 80 made by	-
		untu
and recorded on the <u>16th</u> day of <u>Septembe</u> Clerk for the said County in Book 632 page	printed the first printed by the state of th	only
The proposed location of the well is shown on a loc		Mines
and Quarries, by the undersigned, together with N		
or Oil or Gas on the day of	19	
he proposed well will be known as Well No. one (1) of HIGHLANDER RESOURCES, INC.	
company, etc.) It is proposed to drill this well to		
he proposed location is about 400 feet dis	stant from the nearest property or lease line; al	oout
N/A feet distant from the nearest mining	opening, or quarry (strike out words not appli	cable)
nd/or about 5,000 feet distant from the nearest di	rikking, abandoned, producingsx exceptivelyfor	(strike
ut words not applicable) oil or gas (strike out word		
here is enclosed herewith a certified check or U.S		
\$25.), payable to the Treasurer of Virginia, cover		
s required by Section 45.1-115, Code of Virginia,		
Bond and Surety therefor to insure compliance with		
yinia, 1950 and the 1966 Supplement, for this well with of (give status of) \$5,000.00 Stabilization		
ann or (give sidios or) \$3,000.00 Scabilizacion	Bond-Drigon , \$2,000.00 indentify Bond-Dri	طرق:
Correspondence regarding this well should be addre	ssed to	
IGHALNDER RESOURCES, INC. P. O. BOX 1018	GRAHAM, TEXAS 76046	
	Very fruly yours,	
ignature of officer or certifying party:	HIGHALNDER RESOURCES, INC.	
ROCKITERS	a/k/a HXR Company of Texas	
ocky Arrell Name	Drilling Company or Operator	
ecretary-Treasurer	102 South Court Street, Suite 200	
Title	Street	
	Abingdon, Virginia 24210	
	City or Town	
	VIRGINIA	
Space below this line is fo	State	
	r the use of the Board only. OF MINES AND QUARRIES	
deceived on December 29 ,1980	F WHITES AIND GUAKKIES	
Approved and Permit (no. 395) granted on	March 11	01
Denied and remin (no. 395) granted on	March 11	81
easons for denial		
· · · · · · · · · · · · · · · · · · ·	DIVISION OF MINES AND QUARRIES	
	Ву	
	Title	



INTERVAL SHEET

Page / of 4 Date rec'd: 03/24/94 Date Processed: 4/28/94 PROPERTY: Lloyd Blake # 1

COMPANY: High lader Resources, Inc.

Total Depth: 7140 COUNTY: WAShington (William)

Wa-005 Well Repository No.: W- 7333 Sample Interval: from 90 to: 7/40

Oil or Gas: Water: Exploratory:

From-To	From-To	From-To	From-To	From-To
90-100	400 - 10 10 - 20 718 Sample 30 - 40 40 - 50	50 - 60 60 - 70 70 - 80 80 - 90 90 - 800	1/10-10 10-20 20-30 30-40 40-50	50 - 60 70 - 70 70 - 80 80 - 90 40 - 1500
100 = 10 10 = 20 20 = 30 30 = 40 40 = 50	50 - 60 60 - 70 70 - 80 80 - 90 90 - 500	800 -10 10 -20 20 - 30 30 - 40 40 - 50	50 - 60 60 - 70 70 - 80 80 - 90 90 - 1,200	1500-10 0-20 30-40 40-50
50-60 60-70 70-80 80-90 90-200	710 SAMPLE 510 - 20 20 - 30 30 - 40 40 - 50	50 - 60 60 - 70 70 - 80 80 - 90 90 - 900	1210-10 10-20 20-30 30-40	50-60 60-70 70-80 80-90 80-1600
200 - 10 10 - 20 20 - 30 30 - 40 146 - 50	50-60 60-70 70 Sample 90-600	900 -10 10 -20 20-30 30-40 40-45	50-60 60-70 70-80 80-90 90-1300	/600-10 10-20 20-30 30-40 40-50
50-60 60-70 70-80 80-90 90-300	600 = 10 10 = 20 20 = 30 30 = 40 40 = 50	50 - 60 60 - 70 70 - 80 80 - 90 90 - 1000	3to = 10 10 = 20 20 = 30 30 = 40 40 = 50	50 - 60 60 - 70 70 - 80 80 - 90 90 - 1700
710 SAMPLE 310 = 20 20 = 30 30 = 40 710 SAMPLE	58 = 60 60 = 70 70 = 80 80 = 90 90 = 700	1070 - 10 10 - 20 20 - 30 30 - 40 40 - 50	50 = 60 60 = 70 70 = 80 80 = 90 90 = 1400	1700 - 10 10 - 20 20 - 30 30 - 40 40 - 50
50-60 60-70 70-80 80-90 90-400	700 = 10 10 = 20 20 = 30 30 = 40 40 = 50	50 - 60 60 - 70 70 - 80 80 - 90 90 - 1/00	1400 - 10 10 - 20 20 - 20 30 - 40 40 - 50	50 - 60 60 - 70 70 - 80 80 - 90 90 - 1800
165				

INTERVAL SHEET Continued

Page 2 of 4		W	ell Repository No	.: w- 7333
From-To	From-To	From-To	From-To	From-To
1800 - 10	240 - 10	2600 - 10	3000-10	3400 - 10
10 - 20	10 - 20	10 - 20	10-20	10 -30
20 - 30	90 - 30	20 - 30	20-30	30-30
30 - 40	30 - 40	30 - 40	30-40	30-40
40 - 50	40 - 50	40 - 50	40-50	40-50
50 -60	50-60	50 - 60	50-60	50-60
60 -70	60-70	60 - 70	60-70	60-70
70 -80	70-80	70 - 80	70-80	70-80
80 -90	80-96	80 - 90	80-90	80-90
90 -1900	40-2300	40 - 2710	90-3/00	40-3500
1900 - 10	2300-10	2700 - 10	3 lov- 10	3500-10
10 - 20	10-20	10 - 20	10 - 20	10-20
70 Sample	20-30	20 - 30	70 SAMPL	20-30
30 - 40	30-40	30 - 40	30-40	30-40
40 - 50	40-50	40 - 50	UD-50	40-50
50 - 60	50-60	50 - 60	50-60	50-60
60 - 70	60-70	60 - 70	60-70	70-70
70 - 80	80-80	70-80	70-80	70-80
80 - 90	80-90	80 - 90	80-40	80-90
91 - 2000	40-2400	90 - 2800	90-3210	90-3600
2000-10	2410 - 10	2800 - 10	3200 - 10	360-10
10-20	10 - 20	10 - 20	10 - 20	10-20
20-30	20 - 30	20 - 30	20 - 30	20-30
30-40	30 - 40	30 - 40	30 - 40	30-40
40-50	40 - 50	40 - 50	40 - 50	40-50
50 -60	50-60	50-60	50-60	50-60
60 -70	60-70	60-70	60-70	60-70
70 -80	70-80	70-80	70-80	70-80
80-90	80-90	80-90	80-50	60-90
90-2/00	90-2500	90-2900	90-3300	90-3700
2100-10	2500-10	2900 - 10	3300-10	3700-10
10-20	10-20	10-20	10-20	10-20
20-30	20-20	20-30	20-30	20-30
30-40	30-40	30-40	20-40	30-40
40-50	40-50	40-50	40-50	40-50
50-60	50-100	50-60	50-60	50-60
10-80	10-70	60-70	60-70	60-70
70-80	70-80	70-80	70-80	70-80
80-90	80-90	60-90	80-90	80-90
90-2200	90-2600	90-3000	90-3400	90-3800
198				

INTERVAL SHEET Continued

Page 3 of 4			Well Repository No	.: W-7333
From-To	From-To	From-To	From-To	From-To
3800-10 10-20 20-30 30-40 40-80	4400-10 10-20 20-30 30-40 40-50	480 - 10 10 - 20 20 - 30 30 - 40 40 - 50	5200 - 10 710 54mple 30-40 40-50	5600-10 10-20 20-30 30-40 40-50
50-60 60-70 70-80 80-90 90-3900	50-la 60-70 70-30 50-90 90-4500	9-60 60-70 70-80 80-90 90-4400	50-60 50-70 70-80 80-90 40-5300	50-60 60-70 70-80 80-90 90-5700
390-10 10-20 20-30 30-40 40-50	4500-10 10-20 20-30 30-40 40-50	4900 -10 20-20 20-30 30-40 40-80	5300 - 10 10 - 20 20 - 30 30 - 40 40 - 50	5700.10 10-20 20-30 30-40 40-50
50-60 - - - MO SAmplos	50-la0 60-70 70-80 80-90 90-460	50-60 60-70 70-80 80-90 90-5000	50-60 60-70 70-80 80-90 90-5400	50-60 60-70 70-80 80-90 90-5800
- 420 - 30 30 - 40 40 - 50	4600 - 10 10 -20 20 -30 30-40 40 - 50	500-10 10-20 20-30 30-40 40-50	5400-10 10-20 20-30 30-40 40-50	5800-10 10-20 20-30 30-40 40-50
5D-60 60-70 70-80 80-90 90-4300	50 - 60 70-80 80-90 90-4700	50-60 60-70 70-80 80-90 90-5100	50-60 60-70 78-80 80-90 90-5300	58-60 60-70 70-80 80-90 90-5400
4300 - 10 10-20 20-30 30-40 40-50	4700-10 10-20 20-30 30-40 40-80	5700 - 10 -10 SAmple's	5500 - 10 10 -20 20 -30 30 - 40 40 -50	5900-10 10-20 70 SAMPLE 30-40 40-50
50-60 60-70 70-80 80-90 90-4400	50 - 60 100 - 70 70 - 80 80 - 90 90 - 4800	50 - 60 60 - 70 70 - 80 80 - 90 40 - 5200	50-60 50-70 70-80 80-90 90-5600	50-60 60-70 70-80 80-90 90-6000
188				

INTERVAL SHEET Continued

Page 4 of 4			Well Repository No.:	w- <i>733</i> 3
From-To	From-To	From-To	From-To	From-To
6000-10 10-20 20-30 30-40 40-50	6410 - 10 10 - 20 20 - 30 30 - 40 40 - 50	6811 - 10 20 - 30 30 - 40	95-7100 7100-05 05-10 10-15 15-20	- - - -
50-60 60-70 70-80 80-90 90-6100	50-60 70-80 80-90 90-6500	50-60 60-70 70-80 80-90 90-6980	20-25 25-30 30-35 35-40	- - - -
6/10 - 10 10 - 20 20 - 30 30 - 40 40 - 50	6578 - 10 10 - 20 20 - 30 30 - 40 40 - 50	6900-10 10-20 20-30 30-40 40-50	- - - -	- - - -
50-6200 50-6200	50-60 60-70 780-90 80-6600	50-60 60-70 70-80 80-40 90-95	- - - - -	- - - -
6200-10 10-20 20-30 30-40 10-50	6600-10 20-30 30-40 40-50	95 - 7000 -700 - 05 05 - 10 10 - 15 15 - 20	- - - -	- - - -
50-60 60-70 70-80 80-90 90-6300	50-60 60-70 80-90 90-6700	20-25 25-30 30-35 35-40 40-45		· · · · · · · · · · · · · · · · ·
6300-10 10-20 20-30 20-40 40-50	6700-10 10-20 20-30 30-40 40-50	45-50 55-60 65-70		- - - -
50-60 80-80 80-90 90-6400	50-60 60-70 70-80 80-90 90-6800	70-75 75-80 80-85 90-95	- - - -	-