



WATER-RIGHT DOCKET

Shenandoah National Park

Docket No: 5

5 WELLS, LOFT MOUNTAIN WATER SYSTEM

State Water Rights Documentation

10-03-1962: water well completion report for loft mountain development

COMMONWEALTH OF VIRGINIA DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT DIVISION OF MINERAL RESOURCES Box 3667, University Station, Charlottesville, Virginia				VWR # 715 WGR # 639	
WATER WELL COMPLETION REPORT					
OWNER: <u>Shenandoah National Park - Loft Mtn. No. 1</u>				Mailing Address: <u>Luray, Va.</u>	
TENANT: <u>Loft Mountain Development</u>				Mailing Address: <u>-</u>	
DRILLER: <u>Marvin O. Seck</u>				Mailing Address: <u>Rt. 1, Box 324, Fairfax, Va.</u>	
WELL LOCATION: County <u>Albemarle</u>				Approx. <u>1000</u> ft. elevation	
North (direction) of <u>Milepost No. 79</u> and <u>15</u> <u>mi</u> <u>S</u> <u>W</u> <u>Ivy Creek</u>					
(Give direction and distance in feet or tenths of mile from two reference points: roads, towns, rivers, etc. - on county highway or other map)					
WATER CONDITIONS					
DEPTH					
STATIC WATER LEVEL <u>8</u> feet					
WATER ZONES (fissures or formations supplying water)					
(from) <u>123</u> ft. (to) <u>134</u> ft.					
QUANTITY OF WATER					
WELL PUMPED (or bailed) at <u>20</u> Gal. per Min. with <u>160</u> feet DRAWDOWN after <u>7</u> HOURS PUMPING.					
FLOW (natural) <u> </u> G.P.M. HEAD <u> </u> ft. (above ground)					
REMARKS: <u> </u>					
QUALITY OF WATER					
COLOR <u>clear</u> TASTE <u>good</u>					
ODOR <u>none</u> OTHER <u> </u>					
ANALYSIS. AVAILABLE— Yes ☐ No ☐ ATTACHED Yes ☐ No ☐					
TEMPERATURE <u> </u> WATER (from) <u> </u> ft. (to) <u> </u> ft.					
(salt, brackish, iron, sulfur, acid, other)					
USE OF WATER: Domestic ☐ Town ☐ Industry ☐ Farm ☐ Public ☒					
CONSTRUCTION					
RIG TYPE (or method) <u>air rotary</u>					
(rotary, cable, bored, driven, etc.)					
DATE: Started <u>Aug. 29, 1962</u> ; Completed <u>Sept. 10, 1962</u>					
TOTAL DEPTH <u>323</u> ft.					
BEDROCK at <u>48</u> ft.					
GROUTING INFORMATION					
METHOD USED <u>pump pressure</u>					
GROUTING MATERIAL <u>neat cement</u>					
DEPTH OF GROUTING <u>63</u> feet					
REMARKS: <u>Geologic log available</u>					
Log of well (over)					

HOLE SIZE				CASING SIZE			
(diam.)	in	(from)	ft	(diam.)	in	(from)	ft
<u>10"</u>	<u>0</u>	<u>44'</u>	<u>333</u>	<u>6"</u>	<u>0</u>	<u>44'</u>	<u>333</u>

SCREEN (or perforations)			
(diam.)	(from)	ft	(to)
<u>6"</u>	<u>0</u>	<u>44'</u>	<u>333</u>

PUMP (installed)	
TYPE	Cap. (gpm)
<u> </u>	<u> </u>

H.P.	Depth of intake
<u> </u>	<u> </u> ft.

LOG

FURNISHED BY

Marvin C. Seck

DATE:

Oct. 3, 1962

DEPTH (feet)		TYPE OF SOIL OR ROCK PENETRATED (gravel, clay, etc., hardness, color, etc.)	REMARKS (water, casing, shot, screen, sample, etc.)
FROM	TO		
0	14	clay & boulders	
19	65	shale	
65	90	weathered greenstone	
90	115	greenstone & quartzite	
115	123	quartzite	water @ 123 = 8 gpm
123	134	greenstone & quartzite	water @ 134 = 12 gpm
134	303	greenstone & quartzite	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF MINERAL RESOURCES
Box 3667, University Station, Charlottesville, Virginia
WATER WELL COMPLETION REPORT

VDNR # 710
WVCR # 840

OWNER: Shenandoah National Park - Left Mtn. No. 2 Mailing Address: Luray, Va.
TENANT: Left Mtn. Development Mailing Address: _____
DRILLER: Marvin O. Seek Mailing Address: Rt. 1, Box 204, Fairfax, Va.
WELL LOCATION: County Rockingham Approx. 200 ft.
Southeast (direction) of Skyline Drive and 900 ft. 3 of Milepost 80
(Give direction and distance in feet or tenths of mile from two reference points - roads, towns, rivers, etc. - on county highway or other map)

WATER CONDITIONS

DEPTH

STATIC WATER LEVEL none
WATER ZONES (fissures or formations supplying water)
(from) (to) (from) (to)
65 ft. 69 ft. _____ ft. _____ ft.

QUANTITY OF WATER

WELL PUMPED (or bailed) at 0 Gal. per Min. with
_____ feet **DRAWDOWN** after _____ HOURS PUMPING.
FLOW (natural) _____ G.P.M. HEAD _____ ft. (above ground)
REMARKS: _____

QUALITY OF WATER

COLOR _____ TASTE _____
ODOR _____ OTHER _____
ANALYSIS: AVAILABLE— Yes ☐ No ☐ ATTACHED Yes ☐ No ☐
TEMPERATURE _____
_____ WATER (from) _____ ft. (to) _____ ft.
(salt, brackish, iron, sulfur, acid, other)

USE OF WATER: Domestic ☐ Town ☐ Industry ☐ Farm ☐ Public ☒

CONSTRUCTION

RIG TYPE (or method) air rotary
(rotary, cable, bored, driven, etc.)
DATE: Started Aug. 24, 1962; Completed Aug. 29, 1962
TOTAL DEPTH 160 ft.
BEDROCK at 31 ft.

GROUTING INFORMATION

METHOD USED _____
GROUTING MATERIAL _____
DEPTH OF GROUTING _____

HOLE SIZE

(diam) (from) (to) ft.
6" 0 160
(diam) (from) (to) ft.
6" 0 35'

CASING SIZE

SCREEN (or perforations)

(diam) (from) (to) ft. (opening size)

PUMP (installed)

TYPE _____ Cap. (gpm) _____
H.P. _____ Depth of intake _____ ft.

REMARKS: Black steel pipe (temporary casing) left in hole

Log of well (over)

LOG

FURNISHED BY

Marvin C. Seek

DATE: Oct. 3, 1962

DEPTH (feet)		TYPE OF SOIL OR ROCK PENETRATED (gravel, clay, etc., hardness, color, etc.)	REMARKS (water, caving, shot, screen, sample, etc.)
FROM	TO		
0	35	broken rock & shale	
35	55	greenstone & quartzite	
55	70	greenstone	
70	80	greenstone with some red chips	water at approx 1 gpm 65'-69'
80	160	greenstone	

VDMR #
WWCR #COMMONWEALTH OF VIRGINIA
DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF MINERAL RESOURCES
Box 3667, University Station, Charlottesville, Virginia

WATER WELL COMPLETION REPORT

OWNER: Shenandoah Nat'l Park-Loft Mtn. No. 3 Mailing Address: Luray, Virginia
 TENANT: Loft Mtn. Development Mailing Address: _____
 DRILLER: Marvin O. Seek Mailing Address: Rt. 1, Box 204, Fairfax, Va.
 WELL LOCATION: County Rockingham Approx. 550 ft. W of service road
East (direction) of Skyline Drive and 20 ft. W of service road

(Give direction and distance in feet or tenths of mile from two reference points: roads, towns, rivers, etc. on county highway or other map)

WATER CONDITIONS

DEPTH None

STATIC WATER LEVEL _____

WATER ZONES (fissures or formations supplying water)

(from) _____ (to) _____ (from) _____ (to) _____
 ft. ft. ft. ft.
 ft. ft. ft. ft.

QUANTITY OF WATER

WELL PUMPED (or bailed) at _____ Gal. per Min. with
_____ feet DRAWDOWN after _____ HOURS PUMPING.FLOW (natural) _____ G.P.M. HEAD _____ ft. (above ground) W

REMARKS: _____

QUALITY OF WATER

COLOR _____ TASTE _____

ODOR _____ OTHER _____

ANALYSIS AVAILABLE— Yes ☐ No ☐ ATTACHED Yes ☐ No ☐

TEMPERATURE _____

WATER (from) _____ ft. (to) _____ ft.
(salt, brackish, iron, sulfur, acid, other)USE OF WATER: Domestic ☐ Town ☐ Industry ☐ Farm ☐ Public ☒

CONSTRUCTION

Air RotaryRIG TYPE (or method) _____
(rotary, cable, bored, driven, etc.)DATE: Started 8/20/62; Completed 8/24/62TOTAL DEPTH 250 ft.BEDROCK at 10 ft.

GROUTING INFORMATION

METHOD USED _____

GROUTING MATERIAL _____

DEPTH OF GROUTING _____

REMARKS: Black Steep pipe (temporary casing) left in well.

HOLE SIZE

(diam) _____ (from) _____ (to) _____
 in. ft. ft.
6 0 250

CASING SIZE

(diam) _____ (from) _____ (to) _____
 in. ft. ft.
6 0 19

SCREEN (or perforations)

(diam) _____ (from) _____ (to) _____
 in. ft. ft. (opening size)

PUMP (installed)

TYPE _____ Cap. (gpm) _____

H.P. _____ Depth of intake _____ ft.

Log of well (over)

LOG

FURNISHED BY **Marvin O. Gosh**DATE: **10/3/62**

DEPTH (feet)		TYPE OF SOIL OR ROCK PENETRATED (gravel, clay, etc., hardness, color, etc)	REMARKS (water, caving, shot, screen, sample, etc)
FROM	TO		
0	19	soil & broken rock	
19	25	greenstone	
25	39	weathered greenstone	
39	70	greenstone	
70	71	quartzite	
71	107	greenstone	
107	110	greenstone - quartzite w/ some red chips	
110	131	as above	
131	145	greenstone	
145	250	greenstone - quartzite w/ red chips	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF MINERAL RESOURCES
Box 3667, University Station, Charlottesville, Virginia

VDMR # 7
WWCR # 1

WATER WELL COMPLETION REPORT

OWNER: Shenandoah Nat'l Park-Loft Mtn.No. 4 Mailing Address: Luray, Va.
TENANT: Loft Mtn. Development Mailing Address: _____
DRILLER: Marvin O. Seck Mailing Address: Rt. 1, Box 204, Fairfax, Va.
WELL LOCATION: County Albemarle Approx. 100 ft. 100 ft. 100 ft.
North (direction) of Well No. 1 and _____ of _____

(Give direction and distance in feet or tenths of mile from two reference points: roads, towns, rivers, etc. - on county highway or other map)

WATER CONDITIONS

DEPTH 10'
STATIC WATER LEVEL _____
WATER ZONES (fissures or formations supplying water)
38' (from) _____ (to) 155' (from) _____ (to)
64' _____ (ft) _____ (ft)

QUANTITY OF WATER
WELL PUMPED (or bailed) at 22 Gal. per Min. with
165 feet DRAWDOWN after 7 HOURS PUMPING.
FLOW (natural) _____ G.P.M. HEAD _____ ft. (above ground)
REMARKS: _____

QUALITY OF WATER
COLOR clear TASTE good
ODOR none OTHER _____
ANALYSIS: AVAILABLE- Yes ☐ No ☐ ATTACHED Yes ☐ No ☐
TEMPERATURE _____
WATER (from) _____ ft. (to) _____ ft.
(salt, brackish, iron, sulfur, acid, other)

USE OF WATER: Domestic ☐ Town ☐ Industry ☐ Farm ☐ Public ☐

CONSTRUCTION

RIG TYPE (or method) Air Rotary
(rotary, cable, bored, driven, etc.)
DATE: Started 9/11/62; Completed 9/14/62
TOTAL DEPTH 240 ft.
BEDROCK at 65 ft.

GROUTING INFORMATION
METHOD USED Pump Pressure
GROUTING MATERIAL neat cement
DEPTH OF GROUTING 30 feet

REMARKS: _____

HOLE SIZE

(diam) (from) (to) ft.
19 in. 0 ft. 30 ft.
6 in. 30 ft. 240 ft.
SCREEN (or perforations)
(diam) (from) (to) ft. (opening size)

CASING SIZE

(diam) (from) (to) ft.
6 in. 0 ft. 30 ft.

PUMP (installed)

TYPE _____ Cap. (gpm) _____
H.P. _____ Depth of intake _____ ft.

Log of well (over)

LOG

FURNISHED BY **Marvin O. Seck**DATE: **10/3/62**

DEPTH (feet)		TYPE OF SOIL OR ROCK PENETRATED (gravel, clay, etc., hardness, color, etc)	REMARKS (water, caving, shot, screen, sample, etc)
FROM	TO		
0	8	clay & boulders	
8	30	shale	
30	34	weathered greenstone	
34	69	shale	
69	240	weathered greenstone	38' = 4 gpm 64' = 8 gpm 155' = 10 gpm

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF MINERAL RESOURCES

VDMR: 754
WVCR: 846

Box 3667, University Station, Charlottesville, Virginia

ft Mountain No. 5 WATER WELL COMPLETION REPORT

OWNER: Shenandoah National Park Mailing Address: Luxey, Virginia
TENANT: _____ Mailing Address: _____
DRILLER: Sydner Pump and Well Co., Inc. Mailing Address: Richmond 12, Virginia
WELL LOCATION County: Albemarle Approx _____ ft
Elevation of _____ and _____ ft

(Give distance and direction to top of nearest or with from the reference points - roads, towns, rivers, etc. - as nearly as possible or when ready)

WATER CONDITIONS

DEPTH

STATIC WATER LEVEL 15'

WATER ZONES (fissures or formations supplying water)

(from) (to) (from) (to)
____ ft ____ ft ____ ft ____ ft
____ ft ____ ft ____ ft ____ ft

QUANTITY OF WATER

WELL PUMPED (or bailed) at 22 Gal per Min with
95 feet DRAWDOWN after 24 HOURS PUMPING

FLOW (natural) _____ GPM. HEAD _____ ft (above ground)

REMARKS: Test Pump Log copy to Div. of

Min. Resources

QUALITY OF WATER

COLOR OK TASTE OK

ODOR OK OTHER _____

ANALYSIS: AVAILABLE - Yes ☐ No ☐ ATTACHED Yes ☐ No ☐

TEMPERATURE _____

WATER (from) _____ ft (to) _____ ft
(soft, brackish, iron, sulfur, acid, other)

USE OF WATER: Domestic ☐ Town ☐ Industry ☐ Farm ☐ Public ☒

CONSTRUCTION

RIG TYPE (or method): Air Rotary
(rotary, cable, bored, driven, etc.)

DATE Started 11-16-62 Completed 11-27-62

TOTAL DEPTH 320 ft

BEDROCK at 10 ft

GROUTING INFORMATION

METHOD USED Gravity

GROUTING MATERIAL Cement & water

DEPTH OF GROUTING 33' plus

HOLE SIZE

(diam) (from) (to)
10 in. 0 ft 33'-4" ft
6 in. 33'-4" ft 320 ft

CASING SIZE

(diam) (from) (to)
6 in. 0 ft 33'-4" ft
34'-9" ft

SCREEN (or perforations)

(diam) (from) (to) (opening size)

PUMP (or method)

TYPE _____ Cap (gpm) _____

H.P. _____ Depth of intake _____ ft

REMARKS: Log and samples to Div. of Min. Resources

Water samples taken by Park Service during test pumping

Log of well (over)

Rig 100 FURNISHED BY Superior Pump and Well Co., Inc.

DATE 1-25-61

Data from drillers' notes by Jesse Snyder Jr.

DEPTH (feet)		TYPE OF SOIL OR ROCK PENETRATED (gravel, clay, etc., hardness, color, etc)	REMARKS (water, casing, shot, screen, sample, etc)
FROM	TO		
0	10	Clay broken rock weathered	
10	14	Weathered shale	
14	28	Shale	
28	46	Rock - (shale like)	
46	47	Weathered area - water - 4-5 GPM	
47	50	Greenstone	
50	51	Weathered rock - 5-6 GPM	
51	53	Greenstone	
53	54	Weathered broken rock 15-20 GPM	
54	56	Greenstone	
56	57	Broken weathered rock 2-3 GPM	
57	71	Greenstone	
71	72	Soft weathered No noticeable water increase	
72	80	Greenstone	
80	81	Weathered rock	
81	102	Greenstone	
102	103	Soft greenstone	
103	115	Greenstone	
115	116	Broken rock 8-10 GPM -----	Measured about 45 GPM at this point. As drilling and air lift time went on the flow rate slowly dropped to about 23 to 25 GPM
116	128	Shale & greenstone	
128	130	Greenstone with quartz rock (white)	
130	154	Greenstone	
154	155	White quartz - hard	
155	224	Greenstone	
224	243	Greenstone & shale	
243	258	Soft greenstone	
258	288	Greenstone & white quartz	
288	320	Hard greenstone	

Other Supporting Information

National Park Service
Contract No. 14-10-0137-0135

Final Report #1
LOFT MTN. - BIG FLAT AREA 1962
Shenandoah National Park

Geology

The Loft Mountain-Big Flat Area of Shenandoah National Park is underlain by greenstone and interbedded phyllite of the Catoctin formation that dips 25 to 45 degrees to the southwest and strikes approximately due north. The many local variations in dip and strike are the result of folding of the strata during formation of the Blue Ridge Mountains. The Catoctin formation is overlain by the spotted purple slate of the Loudoun formation that occurs near the Skyline Drive just south of Milepost 79. The quartzite and interbedded phyllite of the overlying Weavertown formation occurs on the west side of the Loudoun slate. The normal sequence of these inclined formations indicates folding of the strata, but no overturning or faulting is known to have occurred in the Loft Mountain-Big Flat Area.

Hydrology

The numerous springs and seeps that issue from the western slopes of Loft Mountain are controlled by the southwest dip of the Catoctin formation. Surface water from rain and melting snow seeps down into the soil cover until it reaches the top of the

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impervious greenstone. The water then migrates down along the greenstone until local topography, structure or thin overburden causes it to emerge at the ground surface. The flow of each of these springs and seeps varies considerably from month to month, and could not be considered at this time as a reliable source for water. Regular weir readings at monthly intervals for a period of at least one year would be necessary before the springs could be evaluated for consideration as potential water sources. Available flow data from the more important springs are listed below.

DOYLE RIVER WEIR - located northeast of the Doyle River Cabin, approximately 800 feet south of the Appalachian Trail and 300 feet south of the cliff on the south side of Big Flat Mountain. This is the only spring that can supply water by gravity feed to the Doyle River Overlook Area.

WEIR READINGS

<u>1961</u>	<u>Flow (gpm)</u>	<u>1962</u>	<u>Flow (gpm)</u>
April 19	27.6	May 11	4.3
July 21	0.4	May 19	6.8
Aug. 4	0.3	June 10	2.4
Aug. 22	0.08	June 23	4.3
Sept. 5	0.08	Aug. 10	0.5
Sept. 22	1.2	Aug. 20	0.6
Oct. 6	0.0	Sept. 9	0.3
Oct. 23	4.3	Sept. 26	0.0

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IVY CREEK SPRING - located at the head of Ivy Creek
approximately 250 feet east of the Skyline Drive at Milepost 79, and
300 feet north of the service road to Big Flat Shelter.

FLOW PIPE READINGS

<u>1961</u>	<u>Flow (gpm)</u>	<u>1962</u>	<u>Flow (gpm)</u>
July 20	2.0+	May 11	24.5
Aug. 4	2.0+	May 19	14.0
Aug. 20	1.3+	June 10	2.0
Sept. 5	10.0	June 23	10.0
Sept. 22	6.0	Aug. 10	3.0
Oct. 6	1.5	Aug. 20	3.0
Oct. 23	25.0	Sept. 6	3.0
		Sept. 20	1.0

IVY CREEK WEIR - located on the western slope of Loft
Mountain, approximately 1500 feet east of Skyline Drive at Milepost 79.

WEIR READINGS

<u>1961</u>	<u>Flow (gpm)</u>	<u>1962</u>	<u>Flow (gpm)</u>
May 25	11.9	May 5	4.3
July 20	9.0	May 19	15.0
Aug. 4	5.1	June 10	12.0
Aug. 20	4.8	June 23	12.0
Sept. 5	20.0	Aug. 10	3.0
Sept. 22	30.0	Aug. 20	5.0
Oct. 6	9.0	Sept. 6	4.0
Oct. 23	120.0	Sept. 26	3.0

COLD SPRING - located approximately 50 feet east of the
Skyline Drive, .2 mile north of Milepost 80.

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FLOWPIPE READINGS

<u>1961</u>	<u>Flow (gpm)</u>	<u>1962</u>	<u>Flow (gpm)</u>
Aug. 4	0.5+	May 11	6.0
Sept. 5	3.0	May 19	4.0
Oct. 6	3.0	June 10	2.5
		June 23	5.0
		Aug. 10	1.0
		Aug. 20	0.5
		Sept. 6	0.3
		Sept. 26	0.03

CLIFF ROCK SPRING - located approximately 900 feet east of the Skyline Drive near Milepost 80, 30 feet east of the service road to Big Flat Shelter, and 50 feet east of test well number 3. No records of flow are available, but estimates indicate a maximum of approximately 10 gpm.

Readings from temporary flow pipes near drilling sites numbers 1 and 4 were made for the first time in September, 1962.

Flowpipe near Skyline Drive - - - - - 4.17 gpm
 Flowpipe near service road - - - - - 0.6 gpm
 Flowpipe in Creek near wells - - - - - 4.0 gpm

Test Drilling Program

In accordance with the preliminary report submitted by the Virginia Division of Mineral Resources on September 22, 1961, drilling of the three recommended test sites at Loft Mountain took place from August 20 to September 10, 1962. Test Site No. 4 was located and drilled after completion of the three previously

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recommended test sites. Drilling of the test holes was accomplished with an air rotary rig owned and operated by Mr. Marvin Seek of Fairfax, Virginia. Test-hole data and geologic logs are attached to this report.

Pump Testing Program

Pump tests for test holes at Sites No. 1 and No. 4 were conducted for a total of 32 hours between September 14 and September 29, 1962. An airline was used during the testing of Test Hole No. 1, but none was available for the turbine pump used in Test Hole No. 4. The electric measuring device used in place of the airline in Test Hole No. 4 is not considered reliable for the purpose of measuring water level during pumping.

The individual pump tests indicate that Test Holes No. 1 and No. 4 yield 20 and 22 gallons per minute, respectively. During simultaneous pumping, each well had a yield of approximately 15 gallons per minute or a total of 30 gallons per minute. The tests were conducted during what is normally the driest time of the year but are not adequate to estimate a sustained yield throughout the Park season. The pump test data are contained in pump test sheets and drawdown curves attached to this report.

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Water Well Recommendation

It is recommended that a well site located approximately 500 feet northwest of Test Hole No. 4 be drilled to a depth of about 400 feet. Although the site is 50 feet lower in elevation than Test Holes 1 and 4, it has been selected for the following reasons:

1. The geologic logs, made by careful microscopic examination of drill cuttings from the test holes indicate that the aquifer potential is greatest in the soft phyllite and interbedded andesite which were penetrated in Test Holes No. 1 and No. 4. Test Holes No. 2 and No. 3 penetrated hard, impermeable Catoctin greenstone and were dry. The phyllite beds possess greater porosity and permeability than the Catoctin formation.
2. The proposed well site is underlain by the Loudoun formation, a slaty phyllite, that occurs stratigraphically between the underlying Catoctin and overlying Weverton formations. In addition to the phyllites in the Loudoun formation and some that are within the Catoctin formation, water may be obtained along the contacts of the Loudoun with both the Weverton quartzite and Catoctin greenstone. A well at the proposed site should intersect these geologic

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contacts and the water-bearing phyllites of the Catoctin formation penetrated by Test Holes No. 1 and No. 4.

The proposed well is considered sufficiently removed from Test Holes No. 1 and No. 4 to have no interference with the possible production from the two test holes.

3. The site is located near the intersection of two streams, which should provide a perennial source of recharge.

The proposed well will spud in Weverton quartzite float and weathered slaty phyllite of the Loudoun formation. The Loudoun-Catoctin geologic contact should be penetrated at a depth of approximately 100 feet. A total depth of 400 feet is proposed to fully evaluate the Catoctin formation for water-bearing fractures below the phyllite beds.

Commonwealth of Virginia
Division of Mineral Resources
Charlottesville, Virginia
October 24, 1962
L. H. Gardner II, Geologist

Shenandoah National Park
LOFT MOUNTAIN AREA
Preliminary Report #2

National Park Service
Contract #14-10-0137-0169

Location

The area at Loft Mountain previously studied for water resources development has been extended for the purpose of selecting additional well-drilling sites. The portion for which detailed field investigations have now been completed includes that portion of Shenandoah National Park between mileposts 78 and 82, for approximately 1/4 to 1 mile on either side of the Skyline Drive. The focal point of this area, insofar as favorable ground-water conditions are concerned, is on the east side of the Skyline Drive between mileposts 78 and 79 (see attached map).

Geology and hydrology

Exclusive of minor structural variations, the geology of the area is as previously reported by this Division (Loft Mt. Preliminary Report dated 9/22/61, and Loft Mt. Final Report dated 10/24/62). More recent spring and weir data verifies the unsatisfactory nature of these sources of water as stated in the above-mentioned reports.

Test Hole Recommendations

Within the Loft Mountain Area, two portions are favorable for the location of test holes; these portions are in Eppert and Ivy Creek hollows. Because of the relatively great distance from Skyline Drive, lack of existing roadways, and absence of pipelines and electrical power, Eppert

Test Hole Recommendations (Continued)

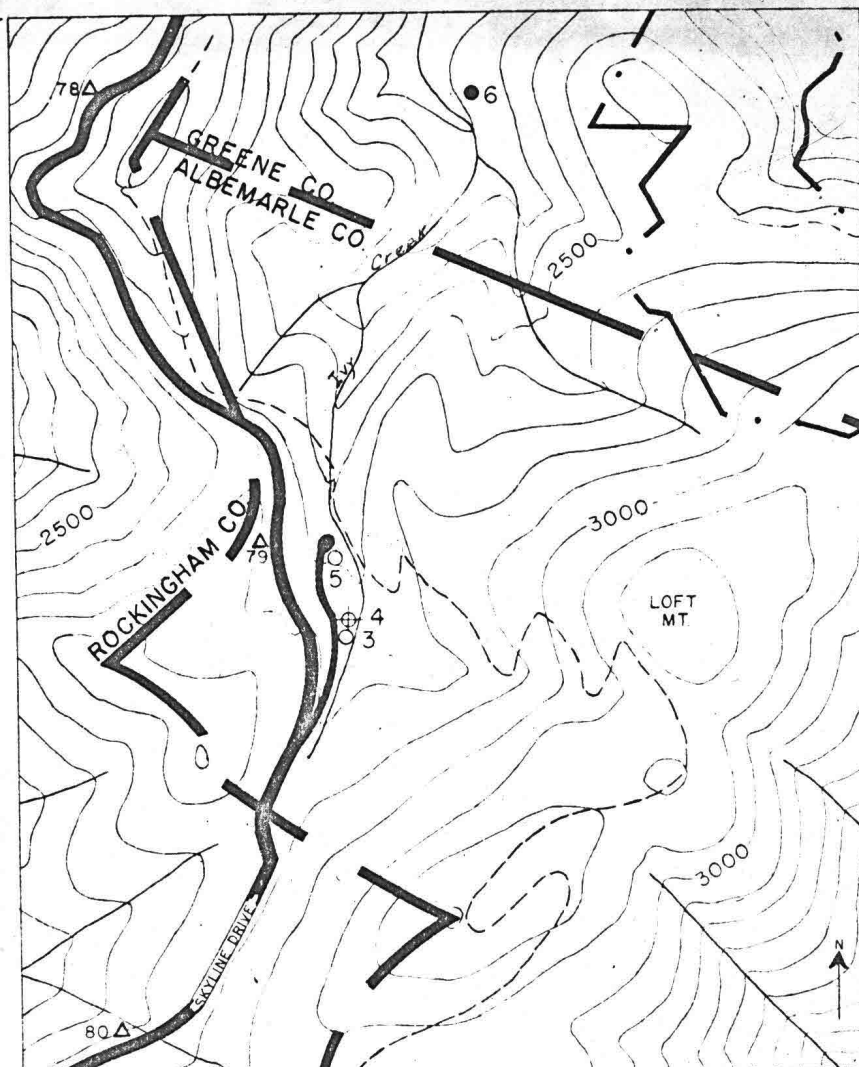
Hollow has not been considered as a drilling locality.

Ivy Creek Hollow is a structural trough comprised of the Weverton, Loudoun and Catoctin formations, from west to east. The drilling site for Test Hole #6 has been so located to penetrate each of these formations at a site approximately 3000 feet east of milepost 78, about 100 feet east of Ivy Creek (see attached map).

A test hole at this site will penetrate a thin overburden of cobbles and soil beneath which is about 140 feet of tan quartzite, sandstone, and siltstone. The purple and silvery-green phyllites of the Loudoun formation and the dense, grayish-green basalts and phyllites of the Catoctin formation will be encountered at approximately 150 and 225 feet, respectively. Drilling should be terminated at 300 feet unless water-bearing fractures or lithologic changes are encountered deeper than 250 feet; in such an event, drilling should continue to a depth not less than 50 feet below the deepest rock fracture or change.

Should it not be possible to develop this test hole into a producing well, a drilling site for Test Hole #7 will be selected in the area immediately upon evaluation of data gathered during drilling of Test Hole #6.

Virginia Division of Mineral Resources
Charlottesville, Virginia
November 17, 1964



TEST HOLE LOCATION MAP-LOFT MOUNTAIN AREA
SHENANDOAH NATIONAL PARK

Legend

County Line
Park Boundary

△ Milepost

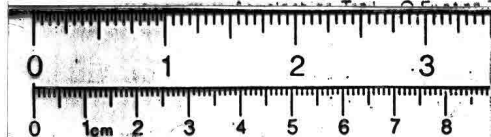
● Proposed Test Hole

○ Existing Test Hole

Scale 1"=1100'

Contour Interval 100'

Virginia Division of Mineral Resources



LOFT MOUNTAIN ADDENDUM

The water well proposed as Well No. 5 in the Loft Mountain Final Report dated October 24, 1962, was completed and pump tested by the Sydnor Pump and Well Company of Richmond, Virginia, on November 27, 1962.

Loft Mountain Well No. 5 is located 450 feet north of Loft Mountain Well No. 4, on the west side of Ivy Creek. Approximately 20 feet of float and weathered material was penetrated above the hard quartzite of the Weverton formation. The micaceous phyllite of the Loupoun formation, similar to that penetrated in Loft Mountain wells No. 1 and No. 4, was encountered from 35 to 115 feet, and the chloritic phyllite of the Catoctin formation from 115 to 320 feet.

Aquifers were penetrated from 45 to 57 and 115 to 116 feet below ground level. A 24-hour pump test was conducted, and a final yield of 22 gallons per minute with 95 feet of drawdown was obtained. The static water levels in wells No. 1 and No. 4 were lowered less than two inches at the conclusion of the pump test.

Production records of these wells should be maintained in order to provide data as to the extent and nature of the ground-water reservoir in this area. This data will assist in the determination of the number of additional wells that can be drilled in the area without endangering the yield from the present wells.

Attached is a copy of the sample examination, pump test data, and the Water Well Completion Report form of Loft Mountain No. 5.

Division of Mineral Resources
Laurence H. Gardner II - Geologist
December 20, 1962

National Park Service
Contract No. 14-10-0137-109

Loft Mountain Area
Preliminary Report #1

The proposed development for the Loft Mountain area includes concession overnight facilities, a 150-site campground, a wayside, and a picnic area. The Park Service has estimated that the maximum water consumption will be 135,000 gallons per day, or approximately 94 gallons per minute.

The area considered is the Loft Mountain-Big Flat Mountain ridge near the intersection of Albemarle, Greene and Rockingham counties. The boundary of the area studied is approximately the 2,700 foot contour around the ridge.

Field investigations indicate no single spring or combination of springs that yield a minimum flow of 94 gallons per minute. A combined maximum yield of 20 to 40 gallons per minute should be available from several spring sources on the west and northwest side of the Loft Mountain-Big Flat Mountain ridge. One or more wells or a combination of wells and one or more springs with a total yield of 94 gallons per minute could possibly be developed in the area.

Geology and Hydrology

The Loft Mountain-Big Flat Mountain area is underlain by greenstone that dips at an angle of 25 to 45 degrees to the southwest. The contact between the greenstone and the overlying quartzites of the Unicoi

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formation is just west of the drive in Eppert's Hollow. This contact passes through Doyle River Overlook (milepost 81.1), down the slope, through the hollow, back up the slope, and crosses the drive in the saddle between Patterson Ridge and Loft Mountain. Only a small portion of the quartzite lies in the area considered in this report (Figure 1).

The greenstone area contains numerous small, apparently near-surface springs, the majority of which are on the west slope and are probably controlled by the southwest dip of the greenstone. All of the springs in the greenstone area occur in zones of heavy soil cover with large boulders scattered over the surface. Similar conditions occur in many areas throughout the park and indicate the springs are probably supplied by water flowing in the soil above the bedrock. The yield from near-surface springs fluctuates greatly with the seasons and the rainfall, and are not considered dependable water sources.

Aerial photographs were used to determine the presence of linear elements such as minor faults, shear zones, and joint and fracture patterns which might have some bearing on the location of ground water. The linear elements are shown on Figure 1, and are concentrated in the three Proposed test areas. This concentration and the presence of springs indicate the need for test drilling.

Weirs and Springs

Only those springs found in the western part of the area are considered because these springs are larger, more numerous, and are located above the 2,700 foot elevation line.

Ivy Creek Weir is located on the western slope of Loft Mountain, below the saddle between Loft Mountain and "The Peak" (Figure 1). Flow records are available only from May of this year:

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Table 1. Ivy Creek Weir

Flow in gallons per minute.

May 25, 1961	11.9+
July 20, 1961	9.0
Aug. 4, 1961	8.1
Aug. 20, 1961	4.8
Sept. 8, 1961	20.0

To use this weir as a water source in the future, the receptacle, collecting-trenches, and lines would have to be dug up and cleaned. Fine sand and silt have accumulated below the mouth of the inlet pipe indicating that the collecting-lines and receptacle have silted up or that there is a break in the inlet line between the receptacle and the weir box. It will also be necessary to install an overflow or by-pass pipe on the receptacle as no provision was made for excess flow on the original installation. During the spring when the water-table was at its highest level, there was a large amount of water flowing through the surface run-off ditch around the weir, and even more was seeping out of the ground in the vicinity of the receptacle and collecting-galleries. The cleaning of the galleries and receptacle, and the installation of an overflow pipe, should eliminate this excess run-off and seepage.

Ivy Creek Spring is located at the head of Ivy Creek about 100 feet east of the drive and 300 feet north of the service road to Big Flat shelter (Figure 1). Only four flow readings are available for this spring and they are not accurate due to seepage around the flow pipe.

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Table 2. Ivy Creek Spring

Flow in gallons per minute.

July 20, 1961	2.0+
Aug. 4, 1961	2.0+
Aug. 20, 1961	1.29+
Sept. 5, 1961	10.0+

At the time these readings were made much water was bypassing the flow pipe.

The flow pipe will have to be dug up and the leakage on the line repaired. There appears to be no provision for excess flow during the wet season at this installation, but the flow pipe is 6 inches in diameter and should be sufficient to carry away the maximum discharge under all conditions.

Cold Spring is located about 50 feet east of the drive at approximately milepost 79.8 (Figure 1). This spring is almost totally undeveloped. The discharge from the flow pipe has been estimated by Mr. Adams to be 1 to 6 gallons per minute. The construction of a cut-off well and collecting galleries at this site could double the discharge rate.

Table 3. Cold Spring Flow Pipe

Flow in gallons per minute.

Aug. 4, 1961	.5+
Sept. 5, 1961	3.0+

Cliff Rock Spring is located about 900 feet east of the drive near milepost 80.0, and 30 feet east of the service road to Big Flat shelter (Figure 1). There are no records of any development of this spring, but a surface run-off ditch appears to have been dug around the spring when the water resources of the area were first studied. The estimated spring flow is 5 to 8 gallons per minute, and development may increase this to 10 to 15 gallons per minute.

On the east side of the drive at milepost 80.1 (Figure 1), the road cut is wet and a small amount of water is always flowing through the

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culvert under the drive. The amount of flow is difficult to determine, but is probably greater than 5 gallons per minute. Development of this area may yield a minimum of 12 to 15 gallons per minute.

The Doyle River weir is the only known spring on the south side of Big Flat Mountain from which water can be gravity-fed to the Doyle River Overlook area. The weir is located northeast of the Doyle River cabin, about 800 feet south of the Appalachian trail and 300 feet south of the cliff along the south side of Big Flat Mountain (Figure 1). The weir box and collecting galleries were built after 1938 by Mr. Lee, and the information concerning the type and size of the installation was not included in the papers from Mr. Dirzulaitis' files. The few records that have been kept show that the flow from this weir would have to be augmented by a well or other weirs in the area to be of use as a water source.

Table 4. Doyle River Weir

Flow in gallons per minute.

May 4, 1961	27.6
July 21, 1961	.44
Aug. 4, 1961	.31
Aug. 22, 1961	.08
Sept. 8, 1961	.08

Water Wells

The individual and combined discharge rates of the springs are insufficient to give the minimum amount of water necessary for the proposed developments on Left Mountain. However, wells or a combination of wells and one or more springs should yield sufficient water for all of the planned developments.

Three areas for test drilling have been selected on the basis of

hydrologic and geologic conditions, accessibility, and proximity to the proposed development area. The proposed areas are discussed in the order of preference.

Test area No. 1 is located near Ivy Creek on the old road (old Appalachian trail) northeast of the drive (Figure 1). This site is in a marshy low-land at the intersection of two cross-trending valleys. The first drill hole should not be less than 150 feet or greater than 300 feet in depth.

Test site No. 2 is located east of the drive at milepost 80.1 and west of the old road between Doyle River Overlook and Left Mountain (Figure 1). This site is located on the south side of what appears topographically to be a minor fault-line scarp across which two electrical resistivity lines were run. Resistivity line number one was run along the east side of the drive with the center stake at the base of the scarp. The resistivity readings indicate an electrical discontinuity at 25.5 feet which was interpreted as the water table. A second discontinuity at 80 feet probably represents solid, non-water-bearing greenstone below the water table. The second resistivity line was run along the old road near the center of the test site. A minor discontinuity at 28 feet should represent the water table, and a second discontinuity at about 100 feet probably represents the solid greenstone below the water table. A drill hole at this site will substantiate the resistivity interpretations and should intersect the water table at about 28 feet, bedrock between 30 and 40 feet, and be below the most favorable water-bearing zones at 100 feet. The maximum depth of the drill hole should be 135 to 150 feet.

Test site No. 3 is located near Cliff Rock Spring and the Big Flat shelter service road (Figure 1). An electrical resistivity line was run along the shelter road, but the results were not conclusive. Topographic

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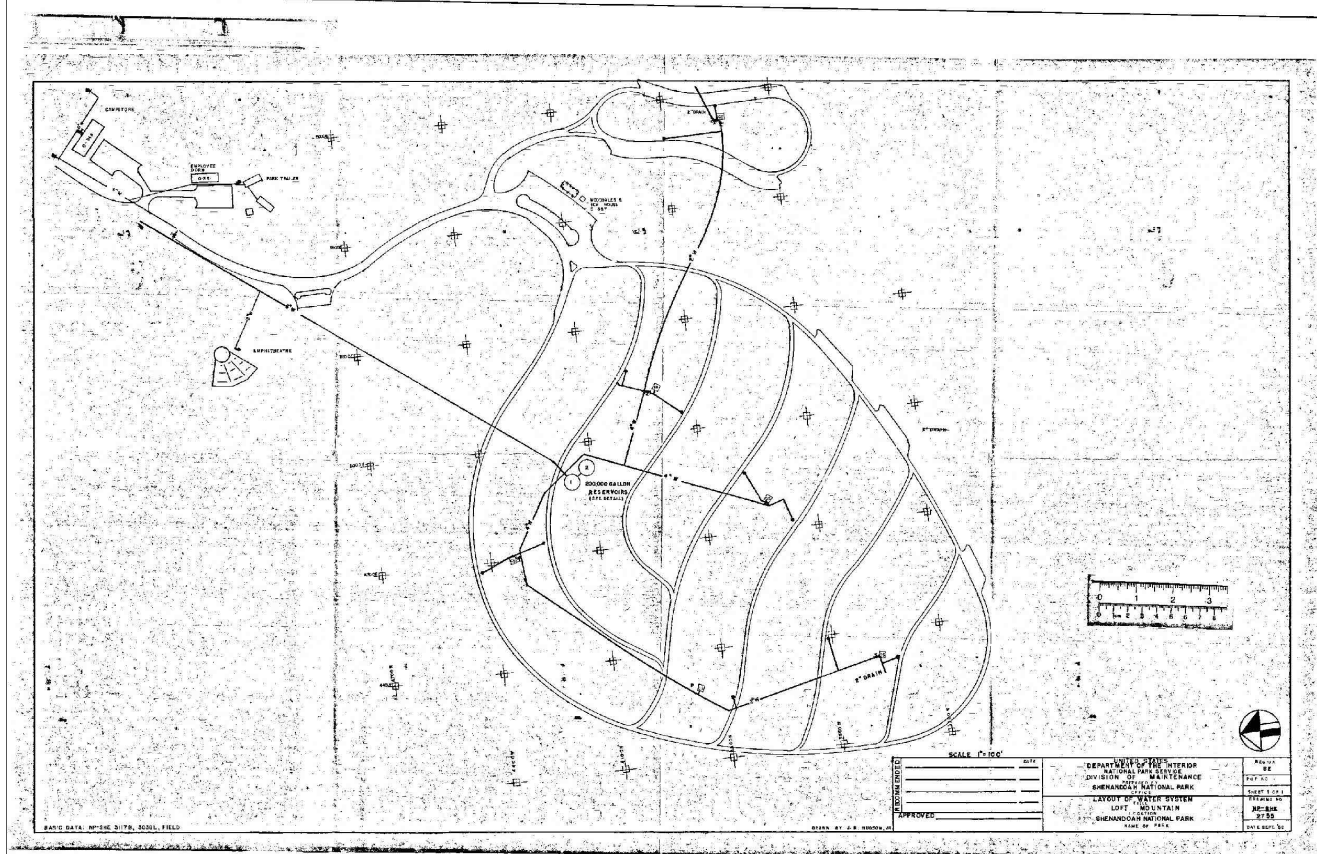
and geologic data collected in the area indicate that the probability of finding large quantities of water at this site is the least favorable of the sites picked for test-drilling.

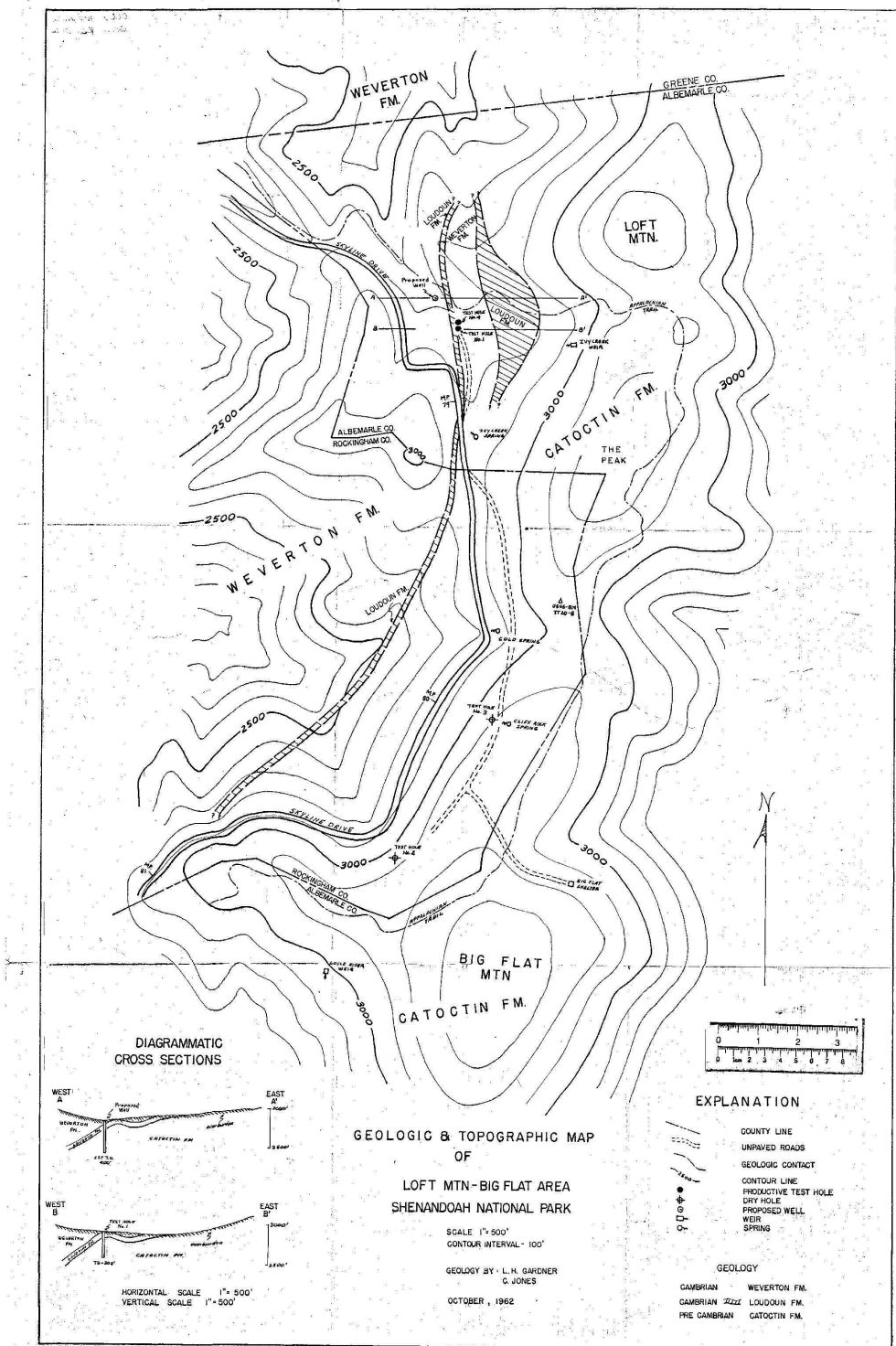
Conclusions

Adequate water is believed to be available for the proposed developments in the Loft Mountain area but it may be necessary to use more than one water source. Test drilling of sites No. 1, 2 and 3 will determine the subsurface geologic conditions, and the location and probable yield of production wells.

It is recommended that a minimum of six small-diameter test holes be drilled to investigate the ground-water conditions before a production well is drilled.

H. R. Hopkins
Division of Mineral Resources
Charlottesville, Va.
September 22, 1961





Docket Information

Number of Documents in Docket 30

Documents Dated from 9/22/1961 to 9/15/1966

Docket Compiled: 6/17/2011