



WATER-RIGHT DOCKET

Mammoth Cave National Park

Docket No: 2

CRYSTAL CAVE WELL

Supporting Hydro Data

00-00-0000: check list

WATER DOCKET CHECK LIST

AREA Mammoth Cave NP
NAME OF WATER SYSTEM Crystal Cave Well
PRIORITY DATE 1948 NO. OF WATER SYSTEMS _____

WATER DOCKET INCLUDES THE FOLLOWING:

PART I (INVESTIGATION)

- Water resources investigations made by qualified geologists:
(a) U.S.G.S. _____ (b) State Agency _____ (c) Consultant, other _____
- Quantity of water used from water sources in park and quantity needed to meet future visitation _____
- Application of well drillers certificate _____
- Record of well and well drillers log _____
- Pump test data _____
- Chemical analysis of water samples _____
- Completion report _____
- Narrative report _____
- Photographs of water system _____
- Sketch showing "as constructed" water system _____
- Other: _____

PART II (WATER RIGHTS)

- Application for water rights from state concerned _____
- Alien Water Rights - Use Permit _____
- Deed for any tract of land in park which refers to water in any form (Copies of deeds in WASO) _____
- Other: _____

REMARKS

- Sources of Information:
(a) Statement prepared by Water Resources Engineer or Park Engineer giving brief history of water sources available in general park area. (Usually obtained from park employees who have been working at the park for many years or local people living in area) _____
(b) Files checked: _____

Superintendent

April 19, 1962

Park Engineer

Report On Well Drilling and Testing, Flint Ridge

The four shallow wells have now been drilled by M. L. Dillingham of Glasgow. The U. S. Geological Survey kept complete notes and will make a report. They will send us a copy of that report.

The logs of the wells are attached.

Gauge recorders have been installed in these wells and will be observed, and then later in the season pumping tests will be made. I contacted the Farmers REA in Glasgow and made provisions for the use of their equipment for these tests. The USGS asserts that these wells add materially to their growing storehouse of information of the area.

The locations of the wells which were drilled are as follows:

Well No. 1, located about 500 feet to the left of the Onyx Cave road, about 1000 feet toward Onyx Cave from the Bransford Spring road intersection. Depth of well - 62 feet.

Well No. 2, located about 75 feet to the right of the Onyx Cave road and about 500 feet toward Onyx Cave from the Bransford Spring road intersection. Depth of well - 62 feet.

Well No. 3, located on left of Flint Ridge road (traveling toward Crystal Cave) just past Mammoth Cave Church and cemetery. Depth of well - 123 feet.

Well No. 4, located about 1500 feet to the left of the Onyx Cave road and about 1000 feet toward Onyx Cave from the Bransford Spring road intersection. Depth of well - 57 feet.

The U. S. Geological Survey has agreed to finance the drilling of Well No. 3.

Some of the wells will produce water but it is not yet known in just what amounts. The recorders and later testing will give us this information.

Mr. Dillingham moved his "rig" in and began setting up on Monday, April 9, at the Crystal Cave well. He drilled the well in late 1948

or early 1949, and a Fairbanks-Morse pump was installed in 1949. The size of the drilled hole was 8" and a 6-7/8" casing was installed to a depth believed to be about 100 feet. Mr. Dillingham says that a log of the well was kept when it was drilled and was turned over to the owners. In checking, we find it is not now available. We have investigated as thoroughly as possible and the available information is quite skimpy. When we tried to begin the test, we found that a 4-7/8" casing had been inserted inside the 6-7/8" casing. Further investigation (contact with people who were partially familiar with the well) revealed that no 4-7/8" casing was in the well when the pump was installed. No one seemed to know why the 4-7/8" casing was installed.

As you know, it was decided that we should attempt to pull the 4-7/8" casing because we were not able to get adequate tests otherwise.

On Saturday, April 14, an attempt was made to pull the 4-7/8" casing, but we were unable to bridge it. We attempted to lower it by letting loose the clamps, etc., and also, we tried several "jerks" on the casing but it was very solid. There was not sufficient room between the 3" I.D. suction pipe and the 4-7/8" casing to insert any measuring devices for recording of the draw-down, rate of recovery, etc. Therefore, it was necessary to place the bottom of the suction pipe at several depths in order to get any usable information. Also, we required the contractor to spend a considerable amount of time doing investigative type work to determine just what was in the well and some of this time is included.

On Monday, April 16, it was decided to insert drilling tools inside the 4-7/8" casing to drill out the obstruction which we encountered at a depth of 388 feet. A depth of about 6 feet was drilled. When the drilling was done, it was discovered that the 388 foot obstruction was actually the bottom of the well. This was quite a surprise, since we had believed, from information gathered, that the well was approximately 448 feet deep.

A brief summary is as follows: In 1948 or 1949 a well was drilled to a depth of about 388 feet, a 6-7/8" casing was installed to a depth of about 100 feet, and not too long thereafter a pump was installed. At some unknown date, a 4-7/8" casing was installed inside the 6-7/8" casing and believed to be set to the bottom of the well. The pumping tests show that the well will produce 5 gallons of water per minute.

Although the well did not produce the quantity of water we had hoped for, we do now have much information that we did not have before and which was needed. The well is probably not at all sufficient for the facilities planned as part of the long range program, but will serve for the present time.

Glenn C. Farrer
Park Engineer

Attachment

TESTS RESULTS - CRYSTAL CAVE WELL

Well believed to have been drilled in 1948 and pump set in 1949, 6-7/8" casing used. Found 4-7/8" casing set inside the larger casing.

Began test at Crystal Cave on April 11, 1962 a.m. Water level 310.0' ⁺ - pipe (suction at 357')

11:20 a.m.	12 gpm
11:40 a.m.	5 gpm
12:10 p.m.	5 gpm

shut down

Began pumping intermittently at 2:00 p.m. (pipe suction @ 357')

2:10 p.m.	24 gpm
2:15 p.m.	20 gpm - began dropping to 5 gpm (indicates water level dropped to 357')
2:25 p.m.	6 gpm
2:45 p.m.	5 gpm
3:30 p.m.	5 gpm
4:00 p.m.	6 gpm
4:20 p.m.	5 gpm - stopped

April 12, 1962 water level 311.0' ⁺ - pipe set at 375'

8:00 a.m.	20 gpm
8:30 a.m.	15 gpm
9:00 a.m.	5 gpm
10:00 a.m.	5 gpm
11:00 a.m.	5 gpm
12:00 noon	5 gpm
1:00 p.m.	5 gpm
2:00 p.m.	5 gpm - stopped - pulled tubing and checked water level but too much time elapsed.

Consumed 2 hours

April 13, 1962 - Driller drilled about 6' to see if obstruction was at 368' and found it was bottom of well. -- four (4) hours consumed --

April 16, 1962, water level at 310.0' ⁺ - set suction near bottom - about 385'.

8:00 a.m.	20 gpm
8:30 a.m.	15 gpm
9:00 a.m.	5 gpm
10:00 a.m.	5 gpm
11:00 a.m.	5 gpm
12:00 noon	5 gpm
12:30 p.m.	5 gpm - stopped (decision made to do no more testing)

Capacity as of April 16, 1962, no more than 5 gpm. Could possibly
be some less during dry season of year.

Glenn C. Ferrar
Park Engineer

Crystal Cave Well

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER ANALYSIS

26W
Dec. 1953

Location Mammoth Cave, Kentucky County Edmonson
Source Drilled well Depth (ft) 391 Diam (in.) 5
Cased to (ft) _____ Date drilled _____ Point of coll. Bailer at well
Owner National Park Service
Treatment _____ Use Domestic
WBF Ste. Genevieve limestone WL 314 ft. below LSD Yield 2-5 GPM pump estimated
Temp (°F) _____ Appear. when coll. Muddy
Collected April 16, 1962 By E.A.B. and D.V.W.
Remarks Water from bailer poured into 5 gallon can and allowed to settle for 20 hours, then siphoned into gallon bottle.

	ppm	epm		ppm	epm
Silica (SiO ₂)	11	---	Bicarbonate (HCO ₃)	84	1.38
Aluminum (Al)			Carbonate (CO ₃)	0	.00
Iron (Fe)					
Iron (Fe) a/	.03	--	Sulfate (SO ₄)	45	.94
Manganese (Mn)	.01	--	Chloride (Cl)	3.0	.08
			Fluoride (F)	.8	.04
Calcium (Ca)	28	1.40			
Magnesium (Mg)	11	.90			
			Nitrate (NO ₃)	5.8	.09
Sodium (Na)	3.8	.16			
Potassium (K)	1.1	.03			
Total		2.49	Total		2.53

	ppm		
		Specific conductance (micromhos at 25° C)	248
Dissolved solids:		pH	7.0
Sum	151	Color	2
Residue on evaporation at 180° C	144		
Suspended solids			
Hardness as CaCO ₃ :			
Calcium, magnesium	115		
Noncarbonate	46		

Lab. No. Col 25893 Field No. S-1,910.9-319.9 Project KY GS Q GW
a/ This is not a representative sample.

PROVIAL RECORDS, SUBJECT TO REVISION

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER ANALYSIS

26W
Dec. 1953

Location Near Mammoth Cave, Kentucky (2 miles East) County Edmonson
Source Well (Crystal Cave) Depth (ft) 420 ± Diam (in.) _____
Cased to (ft) _____ Date drilled _____ Point of coll. Hydrant
Owner National Park Service
Treatment _____ Use _____
WBF Ste. Genevieve limestone WL _____ Yield _____
Temp (°F) 58 Appear. when coll. Clear, sediment
Collected October 19, 1961 By J. A. Van Couvering
Remarks Ran hydrant full open for 15 minutes.

	ppm	epm		ppm	epm
Silica (SiO ₂)			Bicarbonate (HCO ₃)	138	2.26
Aluminum (Al)			Carbonate (CO ₃)	0	.00
Iron (Fe)	1.1	--			
Iron (Fe)			Sulfate (SO ₄)	45	.94
			Chloride (Cl)	3.0	.08
			Fluoride (F)	.6	.03
Calcium (Ca)					
Magnesium (Mg)					
			Nitrate (NO ₃)	2.6	.04
Sodium (Na)					
Potassium (K)					
Total			Total		3.35

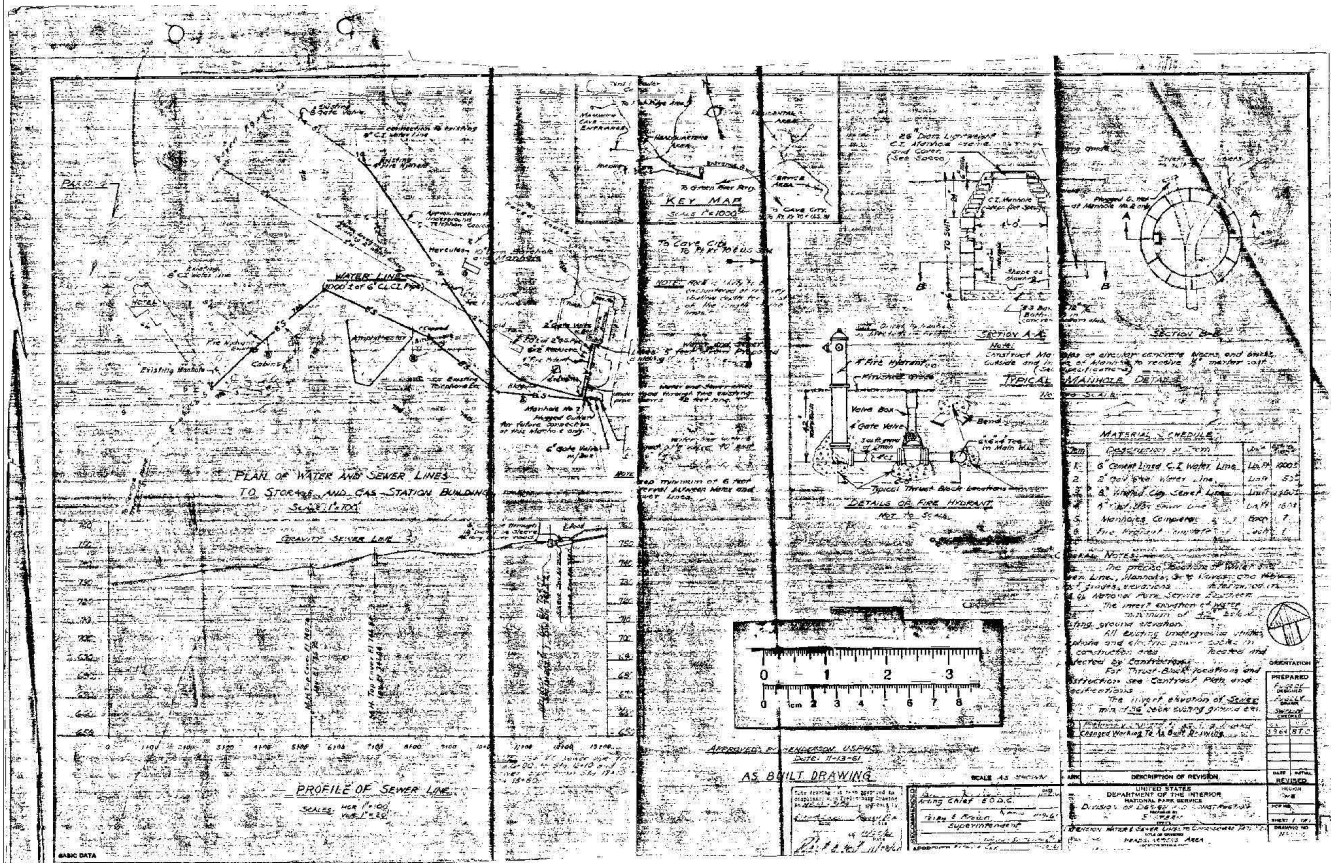
	ppm		
		Specific conductance (micromhos at 25° C)	299
Dissolved solids:		pH	7.3
Sum		Color	
Residue on evaporation at 180° C			
Suspended solids			
Hardness as CaCO ₃ :			
Calcium, magnesium	148		
Noncarbonate	35		

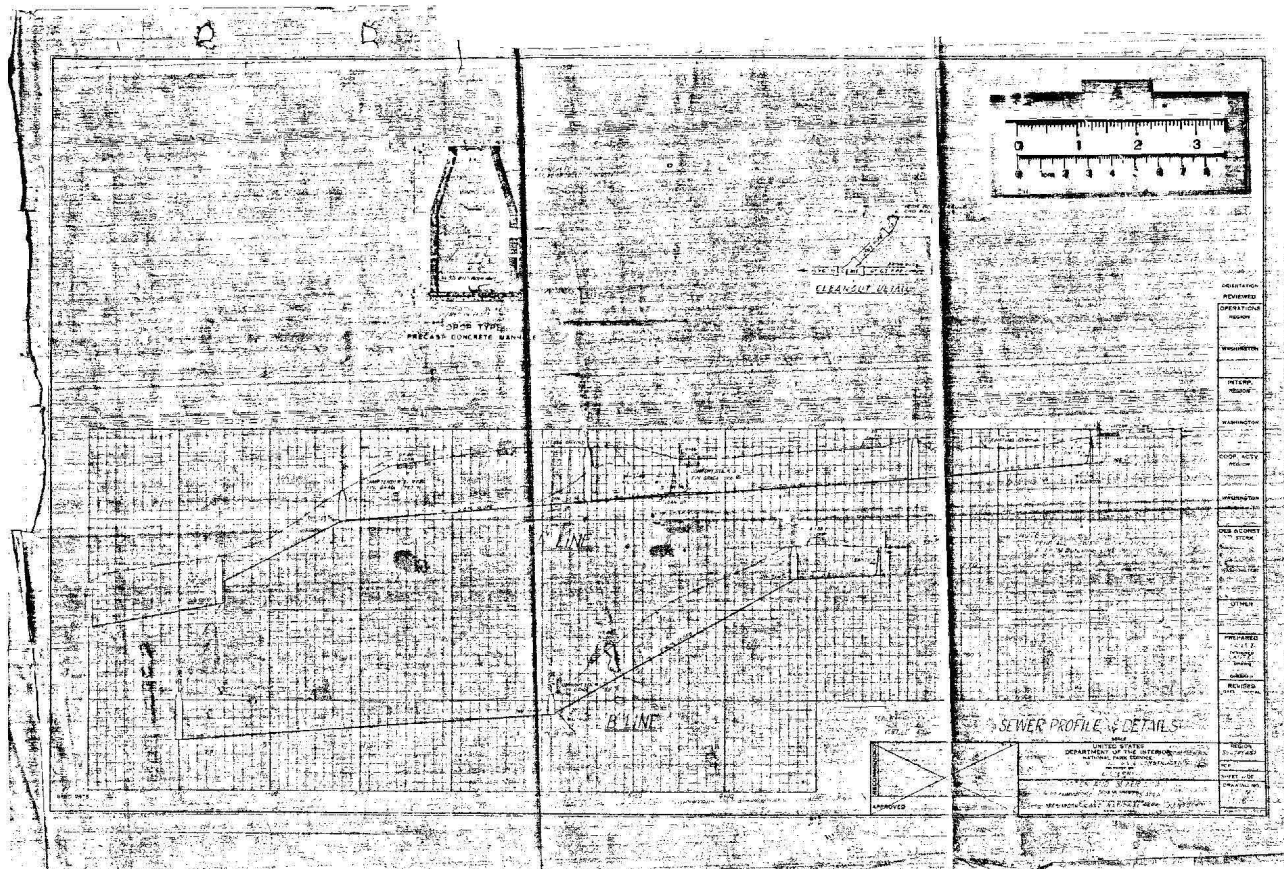
Lab. No. Col 25367

Field No.

Project KY GS Q GW

Maps and Miscellaneous Information





Docket Information

Number of Documents in Docket 9

Documents Dated from 11/30/1961 to 4/19/1962

Docket Compiled: 4/27/2011