

Water supply wells at Canyon De Chelly National Monument

The first record for a well at Canyon de Chelly is for a shallow alluvial well on the south side of Chinle Wash. The exact location could not be determined from information available in WRD files. The well log shows that the well was 100 feet deep, but that the majority of the water was obtained from sand and gravel layers 8-50 feet below ground surface. The well was constructed in 1936. It reportedly was tested at 48 gpm.

A second well was drilled in March-April 1948. The well (10K-232) was located about 35 feet northeast of Well 10R-156, the school well at Chinle. A brief report (Halpenny, 1949) in the WRD files seems to indicate that this well would be used to supply water for the school. However, later documents identify the Headquarters Well as being the same depth (280 feet) and having water chemistry data from April 1948.

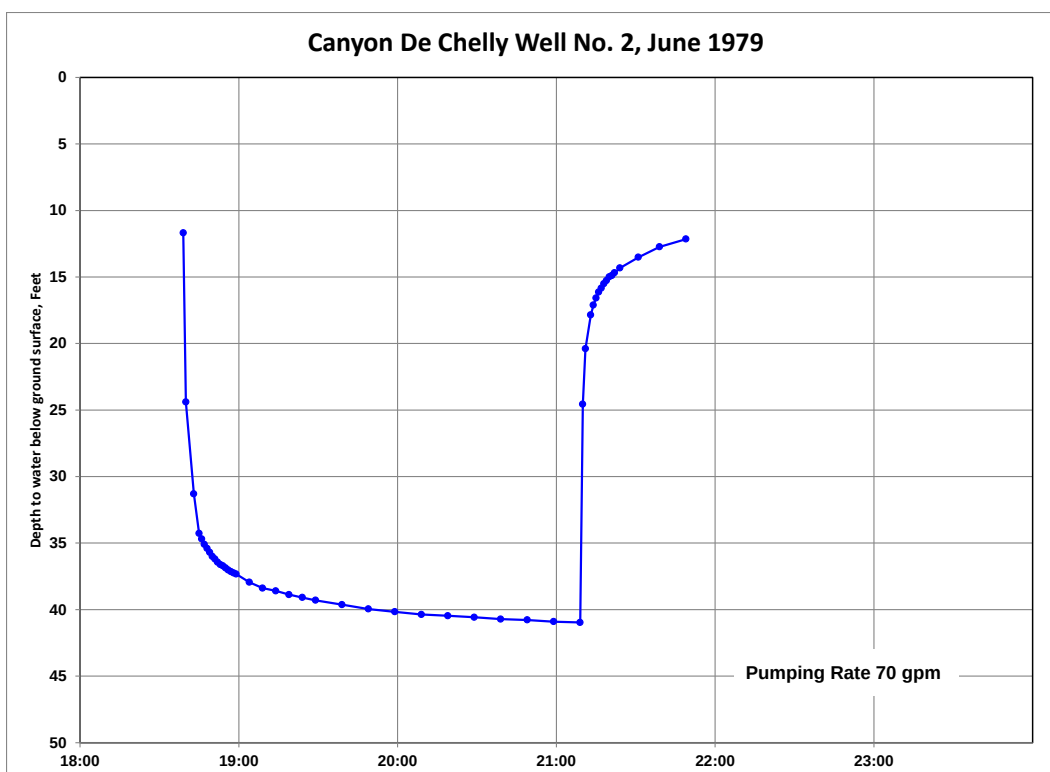
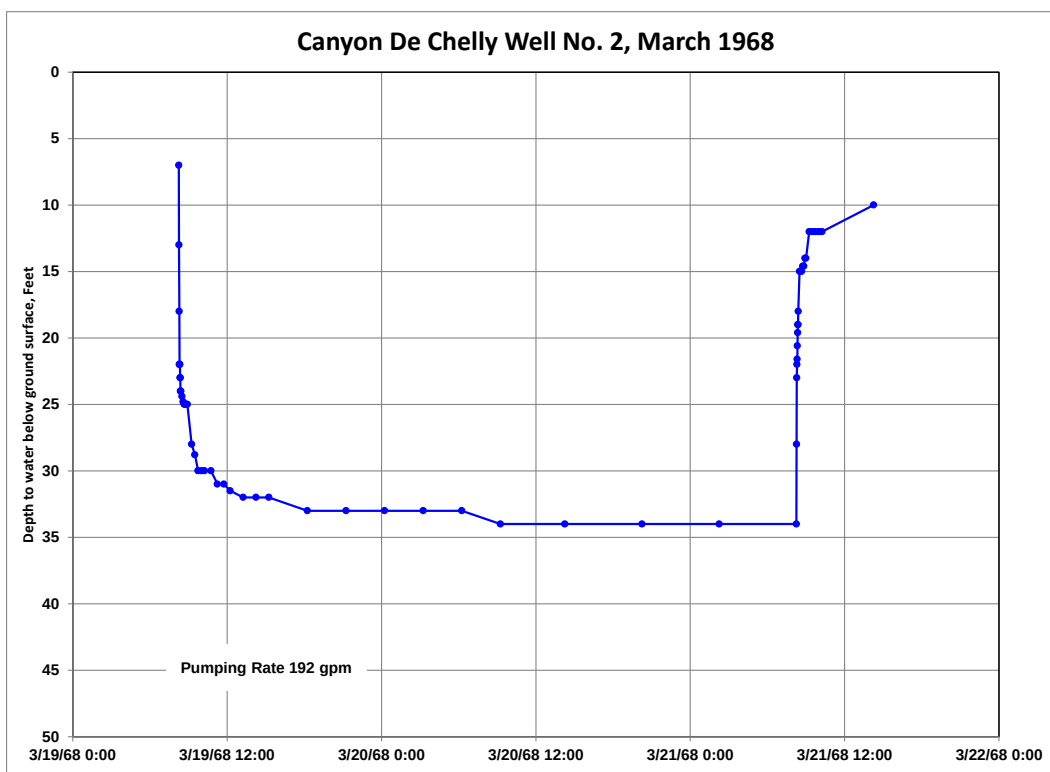
Well data files at WRD (prepared by Bill Werrell) include photos of two NPS wells at the Thunderbird Lodge. Well No. 1 is located at the northeast corner of the Thunderbird development. (It's possible that Well No. 1 might be the 280-foot well discussed in the preceding paragraph.) Well No. 2 is located at the southeast corner of the Thunderbird development. WRD files contain information for only Well No. 2. Well No. 2 is the current water-supply well for NPS facilities.

Well No. 2 is also identified as 10P-536. The well was constructed with a cable tool rig from August to October 1967. The well is 617 feet deep and obtains water from the DeChelly Sandstone. The upper 110 feet of the well was reamed to allow installation of 8-inch casing, which was sealed with clay and cement to exclude poor-quality water from entering the well. Six-inch casing was installed to 617 feet with torch-cut perforations from 160-205, 402-447, and 550-597 feet. Static water level was at 9 feet bgs. The well was test pumped at 200 gpm for 48 hours, resulting in 27 feet of drawdown.

In July 1979, Garland Moore (WRD Hydraulic Engineer) traveled to CACH to test the well. He found that silt had filled the lower 40 feet of the well; sealing off the perforated zone from 577-597 feet. The pump delivered 70 gpm with a pressure of 62 psi at the wellhead. Comparing the results of the 1979 test with the 1967 test (when the well was constructed), Moore determined that the well efficiency had decreased. He attributed the decreased efficiency to encrustation of perforations and silt covering 20 feet of the perforated zone.

In April 1982, the Well Surveys Company from Hereford, Texas conducted a video survey of the well. They noted heavy scale build-up on the inside of the casing. They noted the bottom of the well at 586 feet. They cleaned the well by "Sonar Jetting" which removed some of the scale. There is no record of a pumping test after the jetting to evaluate performance.

It is very likely time to clean the well again. This may be difficult if the wellhead is located inside the building. The building will prevent access with a drill rig.



When the well was new (1968) pumping at 192 gpm lowered the water level to about 35 feet below ground surface. In 1979, pumping at 70 gpm lowered the water table to 40 feet bgs.

Water Chemistry data
Canyon De Chelly Well No. 2

	8/28/67	10/5/67	2/17/77
Boron	.01	.29	
Iron	.04	.07	.06
Calcium	109	72	
Magnesium	38	16	
Sodium	18	13	
Potassium	8.5	12.5	
Phosphorous	Trace	.02	
Bicarbonate	289	215	
Carbonate	Trace	Trace	
Sulfate	191	76	177
Chloride	34	21	1.9
Fluoride	0.5	.25	.19
Nitrate	Trace	.87	.18
TDS	580	320	448

CACH
Well No. 2

Form 12-64-11-02

REPORT OF WELL DRILLER

Submitted: S. C. T. B. STATE OF ARIZONA Application No. _____
Inspector: _____ Claim No. _____
Capped: _____ Coordinate No. _____

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of _____ (This report shall be filed with the State Engineer within 10 days after the completion or abandonment of the well. Failure to file and reports constitutes a misdemeanor.)

DEPT. OF THE INTERIOR NATIONAL PARK SERVICE

(1) WELL OWNER:
Name CANYON DE CHelly
Address CANYON, ARIZONA

(2) LOCATION OF WELL:
County _____ Ground Water Basin _____
(leave blank)
North _____ East NW 1/4 NE 1/4
South _____ West _____
of Section 22 T 5 N R 10 E
and words not needed NEW MEXICO PRINCIPAL MERIDIAN

(3) NATURE OF WORK (check): New Well ☒
Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure: _____

(4) NATURE OF USE (check): Domestic ☐ Industrial ☐ Municipal ☒ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check): Battery ☐ dug ☐ Jetted ☐
Cable ☒ Driven ☐ Bored ☐

(6) CASING SCHEDULE: Threaded ☐ Welded ☒
8" Diam. from 0 feet to 11.0 feet Gage 310
6" Diam. from 0 feet to 6.7 feet Gage 370
" Diam. from _____ feet to _____ feet Gage _____

New ☒ Relet ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☒ No ☐
Type of perforator used PUTTING TROCH
Size of perforations 9/16 inches by 12 inches
4.2 perforations from 5.7 feet to 5.5 feet
4.5 perforations from 5.7 feet to 4.2 feet
5.0 perforations from 2.0 feet to 1.0 feet
perforations from _____ feet to _____ feet
perforations from _____ feet to _____ feet

(8) SCREENS: Well screen installed? Yes ☒ No ☐
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ Set from _____ ft. to _____
Diam. _____ Slot size _____ Set from _____ ft. to _____

(9) CONSTRUCTION:
Was well gravel packed? Yes ☐ No ☒ Size of gravel: _____
Gravel placed from _____ feet to _____ feet
Was a surface seal provided? Yes ☒ No ☐
To what depth? 11.0 feet
Material used in seal: CLAY AND CEMENT
Did any strata contain potable water? Yes ☐ No ☒
Type of water: _____ Depth of strata: _____
Method of sealing strata off: _____

Was surface casing used? Yes ☒ No ☐
Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:
Static level 9' 3" feet below land surface Date 10-2-67
Artesian pressure _____ feet above land surface Date _____

LOG RECEIVED: (11) FLOWING WELL:
Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐
No ☒

(12) WELL TESTS: Drawdown in the distance in feet the water level is for _____ and below static level.
Was a pump test made? Yes ☒ No ☐ If so, by whom? BINNING DRILLING
Yield: 100 gal./min. with 3.7 feet drawdown after 31.68 hours
" 200 " " 2.5 " 2.7 "
" 70 gal./min. with 2.6 feet drawdown after _____ hours
Artesian flow _____ g.p.m. Date _____
Temperature of water 58° Was a chemical analysis made? No ☐ Yes ☐

(13) WELL LOG: Diameter of well 8" BORE 4" CASE inches
Depth drilled 617 feet Depth of completed well 617 feet
NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make an accurate note as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

DEPTH	MATERIAL										REMARKS
	Gravel	Sand	Gravel	Clay	Shale	Bedrock	Other	Gravel	Sand	Gravel	
0-10											RED
10-18											" 1/2' to 1/8' WATER
18-25											SANDSTONE RED
25-31											" "
31-40											RED
40-50											RED
50-60											GRAY
60-70											GRAY
70-85											GRAY
85-90											RED WATER 9 FT SUR
90-100											" SANDSTONE - TAN
100-110											" SEALED W
110-120											" "
120-130											" "
130-140											" SOFT-WAT
140-150											" "
150-160											" "
160-170											" "
170-180											" "
180-190											" SOFT-WAT
190-200											COPPER-COLOR-SANDSTONE
200-220											" "
220-230											" "
230-240											" "
240-250											" "
250-260											" "
260-270											" "
270-280											UNTERMINAL HARDER
280-290											" "
290-300											" "
300-315											TAN SANDSTONE HARDER
315-320											" "

Work started AUGUST 7 1967 Completed OCTOBER 1 1967

(14) PUMP:
Manufacturer's Name _____
Type _____ H. P. _____
Depth to pump or bowline _____ feet

Well Driller's Statement:
This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.
Name BINNING DRILLING (Type or print)
Address 227 50th W. PAYSAN, ARIZ
(Signed) Leslie Binning (Well Driller)
License No. 243 Date _____ 1967

USE OTHER SIDE FOR ADDITIONAL REMARKS

Form 113-114-1140

PAGE II

Examined

Recorded: R. G.

T. B.

Inspection Sheet

Copied

REPORT OF WELL DRILLER

STATE OF

ARIZONA

Application No.

Class No.

Coordinate No.

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of AR (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file a report constitutes a misdemeanor.)

DEPT. OF THE INTERIOR NATIONAL PARK SERVICE

(1) WELL OWNER:

Name CANYON DE CABELLY

Address CHINLE, ARIZONA

(2) LOCATION OF WELL:

County Ground Water Basin (Leave blank)
North East West
South East West
feet from Corner

of Section 22 T 5 N R 10 E
not words not needed
NEW MEXICO PRINCIPAL RESIDUAL

(3) NATURE OF WORK (check):

Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure:

(4) NATURE OF USE (check):

Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):

Rotary ☐ Dig ☐ Jetted ☐
Pile ☐ Driven ☐ Bored ☐

(6) CASING SCHEDULE: Threaded ☐ Welded ☐

1" Diam. from feet to feet Gauge
2" Diam. from feet to feet Gauge
3" Diam. from feet to feet Gauge
New ☐ Rebuilt ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☐ No ☐

Type of perforation tool
Size of perforations inches by inches
perforations from feet to feet
perforations from feet to feet
perforations from feet to feet
perforations from feet to feet
perforations from feet to feet

(8) SCREENS: Well screen installed? Yes ☐ No ☐

Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to
Diam. Slot size Set from ft. to

(9) CONSTRUCTION:

Was well ground packed? Yes ☐ No ☐ Size of gravel:
Gravel placed from feet to feet
Was a surface seal provided? Yes ☐ No ☐
To what depth? feet
Material used to seal:
Did any strata contain unsuitable water? Yes ☐ No ☐
Type of water: Depth of strata:
Method of sealing strata off:

(10) WATER LEVELS:

Static level feet below land surface Date
Artesian pressure feet above land surface Date

LOG RECEIVED:

(11) FLOWING WELL:

Controlled by (check): Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐
No ☐

(12) WELL TESTS:

Drawdown is the distance in feet the water level is read below static level.
Was a pump test made? Yes ☐ No ☐ If so, by whom?
Yield: gal/min. with feet drawdown after
Beller test: gal/min. with feet drawdown after
Artesian flow: 230. Date
Temperature of water: Was a chemical analysis made? No ☐ Yes ☐

(13) WELL LOG:

Diameter of well
Depth drilled feet. Depth of completed well feet.
NOTE: Place an "X" in the space or combination of spaces needed to designate the nature or combination of materials encountered in each depth interval. Under REMARKS make a descriptive notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

DEPTH	Feet	MATERIAL										REMARKS
		Clay	Silt	Sand	Gravel	Cobbles	Stones	Shells	Unconsolidated	Consolidated	Other	
320	330											GRANITE HARD
330	340											" "
340	350											" "
350	360											" "
360	370											" "
370	385											" "
385	395											" "
395	405											" SOFTER WATER 4 3/4"
405	410											" HARD
410	420											" "
420	430											" SOFTER
430	440											" "
440	455											" SOFT
455	465											" HARD LIGHTER COLOR
465	475											" "
475	485											" "
485	495											" "
495	510											" HARD
510	520											" "
520	530											" DARKER COLOR
530	540											" RED
540	560											" LIGHTER
560	570											" HARD
570	585											" "
585	605											" * WBT
605	615											" SOFTER DARKER
615	617											" SOFTER

Work started AUGUST 7 1967 Completed OCTOBER 3 1967

(14) PUMP:

Manufacturer's Name
Type: H. P.
Depth to pump or lower feet

Well Driller's Statement:

This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

Name BUNNING DRILLING
(Person, firm, or corporation) (Type or print)

Address 227 30 4TH W. PAYSAN, UTAH

(Signed) Lester D. Bunning (Type or print)
(Well Driller)

License No. 243 Date 10

USE OTHER SIDE FOR ADDITIONAL REMARKS

CACH

3-19-68

Well No. 2

(B-5-10) 22 und

WSD Rep. (Gd)
April 1968

Well No. 10P-536

WELL SCHEDULE
GEOLOGICAL SURVEY

Quad. 71 2.05 x 7.06
X 7.16
WATER RESOURCES DIVISION
1:24,000

MASTER CARD

Record by E. H. M. G. VOICE Source of data N.P.S. Obs Date 3-19-68 No. Chinle 4 NE
State ARIZONA County Apache
Latitude 36° 08' 47" N Longitude 109° 52' 11" W Sequential number 1
Lat-long accuracy 1" 5" 10" 22" SE NE NW Name Namjo Base line
Local well number 1 Other number Canyon De Chelly N. Mon. #2
Local use National Park Service
Owner or name National Park Service Address
Ownership: (C) Fed Gov't, (D) City, Corp or Co, Private, State Agency, Water Dist (V)
(A) Air cond, Bottling, Comm, Domestic, Power, Fire, Dom, Irr, Mod, Ind, (P) Res, (S) Stock, Tannery, Unused, Repurchase, Recharge, Desal-P, Desal-other, Other
Use of well: (A) Domestic, (D) Desal, (S) Desal, (P) Desal, (R) Desal, (U) Desal, (V) Desal, (W) Desal, (X) Desal, (Y) Desal, (Z) Desal
DATA AVAILABLE: Well data Yes Trans. W/L Irregular Field aquifer char. Yes
Hyd. info. data: Yes
Qual. water data: Yes
Frog. sampling: Yes Frog. inventory: Yes Frog. records: Yes
Aperture cards: Yes
Log data: Driller's log attached

WELL-DESCRIPTION CARD

NAME AS ON MASTER CARD 10P-536 Depth well: 617 ft. Name owner
Depth casing (first part) 160 ft. Casing type steel Diam. 6 in.
Finish: (C) concrete, (D) gravel, (H) open, (P) pipe, (S) screen, (T) other, (V) other, (W) other, (X) other, (Y) other, (Z) other
Method: (A) air, (B) air, (C) air, (D) air, (E) air, (F) air, (G) air, (H) air, (I) air, (J) air, (K) air, (L) air, (M) air, (N) air, (O) air, (P) air, (Q) air, (R) air, (S) air, (T) air, (U) air, (V) air, (W) air, (X) air, (Y) air, (Z) air
Drilled: October, 1967 Date intake testing: 2275.4 ft. Payson, Utah
Driller: Lester Binning Name Payson, Utah
Life: (A) air, (B) air, (C) air, (D) air, (E) air, (F) air, (G) air, (H) air, (I) air, (J) air, (K) air, (L) air, (M) air, (N) air, (O) air, (P) air, (Q) air, (R) air, (S) air, (T) air, (U) air, (V) air, (W) air, (X) air, (Y) air, (Z) air
Power: (A) air, (B) air, (C) air, (D) air, (E) air, (F) air, (G) air, (H) air, (I) air, (J) air, (K) air, (L) air, (M) air, (N) air, (O) air, (P) air, (Q) air, (R) air, (S) air, (T) air, (U) air, (V) air, (W) air, (X) air, (Y) air, (Z) air
Remarks: Top of casing 2.0 ft. below LEO. Alt. NP 5540
Alt. LEO: 5540 Accuracy: 7 Accuracy: MPAS. N.R.S.
Water level: 9.0 ft. above LEO. Alt. LEO 7 Accuracy: MPAS. N.R.S.
Date: 10-4-67 Yield: 193 gpm. Method: MPAS. N.R.S.
Drawdown: 36 ft. Accuracy: MPAS. N.R.S. Pumping period: 48 hr.
QUALITY OF WATER DATA: Iron 19.5 ppm. Sulfate 19.5 ppm. Chloride 19.5 ppm. Hard. 19.5 ppm.
Sp. Conduct: 19.5 X 10³ ohm-cm. Temp. 19.5 °C. Date: 10-3-67
Tests, notes, etc.

Well No. 10P-536

Well No. 10P-536

Latitude-Longitude 36.08.47° 109.32.11.1

HYDROGEOLOGIC CARD

SAVE AS ON MASTER CARD

Physiographic Province: Colorado Plateaus Section: Navajo

Basin: San Juan Subbasin: Chinle Wash

(D) depression, stream channel, dunes, flat, hilltop, sink, swamp.
(H) offshore, pediment, hillslope, terrace, undulating, valley floor

Top of well site: Permian (D) (H) (K) (F) (N) (K) (L)
offshore, pediment, hillslope, terrace, undulating, valley floor

MAJOR AQUIFER: Permian series Da Chelly ss aquifer, formation, group

Lithology: fine-gr. x-bedded ss origin: olian aquifer thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: Permian series Da Chelly ss aquifer, formation, group

Lithology: fine-gr. x-bedded ss origin: olian aquifer thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals screened: 160-205; 402-447; 550-597 = perforations

Depth to consolidated rock: ft Source of data: ft

Depth to basement: ft Source of data: ft

Surface material: ft Infiltration characteristics: ft

Coefficient of permeability: 9,000 approx sp/ft ft Coefficient of storage: ft

Coefficient of transmissibility: ft Number of geologic cards: ft

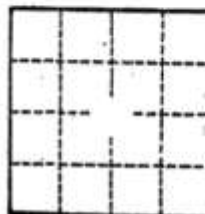
W.L. reported 2.72' below L.S. on 7-11-69 (by MRS.)

8" casing to 110 - sealed with mud & cement

6" casing from 0-617

This is the "new" National Park Service well.

Water level, from LSD, on Feb 25, 1970 = +0.68, well not pumping.



Well No.

10P-536

CANYON DE CHELLY NM
WELL NO. 10P-536

Constant Discharge-Variable Drawdown

Date: March 19, 1968

Observers: USGS, Flagstaff

Weather: Unknown

<u>Clock Time (Hr.)</u>	<u>Pumping Time (Min.)</u>	<u>Avg. Q gpm</u>	<u>Depth to Water (Ft.)</u>	<u>Drawdown (Ft.)</u>	<u>Spec. Cap.</u>	<u>Remarks</u>
8:15 AM	0	-	9.0			SWL
	1	192	15.0	6.0		
	2		20.0	11.0		
	3		24.0	15.0		
	4		24.0	15.0		
	5		24.0	15.0		
	6		25.0	16.0		
	7		25.0	16.0		
	8		26.0	17.0		
	9		26.0	17.0		
	10		26.0	17.0		
	15		26.4	17.4		
	20		26.8	17.8		
	25		27.0	18.0		
	30		27.0	18.0		
	35		27.0	18.0		
	40		27.0	18.0		
	60		30.0	21.0		
	75		30.8	21.8		
	90		32.0	23.0		
	105		32.0	23.0		
	120		32.0	23.0		
	150		32.0	23.0		
	180		33.0	24.0		
	210		33.0	24.0		
	240		33.5	24.5		
	300		34.0	25.0		
	360		34.0	25.0		
	420		34.0	25.0		
	600		35.0	26.0		
	780		35.0	26.0		
	960		35.0	26.0		
	1140		35.0	26.0		
	1320		35.0	26.0		
	1500		36.0	27.0		
	1800		36.0	27.0		
	2160		36.0	27.0		
	2520		36.0	27.0		
	2880	192	36.0	27.0		

CANYON DE CHELLY
WELL NO. 10P-536

Recovery Data

Date: March 19, 1968

Observers: USGS, Flagstaff

<u>Pumping Time (Min.)</u>	<u>Time Pump Stopped (Min.)</u>	<u>t/ t'</u>	<u>Depth to Water (Ft.)</u>	<u>Recovery (Ft.)</u>	<u>Remarks</u>
2880	0	Infinity	36.0	0	Pump stopped
2881	1	2881	30.0	6.0	
2882	2	1441	25.0	11.0	
2883	3	961	24.0	12.0	
2884	4	721	23.6	12.4	
2885	5	577	22.6	13.4	
2886	6	481	21.6	14.4	
2887	7	412	21.0	15.0	
2888	8	361	21.0	15.0	
2889	9	292	20.0	16.0	
2895	15	193	17.0	19.0	
2900	20	145	17.0	19.0	
2905	25	162	17.0	19.0	
2910	30	97	16.6	19.4	
2915	35	83	16.6	19.4	
2920	40	73	16.0	20.0	
2925	45	65	16.0	20.0	
2940	60	49	14.0	22.0	
2955	75	39	14.0	22.0	
2970	90	33	14.0	22.0	
2985	105	28	14.0	22.0	
3000	120	25	14.0	22.0	End of Test
3240	360	9	12.0	24.0	

CACH
Well No. 2

6-29-79

UNITED STATES GOVERNMENT

memorandum

DATE: July 3, 1979

REPLY TO
ATTN OF: Hydraulic Engineer, Water Resources, SWR

SUBJECT: Analysis of Canyon de Chelly National Monument Water Source

TO: Regional Chief of Maintenance, SWR

Purpose: Conduct a flow test of the existing water supply system at the monument.

Results:

1. The pump is operating in accordance with manufacturer's performance curves.
2. Electrically the pump is in perfect operating condition.
3. The lower 40 feet of the well is reportedly filled with silt thus sealing off 20 feet of the perforated zone from 577 to 597 feet below top of casing.
4. The pump is delivering 69.8 gpm with a pressure of 62 psi at the well head.
5. The well has a lower efficiency rating at this time wherein the drawdown is 22 feet lower than it should be. This increased in pumping head consumes 6.7% of the total energy requirements of the pump.

Recommendations:

1. Pump - none.
2. Well - the lower .40 feet should be cleaned of all silt and the incrustated perforations should be cleared by chemical and mechanical methods.

Existing System at Well Head:

1. Well-
Diameter - 6 inches, Total Depth - 617 feet.
Diameter - 8 inches, Total Depth - 110 feet.
Perforations - field cut ($\frac{1}{4}$ " x 12").
47 perforations from 597 to 550 feet.
45 perforations from 447 to 402 feet.
50 perforations from 205 to 160 feet.



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

OPTIONAL FORM NO. 10
(REV. 7-78)
GSA FPMR (41 CFR) 101-11.6
5010-112

RESULTS OF FLOW TEST

Pressure (psi)	Equivalent (feet)	Time to fill 35 gal (sec)	Computed (gpm)
0	0	24	87.5
20	46.20	26	80.8
40	92.40	28	75.0
60	138.60	30	70.0
80	184.80	32	65.6

At the conclusion of the above test a pressure gauge was installed at the top of the discharge line. Normal operating conditions showed that the system operates at 62 psi. Computed flow is 69.8 gallons per minute.

The above flow conditions compare favorably with the pump performance curves supplied by its manufacturer.

7. Well Performance-

Constant discharge time drawdown measurements were made for 150 minutes on the drawdown and 40 minutes on the recovery cycle with a Fisher M-Scope. All measurements were made to 0.01 feet from the top of casing and later reduced to ground level. (See Appendix A for test data and appropriate graphs).

In comparing the results of this short term test with a more comprehensive test performed in 1967 we find that the well has decreased in efficiency, where the drawdown is 22 feet lower than it should be. The raising of 70 gpm for the 22 feet consumes approximately 6.7% of the total electrical energy requirements of the pump.

Efficiency can be restored by removing all incrustation at the perforations and cleaning approximately 30 to 40 feet of silt at the bottom of the well which has sealed off the lower 20 feet of perforations (597 to 577 feet).

2. Hydraulic-
Static Water Level - 9.25 ft. below ground level. Test pumped
48 hours at average discharge rate of 192 gallons per minute.
Drawdown from 9.25 feet to 36.0 feet below ground level.

3. Pump-
Unit Jacuzzi 7556J5-T/S-131, Serial #SS1-20034.

4. Motor-
Franklin Electric
Model # 236102200 3
RPM - 3450; volts - 208/220
Cycles - 60; AMP -20.6
SF - 1.15; SFA - 23.2
HP - 7.5; SER - AN785
Code - G; Date - 07.

Pump and motor located 106 feet below top of casing.

5. Electrical Test-

- A. Incoming idle voltage - 240
Running voltage - 230
Running amperage: Black - 21a
Yellow - 23a
Red - 21a

- B. Check Pump - motor for ground-
(motor windings to housing)
1 Red good
2 Black good
3 Yellow good

- C. Check "Open Windings (continuity) in cable or motor-
1-2 (Red to Black) 0.70XR1
2-3 (Black to Yellow) 0.75XR1
1-3 (Red to Yellow) 0.80XR1

6. Flow Test-

Install pressure gage nearest pump discharge line, followed by 1½" gate valve and 10 feet of 1½" discharge line. Discharge to system and reservoir valved shut so that all water will flow to test area. Flow measurements made in 35 gal. rated garbage can and time.

Park: Canyon de Chelly Well
Date: June 29, 1979
Weather: Warm & Windy
Observer: Garland Moore

DRAWDOWN DATA

Clock Time (hour)	Pumping Time (min)	Depth to Water (BGC)	Specific Capacitance	Remarks
1839	0	11.69	5.97	69.8 gpm (62 psi)
	1	24.40	2.86	
	4	31.30	2.23	
	6	34.27	2.04	
	7	34.70	2.01	
	8	35.10	1.99	
	9	35.40	1.97	
1849	10	35.70	1.96	
1850	11	36.00	1.94	
	12	36.20	1.93	
	13	36.44	1.92	
	14	36.62	1.91	
	15	36.72	1.90	
	16	36.87	1.89	
	17	37.02	1.89	
	18	37.15	1.88	
	19	37.25	1.87	
	20	37.33	1.87	
	25	37.95	1.84	
1904	30	38.39	1.82	
1909	35	38.60	1.81	
1914	40	38.88	1.80	
1919	45	39.09	1.79	
1924	50	39.30	1.78	
1929	60	39.63	1.76	
1939	70	39.96	1.75	
1949	80	40.17	1.74	
1959	90	40.37	1.73	
2009	100	40.47	1.72	
2019	110	40.58	1.72	
2029	120	40.72	1.71	
2039	130	40.78	1.71	
2049	140	40.91	1.71	
2059	150	40.97	1.70	
2109				

RECOVERY DATA

Clock Time (hour)	Time, Pump Start (t, min)	Time, Pump Stop (t, min)	Ratio t/t'	Depth to Water BGL	Drawdown from Pumping Curve	Calculated Recovery
2109	150	0	-	40.97	40.97	0
	151	1	151.00	24.57	40.97	16.40
	152	2	76.0	20.40	40.97	20.57
	154	4	38.5	17.85	40.97	23.12
	155	5	31.0	17.12	40.97	23.85
	156	6	26.0	16.58	40.97	24.39
	157	7	22.4	16.14	40.97	24.83
	158	8	19.8	15.85	40.97	26.12
	159	9	17.7	15.51	40.97	25.46
2119	160	10	16.0	15.28	40.97	25.69
	161	11	14.6	15.00	40.97	25.97
	162	12	13.5	14.90	40.97	26.07
	163	13	12.5	14.69	40.98	26.29
	165	15	11.0	14.33	40.98	26.65
2131	172	22	7.82	13.52	40.98	27.46
2139	180	30	6.00	12.74	40.99	28.25
2149	190	40	4.75	12.15	41.00	28.85