WRD Exp. (GW)
April 1966

Well No. 080-12W-19BCC

# WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

## MASTER CARD

Record by D. AARONSON | Source of data FILE | Date 2/8/67 | Map 1:63,360 COUNTYAWY.

State IOWA (16) | County (or town) IOWA (48)

Latitude: 41 43 35 N | Longitude: 092 17 50 | Sequential number: 1

Lat-long accuracy: 2 | T. 80 S, R 12 W Sec 19, SW ¼, SW ¼, NW ¼ 5 B & M

Local well number: 080 12W 19BCC | Other number: W-1199

Local use: 01 99 40CITY | Owner or name: VICTOR TOWN WELL

Owner or name: VICTOR IOWA | Address: VICTOR, IOWA

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) Agency, (W) Water Dist — M

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Mad, (N) Ind, (P) S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Z) Desal-other, (Z) Other — P

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed — W

DATA AVAILABLE: Well data 3 | Freq. W/L meas.: INVENTORY (0) | Field aquifer char.

Hyd. lab. data:

Qual. water data; type: COMPLETE — C

Freq. sampling: INTERMITTENT (9/9/40) — I | Pumpage inventory: yes / no, period:

Aperture cards: yes

Log data: GEOLOGIST LOG — G

## WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD | Depth well: 349 ft (349) Meas. rept accuracy: DRILLER'S LOG — 3

Depth cased; (first perf.) 331'8" ft (332) | Casing type: STEEL; Diam. 12 in — 12

Finish: (C) porous concrete, (F) gravel w. (perf.), gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other — S

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — C

Date Drilled: JUNE 1940 (940) | Pump intake setting: 164 ft — 164

Driller: C. D. NOLAN (name), CEDAR RAPIDS, IA. (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — Deep / Shallow — D

Power (type): diesel, elec, gas, gasoline, hand, gas, wind; nat, LP; H.P. — Trans. or meter no.

Descrip. MP LSD ft above/below LSD. Alt. MP 892

Alt. LSD: 892 (892) | Accuracy: (source) ALTIMETER — 7

Water Level 116'2" ft above/below MP; Ft above/below LSD (116) | Accuracy: DRILLER'S LOG — D

Date meas: JUNE 1940 (640) | Yield: 85 gpm (85) | Method determined

Drawdown: 1'8" ft (02) | Accuracy: | Pumping period hrs

QUALITY OF WATER DATA: Iron 3.3 ppm (6) | Sulfate 750 ppm (8) | Chloride 6.5 ppm (0) | Hard. 580 ppm (8)

Sp. Conduct 1800 K x $10^6$ (5) | Temp. °F | Date sampled APR. 30, 1962 (462)

Taste, color, etc. SLIGHT YELLOW COLOR ON RECEIPT IN LAB.

Punched ERC

Verified PMJ

Well No. 080-12W-19BCC

Well No. 080-12W-19BCC

Latitude-longitude 41 d 43 m 35 s (N) 092 d 17 m 50.1 s

## HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD [1–19]

Physiographic Province: CENTRAL LOWLAND [20–21: 12] Section: DISSECTED

TILL PLAIN [22: E] Drainage Basin: IOWA [23–25: 25D] Subbasin: _____ [26]

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat — UPLAND [27: F]

MAJOR AQUIFER: QUATERNARY system, PLEIST series [28–29: QG] _____ aquifer, formation, group [30–31: GX]

Lithology: SAND & GRAVEL [32–33: R] Origin: GLACIAL [34: O] Aquifer Thickness: _____ ft

[35–37] Length of well open to: _____ ft [38–40] Depth to top of: _____ ft [41–43]

MINOR AQUIFER: _____ system, _____ series [44–45] _____ aquifer, formation, group [46–47]

Lithology: _____ [48–49] Origin: _____ [50] Aquifer Thickness: _____ ft

[51–53] Length of well open to: _____ ft [54–56] Depth to top of: _____ ft [57–59]

Intervals Screened: 331'- 349'

Depth to consolidated rock: _____ ft [60–63] Source of data: _____ [64]

Depth to basement: _____ ft [65–68] Source of data: _____ [69]

Surficial material: NONCALC. SILT [70–71: NQ] Infiltration characteristics: POOR [72: 4]

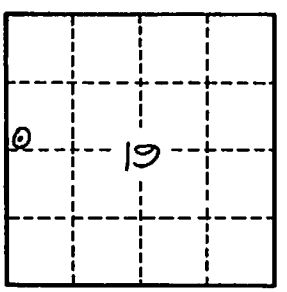
Coefficient Trans: _____ gpd/ft [73–75] Coefficient Storage: _____ [76–78]

Coefficient Perm: _____ gpd/ft$^2$; Spec cap: 40.8 gpm/ft; Number of geologic cards: _____ [79]

CASING:

331'8" OF 12" PIPE FROM 0-331'8"

18' OF 12" SCREEN 331'-349'.




Well No. 080-12W-19BCC

GPO 857-700

IOWA GEOLOGICAL SURVEY
Generalized Log Based on Detailed
Description of Drill Cuttings

Name of Well Victor Town Well Survey No. W- 1199

Location SW¼ SW¼ NW¼ sec. 19, T. 80 N., R. 12 W.

Drilled by C. D. Nolan, Cedar Rapids Date June, 1940

Total Depth 349 ft, Curb Elevation 892 ft, Static Level 116'2" ft.

Pumping Test 2 Hours 0 Min; Gal. per Min. 85, Drawdown 1'8" ft. in 120 min.

Casing Data 331'8" of 12" 45-lb. W. I. pipe from surface to 331'8" equipped with steel drive shoe at bottom. 18' of 12" Johnson Everdur screen from 331' to 349'; (20-slot 343-349, 15-slot, 337-343, 10-slot 331-337) screen with lead packer swedged into pipe.

## Description of Formations

| No. | Rock Unit | Thick. | From (feet) | To |
|---|---|---|---|---|
| | **PLEISTOCENE SYSTEM** | | | |
| 1. | Silt (loess), pale to medium brown, noncalcareous; 10% to 25% clay; trace to 2% sand | 15' | 0 | 15' |
| | **Kansan drift** | | | |
| 2. | Till, oxidized, unleached--clay, buff to medium brown, calcareous; 5% to 20% sand, granules and pebbles | 15' | 15' | 30' |
| 3. | Till, unoxidized, unleached--clay, medium gray to medium drabish gray, calcareous, 10% to 50% sand, granules and pebbles | 35' | 30' | 65' |
| | **Nebraskan drift** | | | |
| 4. | Till, oxidized, unleached--clay, light yellowish brown to light drabish brown; 5% to 25% sand, granules and gravel; 5% gumbotil, medium gray at 80 to 85 feet | 65' | 40' | 105' |
| 5. | Till, unoxidized, unleached--clay, medium gray to medium drabish gray, calcareous; 15% to 30% sand, granules, and pebbles | 105' | 95' | 300' |
| 6. | Sand, 25% to 50% coarse-grained, 25% to 40% medium-grained, 10% to 25% granules; 10% to 35% clay, medium drabish gray, calcareous | 5' | 300' | 305' |
| 7. | No sample interval | 25' | 305' | 330' |
| 8. | Sand, 40% to 50% coarse grained, 20% to 40% medium-grained, 0% to 20% fine-grained, 10% to 30% granules and gravel; 15% clay, drabish gray, in upper foot | 4' | 330' | 334' |

Notes:

Copies to Thorpe Well Company, Des Moines, Iowa, May 16, 1941.
Mr. Chas. D. Nolan, Cedar Rapids, Iowa, May 16, 1941.

| | Description of formations | Thick. | From | To |
|---|---|---|---|---|
| 9. | Gravel, 50%, 40% granules, 10% sand, coarse | 1' | 334' | 335' |
| 10. | Sand, 50% coarse-grained, 50% granules and gravel | 2' | 335' | 337' |
| 11. | Sand, 40% fine-grained, 40% medium-grained, 20% coarse-grained | 1' | 337' | 338' |
| 12. | Sand, 40% to 75% medium grained, 10% to 35% fine-grained, 15% to 40% coarse-grained, granules and pebbles | 8' | 338' | 346' |
| 13. | No sample interval | 3' | 346' | 349' |
| | Total depth | | | 349' |

May 2, 1940 Charles Carter

Mr. E. G. Fiala
Assistant Engineer
State Department of Health
Des Moines, Iowa

Dear Mr. Fiala:

I am extremely sorry that it was impossible for me to meet you at Victor. An emergency in our office made it necessary for me to remain here.

On April 30 I went through Victor and had an opportunity to make a reconnaissance of the water possibilities. I believe the best results will be obtained by a well in the valley flat north of town. It will be necessary, of course, to do some test drilling to establish the most advantageous site for the well.

From my observations it appeared that the important part of the pre-drilling work would be your determination of the most satisfactory site from a sanitary point of view. The only suggestion that I can offer at present is that the test holes be placed on the valley flat and not on the upland or upland slopes.

If additional work is necessary at Victor I will be very glad to do it. I shall also appreciate it if you will send me a copy of the report on your work there.

Very truly yours,

H. G. Hershey

HGH:M

Iowa County.

Sheet No. 1 Name of Well. Victor Town Well Survey No. W-1199

Location SW.SW.NW. 19-80-12 Date Drilled Jun. 1940 Analyst DAVIS 5-8-41

00 silt, pale brn, noncalc. 10% clay. 2% sd ½-¼.

silt, choc. brn. noncalc. 25% clay Tr. sd. ½-¼

10 silt, lt. brnsh. bf, calc. 10% clay, 2% sd. ½-¼. 5% small frag & pepples dolo.

clay, med. bf, calc. 20% sd. & granules & dolo.

20 clay, pale brn to med. drb. gray, granules ls., igneous pebbles.

clay, med. brn, calc. 5% sd. ½-¼.

30 clay med. drb. gray, calc. 20% gravel & granules

clay, med. drb gray, calc. 15% sd & granules.

40 clay, med. gray, calc. 10% sd & granules.

clay, med. gray calc. 25% sd & granules

50 clay, med. gray, calc. 25% sd & granules & gravel

clay, med gray calc. 25% sd granules & gravel.

60 clay, med. gray calc. 50% sd, granules & gravel.

clay, lt. gel. brn, calc. 20% sd. granules & gravel.

70 clay lt. yel. brn, calc. 20% sd. granules & gravel.

clay, lt. gel brn, calc., 35% sd. granules & gravel.

80 clay, lt. yel. brn, calc. 15% sd, granules & gravel

2% qumbatil

clay, lt. yel. brn. calc. 15% sd & granules.

90 clay lt. brn to drb. brn, calc. 5% sd & granules.

clay lt brn to drab. gray, calc. 20% sd. granules & gravel.

100

Sheet No. 2 Name of Well. Victor Town Well Survey No. W-1199

Location SW SW NW 19-80-12 Date Drilled June 1940 Analyst J. Davis 5-8-41

100 Clay, lt. brn. to med. drb-gray, calc. 25% sd. granules gravel.

Clay, lt brn. to med. drb-gray, calc. 40% sd granules & gravel. 10% gumbotil.

110 Clay, med. gray, calc. 15% sd & granules.

Clay, med. gray, calc. 15% sd & granules.

120 Clay, med. gray, calc. 15% sd & granules.

Clay, med gray calc. 15% sd & granules

130 Clay, med gray, calc. 20% sd. granules & gravel

Clay, med gray, calc. 30% sd, granules & gravel, 20% clay, lt. yel. brn. (Cave ?)

140 Clay med. gray, calc. 20% sd. granules & gravel.

Clay, med gray, calc. 15% sd & granules

150 Clay, med. gray, calc. 15% sd, granules & gravel

Clay, med. gray, calc. 10% sd & granules

160 Clay, med gray calc, 30% sd, granules & gravel.

Clay, med. gray, calc. 25% sd, granules & gravel.

170 Clay, med. gray, calc. 25% sd, granules & gravel.

Clay, med. gray, calc. 25% sd granules & gravel.

180 Clay. med. drb-gray, calc. 20% sd & granules.

Clay, med. drb. - gray, calc. 25% sd & granules.

190 Clay, med. drb-gray, calc. 25% sd & granules

Clay, med drb. gray calc. 20% sd & granules

200

Sheet No. 3 Name of Well. Victor Town Well Survey No. W-1199

Location SW SW NW 19-80-12 Date Drilled June 1940 Analyst DAVIS 5-9-41

| | |
|---|---|
| 200 | |
| | Clay, med. drb-gray, calc. 30% sd. granules & gravel. |
| | Clay, med drb-gray calc. 20% sd. granules & gravel |
| 210 | |
| | Clay, med. drb-gray calc. 20% sd. granules & gravel. |
| | Clay, med. drb-gray, calc. 20% sd. granules & gravel. |
| 220 | |
| | Clay, med. drb-gray, calc. 15% sd, & granules |
| | clay, med. drb-gray, calc. 25% sd, granules & gravel |
| 230 | |
| | Clay, med, drb-gray, calc. 25% sd. granules & gravel. |
| | clay, med drb-gray, calc. 25% sd & granules. |
| 240 | |
| | clay, med. drb-gray, calc. 25% sd & granules. |
| | clay, med. drb-gray, calc. 30% sd & granules. |
| 250 | |
| | clay, med. drb-gray, calc. 25% sd & granules. |
| | clay, med drb-gray, calc., silty, 15% sd & granules |
| 260 | |
| | clay, med drb-gray, calc. 15% sd & granules. |
| | clay, med. drb-gray calc. 10% sd & granules |
| 270 | |
| | clay, med. drb-gray, calc. 20% sd, granules & gravel |
| | clay, med drb-gray, calc. 30% sd granules & gravel. |
| 280 | |
| | clay, med drb-gray, calc. 25% sd. granules & gravel. |
| | clay, med. drb-gray, calc. 15% sd., granules & gravel. |
| 290 | |
| | clay, med. drb-gray, calc. 15% sd & granules. |
| | clay, med drb-gray, calc. 25% sd, granules & gravel |
| 300 | |

Sheet No. 4 Name of Well. Victor Town Well Survey No. JX-1199

Location S.W. SW NW 19-20N-12W Date Drilled June 1940 Analyst. DAWS 5-9-41

300
02 Sd. maj. grade 1/2-1/4. - 40% c. 25% coarse, 25% fine, 10% granules 35% clay drb-gray calc.
03 Sd 50% coarse, 25% med., 25% granules. 10% clay.
310
320
330
31 Sd. ~~coarse 50%; med. 40% gran 10% 15% clay drb gray calc~~
32 Sd. Coarse 50%; med. 30% % granules 20%
33 Sd 40% coarse, 30% med. 20% fn. 10% gran. & gravel.
34 Sd. 50% crs, 20% med. 30% gran & gravel.
35 gravel fine 40% granules ~~50% core sd~~
36 Sd. crs, 50% granules & gravel.
37 Sd. Crse 30% granules & gravel.
38 Sd. 40% fn 40% med 20% crse.
39 Sd. 50% med 30% fn 20% crse to granules & gravel.
340
40 Sd. 40% med ~~30% fn. 30% crse~~ to granules & gravel.
41 Sd., 55% med. 10% fn 35% crse to granules & gravel.
42 Sd. 75% med 35% fn.
43 Sd. 60% med. 25% fn. 15% crse.
44 Sd. 60% med 25% fn 15% crse.
45 Sd. 55% med 20% fn 25% crse to granules & gravel.
46 Sd., 40% med 40% crse. 20% granules & gravel.
350
360
370
380
390
400

September 17, 1940

City Clerk
Victor, Iowa

Dear Sir:

Inclosed is the final report on the analysis of water from the newly drilled Victor well as shown by a sample which I collected on September 9. This sample does not indicate the sanitary condition of the well since it is impossible to make a bacteriological count from a sample collected in this manner. Mineralogically the water is somewhat harder and therefore somewhat more highly mineralized than the water from the old well. The iron content of 1.2 parts per million is high and will probably be found to be objectionable. The fluorine content of 2.0 parts per million is also high and may have a deleterious effect on the teeth of growing children. It is believed that no other constituents are present in large enough quantity to be harmful.

See Water analysis file

If you have any questions regarding the analysis or if the Iowa Geological Survey can be of further service, please feel free to call on us.

Very truly yours,

H. G. Hershey

HGH:N

Inc.

CC to Mr. Chas. D. Nolan

IOWA
STATE DEPARTMENT OF HEALTH
DIVISION OF PUBLIC HEALTH ENGINEERING
DES MOINES

Town Victor, Iowa. Date May 8th, 1940.

Report on Water supply survey (new development)

By E. G. Fiala Approved A. H. Wilson Director
Division of Public Health Engineering

Pursuant to a request from the Town Clerk, Mr. T. A. Lane, of Victor, the writer on the above date visited in Victor with members of the council and discussed the proposed new ground water development.

At this time the Town of Victor is supplied by one large diameter, shallow, dug well. This well is located north of town in low ground and in the flood plain of Bear Creek. At the present time the supply is chlorinated using a hypochlorite solution. In the past few years some difficulty has been experienced from the standpoint of shortage. It became necessary on several occasions to notify the citizens to use the water sparingly to avert any crisis. It was felt locally that the development of a new source of supply would be very desirable at this time. Apparently the main reason for the failure of the present well is due to packing of the very fine sandy stratum in which the present well is developed. Several years ago the fine sand was removed from the bottom of the well and sandpoints were driven from the circumference of the well outward. This procedure greatly influenced the capacity of the well. However, the packing of the sand has recurred with the result that it is unlikely that the well could be reclaimed as easily as the previous attempt.

In view of the location of the present site and the necessity of treating the water, it was thought that a location more ideally adapted to ground water development would be necessary. Therefore, in company with the mayor and several members of the council, the writer proceeded to investigate other sites. These sites will be discussed in their order of preference as follows:

LOCATION NO. 1.

This site is located in south Victor, on the property owned by J. W. Schultz, Jr. This particular area is probably the highest point within the corporate limits and is free from all surface pollution and visible sources of contamination. The site is considered ideal for the development of a deep well. The area is easily accessible and a relatively short connection could be made with the existing four inch main. Approval is therefore granted this site subject to the construction of the permanent well.

LOCATION NO. 2.

This site is located on the Louis Feller property, south of town and east of the county line, on the north side of the small ditch. This site was investigated primarily from the standpoint of shallow water development. It was thought the wide valley in this area would be suitable for a shallow well as it is believed that a relatively coarse gravel bed has been laid down. The objection to this site is that an extensive length of main would be necessary and the site is not as easily accessible as would be desirable. Approval, however, is granted this site subject to the construction of the permanent well, and the provision of the necessary fill to deflect any surface water or flood water from the nearby ditch. Such fill should be at least the same elevation as the county road and approximately fifty feet across the top. The slope of the fill should be such so that erosion would be reduced to a minimum. It is urged therefore that this site be prospected with a small diameter test hole.

LOCATION NO. 3.

This site is located approximately 600 feet northwest of the present shallow well in the lowland of Beer Creek. From a sanitary standpoint the site is not the most desirable, being subject to floods, and in low ground subject to surface runoff pollution. It was thought, however, that in the event suitable gravel formation could be encountered a reasonably economical supply could be developed, as a connection could be made from the new well to the pumping station. First, because the initial cost of a shallow well would be less than that of a deep well, and then, a reasonably short connection could be made with the existing distribution system. It is to be remembered, however, that all shallow well supplies are subject to chlorination regardless of the location and construction. Approval is therefore granted to this site subject to the construction of the permanent well, a provision for adequate fill (top of fill to be above adjacent road level) and the application of chlorine if and when found necessary.

A fourth possible site for shallow well development is located on south Washington Street, approximately one block north of well site No. 1, and on the west side of Washington Street. This area consists of pasture land, well drained, and so located that the well proper could be constructed so that no visible sources of pollution would exist within 250 feet of the supply. Whether or not the volume of water in this area is sufficient for the town's needs seems to be questionable. It is felt that the site is worthy of a prospect hole to determine the nature and extent of the formation. The water from this site would also be subject to chlorination.

From the past experience of the Victor water supply it is the writer's opinion that a deep well, properly constructed, would be advisable. The writer is therefore taking the liberty to consult with Dr. H. G. Hershey, of the Iowa Geological Survey, to determine the possibility of a deep well development. In the meantime, however, it is suggested that the various sites for shallow well development be prospected with a small diameter test hole to make sure that all possibilities of shallow well development are exhausted. It is felt by some that the area within the flood plain of Beer Creek is void of gravel as there have been several test holes placed along the creek bank. In view of the fact that test holes are rather inexpensive, it is the writer's opinion that such holes would be a governing factor in the development of ground waters.

The writer wishes to point out at this time that regardless of the type of well to be constructed that detailed plans and specifications for the well be submitted to the State Department of Health for review.

Respectfully submitted,

E. G. Fiala,
Assistant Engineer.

EGF:M

080-12W-19BCC

IOWA GEOLOGICAL SURVEY W-1199

In Cooperation with U. S. Geological Survey

RECORD OF WELL




Location:

Town: Victor ( N E ) ( S W ): County Iowa, Ia.

SW-SW-NW sec. 19 T 80 N., R. 12 W. Hartford Twp.

Well name and number Victor Town Well

Owner Town of Victor Address

Tenant Address

Contractor C. D. Nolan Address Cedar Rapids

Drillers Howard White

Drilling dates June to Sept 1940

Well data:

Elevations: Drilling curb 892 feet; Land surface 891 feet

Determined by

Topographic position Upland.

Total depth: Reported feet, Measured 349 feet

Drilling method Cable.

Hole and casing data 331'8" of 12" pipe from 0-331'8", equipped with steel drive shoe at bottom; 18' of 12" screen from 331-349

Original depth to water ft. above below Date

Original elevation of water level ft.; Source of data

Sources of water: Principal Nebraskan; Others

Production data: Date

Static depth to water 116'2" Measuring point

Pumping level 117' 10" at 85 g.p.m.

Specific capacity 44.1 g.p.m. per ft. drawdown; Temperature 54 °F.

Pump data: Type pump Cylinder Column Dia. Length 164

Cylinder or bowls: Dia. 5 3/8" Length Suction pipe

Power Airline

Estimated rate of production: g.p.m. for hrs. a day

Use of water City Supply

WATER ANALYSES (in parts per million)

| | | | | |
|---|---|---|---|---|
| Date samples | Sept. 9, 1940 | May 28, 1946 | | |
| Sampled by | H. G. Hershey | A. L. Bennett | | |
| Total solids | 1298 | 1455 | | |
| Insoluble matter | 12.0 | 12 | | |
| Alkalinity (Meo) | 228.0 | 191 | | |
| Alkalinity (Phn) | 0.0 | none | | |
| pH | 7.7 | 7.1 | | |
| $Fe_2O_3 + Mn_2O_3 + Al_2O_3$ | 3.0 | 9.5 | | |
| Alkali as sodium | 176.2 | 192.1 | | |
| Calcium | 142.2 | 155.4 | | |
| Magnesium | 53.1 | 63.5 | | |
| Iron (unfiltered) | 1.2 | 1.4 | | |
| Manganese | 0.00 | 0.0 | | |
| Nitrate | 0.06 | 8.9 | | |
| Fluoride | 2.0 | 0.5 | | |
| Chloride | 12.0 | 9. | | |
| Sulfate | 703.1 | 792.1 | | |
| Bicarbonate | 278.2 | 236.7 | | |
| Hardness (ppm) | 576. | 652 | | |
| Hardness (gpg) | 33.7 | 38.1 | | |

Remarks

Laboratory data: Sample storage location

Sample range 0-346 No. spls. 82 No. dupls. & cond. 86 Good.

Spls. prepared by Unknown Washed range by

Driller's log and cond.

Insoluble residues: Prepared by Studied by Strip log

Microscopic study 0-349 strip log Owen

Gen. log yes Correl. by Owen