44193

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND & WATER
Alaska Hydrologic Survey

WATER WELL LOG Revised 08/18/2016

Drilling Started: ___/___/_____ Completed: 8 / 3 / 1981 Pump Install: ___/___/_____

City/Borough	Subdivision	Block	Lot	Property Owner Name & Address
Chugach REAA				Valdez Water System AK,

Well location: Latitude 61.131164600000005 **Longitude** -146.382477
Meridian C Township 008S Range 006W Section 31 , NW 1/4 of NE 1/4 of NW 1/4 of SW 1/4

BOREHOLE DATA: (from ground surface)
Suggest T.**M. Hanna's hydrogeologic classification system***
https://my.ngwa.org/NC__Product?id=a185000000BYub3AAD

	Depth From	Depth To
GRAVELLY SANDY SILT SILTY SANDY GRAVEL	0	23
NEST OF LARGER ROCKS	23	25
GRAVELLY SAND WITH WATER	25	39
SAND AND GRAVEL WITH SILT LENSES - WATER	39	42
SANDY GRAVEL - WATER	42	52
SANDY GRAVEL WITH SILT LENSES - WATER	52	58
SANDY SILT WITH NO WATER	58	62
COARSE GRAVEL WITH SOME SILT - WATER	62	65
SANDY GRAVEL WITH SILT - WATER	65	71
SAND AND GRAVEL WITH CLAY BALLS	71	72
GRAVELLY SAND WITH SILT AND WATER	72	75
FINE SAND AND SILT - HEAVING	75	78

Include description or sketch of well location (include road names, buildings, etc.):

North

Drilling method: ☐ Air rotary, ☒ Cable tool, ☐ Other _____
Well use: ☒ Public supply, ☐ Domestic, ☐ Reinjection, ☐ Hydrofracking
☐ Commercial, ☐ Observation/Monitoring, ☐ Test/Exploratory, ☐ Cooling,
☐ Irrigation/Agriculture, ☐ Grounding, ☐ Recharge/Aquifer Storage,
☐ Heating, ☐ Geothermal Exploration, ☐ Other _____
Fluids used: _____

Depth of hole: 78 ft Casing stickup: _____ft
Casing type: STEEL Casing thickness: _____ inches
Casing diameter: 16 inches Casing depth: 78 ft
Liner type: _____ Depth: _____ ft Diameter: _____inches
Note: _____

Well intake opening type: ☐ Open end, ☐ Open hole, ☒ Other screened
Screen type: _____, Screen mesh size: _____
Screen start: 38 ft, Screen stop: 75 ft, Perforated ☐ Yes ☒ No
Perforation description: _____ Perf from: _____ ft, Perf to: _____ft, Perf from: _____ ft, Perf to: _____ ft
Gravel packed ☐ Yes ☒ No Gravel start: _____ ft , Gravel stop:_____ ft
Note: 150 to 250 SLOT SIZE

Static water (from top of casing): 8 ft on___/___/_____ Artesian well ☐
Pumping level & yield: 20 feet after 12 hours at 2100 gpm
Method of testing: _____
Development method: _____ Duration: _____
Recovery rate: _____ gpm

Grout type: _____ Volume _____
Depth: From _____ft, To _____ft

Final pump intake depth: _____ ft Model: _____
Pump size: _____ hp Brand name: _____

Was well disinfected upon completion? ☐ Yes ☒ No
Method of disinfection: _____
Was water quality tested? ☐ Yes ☒ No
Water quality parameters tested: _____

Well driller name: .....
Company name: DOWL ENGINEERS .....
Mailing address: .....
City: _____ State: AK Zip: _____
Phone number: (_____) _____- _____
Driller's signature: _____
Date: _____/_____/_____

AS 41.08.020(b)(4) and AAC 11 AAC 93.140(a) require that a copy of the well log be submitted to the Department of Natural Resources within **45 days of well completion**. Well logs may be submitted using the online well log reporting system available at:

https://dnr.alaska.gov/welts/

OR email electronic well logs to

dnr.water.reports@alaska.gov

Anchorage Municipal Code 15.55.060(I) and North Pole Ordinance 13.32.030(D) require that a copy of this well log be submitted to the Development Services Department/City within **30 days of well completion**.

City Permit Number: _____
Date of Issue: _____/___/_____

Parcel Identification Number: _____-_____-_____

*Guide for Using the Hydrogeologic Classification System for Logging Water Well Boreholes by Thomas M. Hanna NGWA Press

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VALDEZ PRODUCTION WELL NO. 4

Summary of Driller's Log for Production Well

DEPTH	DESCRIPTION
	Top of casing 9/8/81, elev. 43.03. (Design finish elev. top of casing in pump house = 42.50).
0	Top of existing ground, elev. 38.5.
0 - 23'	Gravelly sandy silt and silty sandy gravel to 6" diameter.
23 - 25'	Nest of larger rocks.
25 - 39'	Gravelly sand with water.
39 - 42'	Sand and gravel with silt balls (apparently thin silt lenses).
42 - 52'	Sandy gravel - water.
52 - 58'	Sandy gravel with silt lenses - water.
58 - 62'	Sandy silt with no water.
62 - 65'	Coarse gravel with some silt - strong water flow.
65 - 71'	Sandy gravel with silt - water.
71 - 72'	Sand and gravel with clay balls.
72 - 75'	Gravelly sand with silt and water.
75 - 78'	Fine sand and silt - heaving.
78'	Bottom of hole.

The screen used was manufactured by UOP - Johnson Division and was constructed of stainless steel. In order to use locally available screen, the assembly was made up of standard 5' sections with threaded connections. The formations were developed and tested in a two-step process. The casing was pulled back to expose the screen to the formation between 59' and 74' and the formation was developed for approximately 16 hours using the air jetting method. The formation was pump tested for 2 hours at a rate of 257 gpm. This rate caused a drawdown of approximately 20' below the static level of 5' 3". This indicated a specific capacity of only 13 gpm per foot of drawdown. It was interesting to note, however, that within approximately 2 minutes after pumping began, the drawdown became virtually stable.

After completing the testing of the lower formation, the screen was backfilled with fine gravel to the 58' level and a plaster of paris plug set at that level to allow the upper formation to be developed and tested independently. The casing was then pulled to the 37' level. This zone was air surged for 11 1/2 hours after which the test pump was reinstalled. This zone was pumped at a rate of 400 gpm with a drawdown of approximately 13', or a specific capacity of approximately 31 gpm per foot of drawdown. Although the drawdown in this formation also stabilized within a very few minutes, the pump test was run 24 hours to make certain that long-term effects would not occur. An effort was then made to drill out the plaster plug and clean out the bottom section of the screen in order to determine the composite specific capacity of the total screened area. During this work, however, the screen became unscrewed at approximately the 50' level. Efforts to correct the situation were unsuccessful and the well was left with the screen nearly full of sand. Upon completion of the work on the production well, the top 20' of the test well casing was grouted by filling the annular space between the 8" and 6" casings with neat cement grout after which the 8" casing was extracted. This operation required 4 sacks of cement.

CONCLUSION: Based on the results of the test well, it was apparent that a production well in this location may be limited to a safe capacity of approximately 1,000 to 1,500 gpm.

PRODUCTION WELL FOR WELL #4 - INTOWN

DRILLING: A cable tool rig was moved to the site and set up on 8/3/81. 20" casing was installed to the 26' level which was then lined with 16" which was drilled down to the 78' level. The formations encountered were virtually identical to those discovered by the test well (see

DEVELOPMENT & TESTING: Based on the analyses of gravel samples collected from the aquifers, a screen design was determined as follows:

38'	Top of screen assembly and packer
38' to 42'	No. 100 Slot
42' to 44'	No. 150 Slot
44' to 58'	No. 250 Slot
58' to 62'	Blank section (tight rod wrap used)
62' to 70'	No. 250 Slot
70' to 73'	No. 200 Slot
73' to 75'	No. 150 Slot
75'	Closed bottom

This screen was manufactured by UOP, Johnson Division, of Stainless Steel. The casing was pulled back to the 40' level after which development work was begun. The well was initially developed using a horizontal water jetting procedure as called for by the contract documents. Although 40 hours of surging time was used, with considerable amounts of sand and silt being removed, it was discovered when the test pump was installed that the development was far from complete. Pumping at a rate of 600 to 700 gpm would cause drawdown to the suction of the pump at 53'. The water pumped was very thick with silt and fine sand. A short step-drawdown test at rates of 530, 600, and 640 gpm showed specific capacities of 88, 65, and 39 gpm per foot of drawdown respectively. From this it was obvious that the potential of the well was quite good, however, the development of the formation was far from complete. A backflushing type development procedure was then arranged. Under this procedure, the annular space between the casing and the pump column was closed with an opening provided for connection of a 6" line into the annular space. Water was then pumped from the well into a large tank truck using the test pump, after which the test pump would be stopped, its discharge valved off, and water pumped from the tanker into the casing by a 6" ditch pump. When the tanker was empty, or excessive pressure began to build up in the casing, the ditch pump would be stopped and the test pump restarted. This cycle was repeated for approximately 32 hours after which the specific capacity of the well when pumped at rates in the vicinity of 2,000 gpm was in excess of 160 gpm per foot of drawdown. During this development procedure, it was necessary to add approximately 2 cubic yards of gravel to fill a subsidence area which developed around the well. After completion of the development work, a 12 hour pump test was performed at a rate of 2,100 gpm (see attached data and plot). Upon completion of testing, the annular space between the 20" and 16" casings was filled with neat cement grout and the 20" casing was removed. This operation required 72 bags of cement.

RECOMMENDATIONS: The extremely high specific capacity of this well will allow it to be pumped for extended periods at rates in excess of 2,000 gpm. At the time of the final pump test, the static water level was approximately 8' below the surface or 32' above the top of the exposed well screen. Since the drawdown at that rate amounts to only about 12', this leaves approximately 20' of additional drawdown available above the top of the screen. Although there is presently no information available

regarding the seasonal fluctuations of the water table in the area, it is highly unlikely that the combined effects of seasonal fluctuations and any regional drawdown due to pumpage during the winter months could draw the water table down anywhere near the top of the screen. It is our recommendation, therefore, that a well pump of approximately 2,000 gpm be installed in the production well.

If more detailed questions arise regarding well construction, a complete set of driller's daily work sheets are on file at DOWL Engineers.

R. W. Kranich Jr.

Robert W. Kranich, Jr. P.E.

RWK:pok

Attachments