83509

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: ____/____/_____ Pump Install: ____/____/_____

City/Borough	Subdivision	Block	Lot	Property Owner Name & Address
				KAKO Retreat Center ,

Well location: Latitude 61.90131600000001 **Longitude** -161.443504
Meridian S Township 021N Range 066W Section 19 , SW 1/4 of NW 1/4 of NE 1/4 of NE 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

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

North

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

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: 60 ft Casing stickup: 2 ft
Casing type: Steel Casing thickness: _____ inches
Casing diameter: 6 inches Casing depth: _____ ft
Liner type: _____ Depth: _____ ft Diameter: _____ inches
Note: _____

Well intake opening type: ☐ Open end, ☐ Open hole, ☒ Other perforated
Screen type: _____, Screen mesh size: _____
Screen start: _____ ft, Screen stop: _____ ft, Perforated ☒ Yes ☐ No
Perforation description: _____ Perf from: 40 ft, Perf
to: _____ ft, Perf from: _____ ft, Perf to: _____ ft
Gravel packed ☐ Yes ☒ No Gravel start: _____ ft , Gravel stop: _____ ft
Note: Perforations added in 2013 to increase yield.

Static water (from top of casing): _____ ft on ____/____/_____ Artesian well ☐
Pumping level & yield: _____ feet after _____ hours at 2.5 gpm
Method of testing: _____
Development method: _____ Duration: _____
Recovery rate: _____ gpm

Grout type: Bentonite Volume _____
Depth: From 0 ft, To 3 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: JONATHAN PENZ .....
Mailing address: .....
City: _____ State: AK Zip: _____
Phone number: (_____) _____- _____
Driller's signature: _____
Date: _____/_____/_____

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: _____-_____-_____

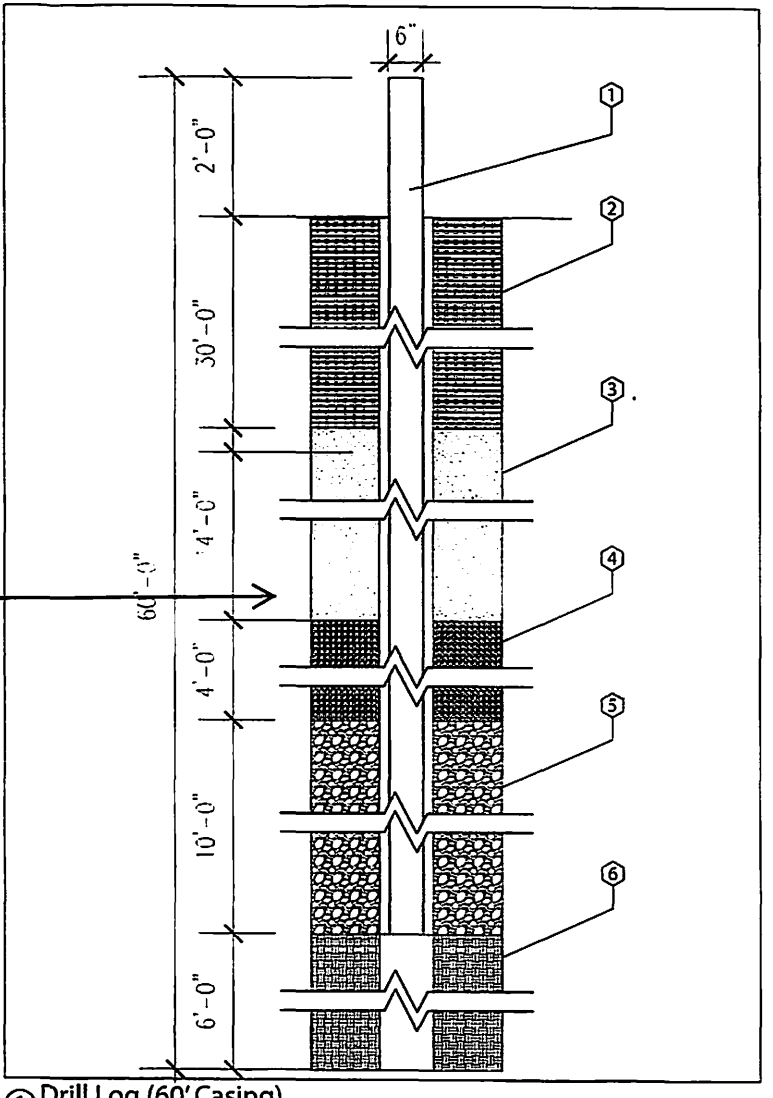
*Guide for Using the Hydrogeologic Classification System for Logging Water Well Boreholes by Thomas M. Hanna NGWA Press

Kako Retreat Center

Kako Retreat Center, Inc.
PO BOX 29
Russian Mission, AK 99657

NOTES

WELL CASING PERFORATED IN THIS AREA IN 2013



① Drill Log (60' Casing)
Scale: 3/8" = 1'-0"

1. 2' ABOVE GROUND
2. 30' ROCKY MUD
3. 14' SAND/GRAVEL
4. 4' SOFT ROCK
5. 10' BEDROCK
6. 6' DRILL BELOW CASING

Details

TAURIAINEN ENGINEERING & TESTING

35186 Spur Hwy Soldotna, AK 99669 (907)262-4624 FAX 262-5777 engineeringalaska@gci.net

MEMORANDUM

Date: 8 June 2015 13066

To: Darlene Galido, ADEC

Copy: Jonathan Penz

From: Mike Gahr, Project Engineer

Subject: KAKO Retreat Center Class B Public Water System PWS# 263066
Request for Interim Approval to Operate Well Water System and Request for Waivers of Separation Distance Between Source Well and Onsite Wastewater Systems
3 pages + Attachments

We request Approval to Operate the existing KAKO Retreat Center Class B water system and waiver of regulatory separation distance requirements for some existing onsite wastewater features. The water system serves a Lodge with Wash House.

The system has less than 10 year-round residents. The system serves a Class B population during the summer months. The entire KAKO Retreat Center consists of a Lodge, Wash house, 11 wet cabins/buildings and ~ 14 dry cabins/buildings. For many years the source of potable water has been a year-round creek. The system also has a low-yield water well. A water-bourne disease outbreak which was apparently associated with use of the creek water system occurred at the camp in 2012. The camp has since operated under a boiled water notice, including operating the Lodge and Wash House using the well water source, which has been tested for coliform and nitrate and meets regulatory limits.

KAKO has isolated the Lodge and Wash house from the creek water system by cutting and capping water lines inside of buildings. The Lodge and Wash house are currently served by the source well. A potable water storage tank will be used to meet peak flow requirements. The other wet buildings, including staff housing, are served by the creek water system. Campers stay in dry cabins. Staff, campers and residents will consume potable water and shower at the Lodge and Wash house systems. Staff will use creek water in the housing units for toilets. Sink water in the staff housing units is also creek water and will not be consumed or used as potable water. Water containers will be used for staff to haul small amounts of potable water to housing as needed. Notices stating water is non-potable will be posted inside all wet buildings served by creek water.

This submital requests approval to operate the Lodge and Wash House water system during this summer season. KAKO is concurrently preparing to drill another source well and hopes to procure enough water to serve the entire camp.

Source Well

The well, drilled in 1991 by Jonathan Penz, is 6" diameter steel-cased to a depth of 60 feet, open-ended, with a static level of ~22 feet. The casing was perforated by a well driller at a level ~40 feet below grade in 2013 in an attempt to increase yield. The long term yield is currently

~2.5 GPM. The well was retro-grouted in 2013 by placing a 3' deep, 3' diameter, 6 inch thick bentonite donut surrounding the casing. The casing was also extended more than 12" above grade and the surrounding area was graded. This provides adequate grout protection around the casing and surface water drainage away from the casing. All regulatory separation distances are met except distances to three private sewer lines within 100 feet serving House#1 and the Lodge and Wash House, and to the community sewer line portion and any cleanouts within 200 feet, for which waivers are requested.

The ADEC Contaminated Sites online database was consulted. No active sites were found within several miles of the subject source well.

Peak flow for the Lodge and Wash House is calculated at 17 GPM per AWWA M22. Since the existing source well cannot provide peak flow, a 1500-gallon, above-ground, rectangular steel storage tank will be used. The tank was buffed to bare metal, then coated per NSF61 standards using International Paint Bar Rust 233H. Per owner-provided information, the tank was coated with two coats using brush and roller. The first coat was cured above 77F for at least 24 hours before the second coat was applied and cured for an additional 10 days above 77F. The tank was heated with an electric heater during curing and monitored with a digital temperature probe.

A Grundfos Model 16GS submersible stainless 3/4 HP well pump will be installed in the storage tank and can provide water at peak flow with a distribution pressure exceeding 20 psi at the Lodge and Wash House. The well pump will operate on storage tank level control using a mechanical level switch. The distribution pump will operate on system pressure using a pressure switch on the distribution line at the storage tank. One 44-gallon pressure tank and two particle filters are in House#1. A second 30-gallon pressure tank is at the Wash House. Calculations for peak flow, TDH, pressure tanks and storage tank sizing are attached.

We request a waiver of the 100-foot regulatory separation distance between the Class B source well and three private sewer lines serving House#1, the Lodge and Wash House, and of the 200-foot regulatory separation distance between the Class B source well and a community sewer line and two associated clean-outs, described in 18 AAC 80.020. We believe the lesser distances of 28, 72 and 72 feet to the three private sewer lines, and 72 feet to the community sewer line and 89 and 172 feet to the associated clean-outs, present no significant risk to public health.

- The well has been tested for coliform and nitrate and meets all regulatory limits
- The elevation of the grade at the well casing is at least 1 foot higher than the clean-out grade elevations
- The casing provides over 12" of stickup
- The casing has a sanitary well cap
- The sewer lines are constructed of PVC piping
- The drilling log for the source well indicates a confining clay layer from 0 to 30 feet below grade. Static level of 22 feet indicates artesian influence.
- The source well was retro-grouted in 2013 by placing a 6-inch thick, 3-foot diameter bentonite ring 3 feet below grade and surrounding the casing
- The area surrounding the source well provides drainage away from the casing
- The 30' soil confining layer restricts lateral, subsurface migration of any sewage.

The well is within 500 feet of surface water bodies and the intake is less than 50 feet below grade. However, due to the confining clay layer and successful water testing results, we recommend it be considered a groundwater source and not be considered under the direct influence of surface water.

The water is distributed with a new above-ground 1" HDPE line to House #1, then with the existing buried 1 1/4" HDPE line to the Lodge and Wash House. Trenches will be dug at least

12 feet below grade and permanent HDPE lines buried between House #1 and the storage tank prior to this winter. The HDPE is currently connected with mechanical clamps. A fusion machine will be used to join any required sections of new HDPE prior to burial. The HDPE piping between the source well and the Lodge and Wash House was pressure tested by owner in June 2015 at 30 psi with the pump turned off overnight. The system lost less than 1 psi, indicating no existing leaks in that portion of the system. The piping was also disinfected with a strong chlorine solution, flushed and tested negative for total coliform. The piping between House #1 and the storage tank has been successfully pressure tested, disinfected and tested for coliform. Sample results are pending and will be submitted prior to approval to operate.

Based on owner-provided information all materials used in construction are generally acceptable for potable water service and the system as constructed and operated poses no significant risk to public health. We recommend approval of the requested waivers and Interim Approval to Operate the Lodge and Wash House water system be granted.

End of Memo Text

Attachments

- Facility and Project Information Forms (2 pg)
- General Checklist (4 pg)
- Source - Groundwater Checklist (2 pg)
- Source - GWUDISW Determination Checklist (2 pg)
- Distribution - Piped checklist (2 pg)
- Waiver Checklist - Source (2 pg)
- Water Analyses Results (4 pg)
- Well Log
- Well Lat/Long Form
- Calculations
- Cut Sheets (18 pg)
- Water Rights (2 pg)
- ADEC Contaminated Sites Map
- Record Drawings (2 pg)