

WATER WELL ANALYSIS
SANITATION FACILITIES CONSTRUCTION

EKWOK, ALASKA

PROJECT NO. AN-73-621 G

ENGINEER

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Operations

ALASKA AREA NATIVE HEALTH SERVICE
Office of Environmental Health

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ALASKA

MINERAL LAB

14 2225 SPENARD ROAD
ANCHORAGE, ALASKA 99503

PHONE 272-2716

REPORT OF ANALYSIS

FOR Alaska Testlab

4040 B Street

Anchorage, Alaska 99503

DATE October 18, 1974

SCHOOL
WELL

PAGE 1 OF 1

IDENT.
NO.

DESCRIPTION

ELEMENT
UNIT1836
Bethel1837
Elyak

Color

Turbidity

pH

Specific Conductance

Dissolved Solids

Suspended Solids

Total Solids

Alkalinity

Calcium (Ca)

Magnesium (Mg)

Iron (Fe)

Manganese (Mn)

Silicon(Si)

Sulfate (SO₄)Sulfite (SO₃)Nitrate (NO₃)Nitrite (NO₂)

Tannin and Lignin-like substances

mg/l*

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

mg/l

micromhos/cm

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH

WELL LOG

LOCATION EKOK - SCHOOL WELL #1

DATE STARTED 08-15-74

DATE COMPLETED 8/21/74

CREW Sheldon & Baldwin

TOTAL DEPTH OF WELL 65 FT. CASING INSTALLED 65' DIAMETER 6"

GROUT Non e SCREEN SIZE Non e MFG. -- LENGTH --

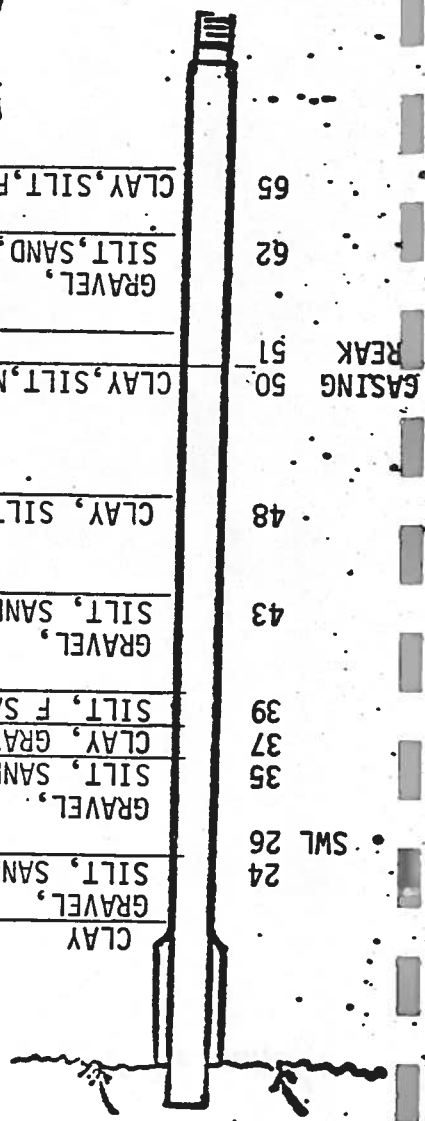
STATIC WATER LEVEL HRS. PUMPED @ GPM DRAWDOWN FT.

DEVELOPMENT PROCEDURES

Clyde Baldwin
Leo Burghall

DATE	DEPTH FROM - TO	FORMATION
0-8	tan clay	
8-24	tan silt, sand, & gravel	
24-35	tan silt, sand, & gravel	
35-37	gray clay & gravel	
37-39	tan & gray silt & fine sand	
39-43	tan & gray silt, sand & gravel	
43-48	blue gray clay, silt & fine sand	
48-51	blue gray clay, silt & medium sand	
51-62	blue gray silt, sand & gravel	
62-65	blue gray clay, silt & fine sand	

CLAY	GRAVEL, SILT, SAND
GRAVEL, SILT, SAND, H ₂ O	CLAY, GRAVEL
SILT, F SAND	GRAVEL, SILT, SAND
CLAY, SILT, M SAND	CLAY, SILT/SAND
CLAY, SILT, F SAND	GRAVEL, SILT, SAND
GRAVEL, SILT, SAND, H ₂ O	GRAVEL, SILT, SAND
CLAY, GRAVEL	GRAVEL, SILT, SAND
CLAY, SILT, F SAND	GRAVEL, SILT, SAND
CLAY, SILT, F SAND	GRAVEL, SILT, SAND



SPECIAL NOTES:

WATER DATA FIELD TEST
TASTE
APPEARANCE FRESH
AFTER 24 HOURS
IRON
CHLORIDES
TDS
ALKALINITY
PH

Apy 50' Casing Broke
Anticipate drilling below 65' explore
Water @ 35' had sulfur smell, is not enough to produce 10 gpm
Sending drill bit & bottom out of hole

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WELL LOG

LOCATION EKHO School Well #2 DATE STARTED 08-22-74

DATE COMPLETED 9/28/74 CREW ALEX SHELTON

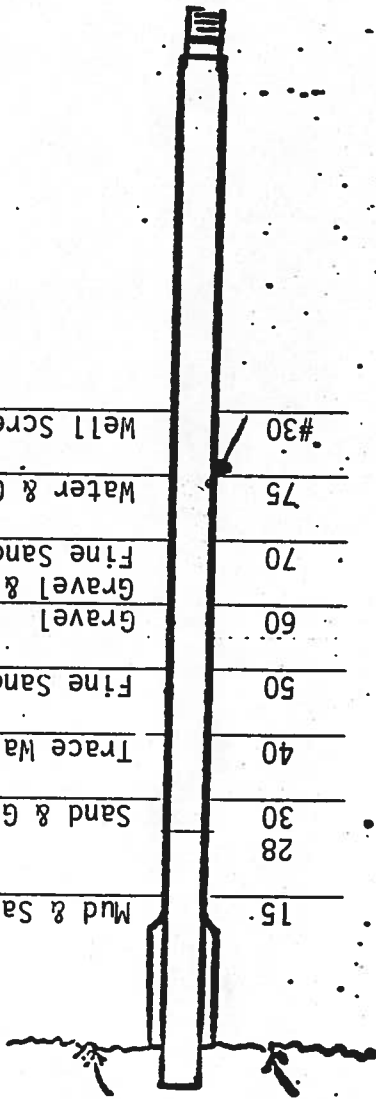
TOTAL DEPTH OF WELL 75 FT. CASING INSTALLED 75 DIAMETER 6"

GROUT NONE SCREEN SIZE #30 MFG. JOHNSON LENGTH 5 ft.

STATIC WATER LEVEL 28 HRS. PUMPED 8 @ 10° GPM DRAWDOWN 38 FT.

DEVELOPMENT PROCEDURES OPEN HOLE TEST PUMPIN

15	Mud & Sand
28	Sand & Gravel
30	Trace Water
40	Fine Sand
50	Gravel
60	Gravel & Fine Sand
70	Water & Gravel
75	Well Screen



DATE	DEPTH FROM - TO	FORMATION
	0-15	Mud & Sand
	15-30	Sand & Gravel
	30-40	Sand & Gravel, Trace Water
	40-50	Fine Sand & Gravel
	50-60	Gravel
	60-70	Fine Sand & Gravel
	75	Good Water & Gravel

WATER DATA FIELD TEST

TASTE
 AFTER 24 HOURS
 IRON
 CHLORIDES
 ALKALINITY
 pH

SPECIAL NOTES:

10/13 Perforations - 16 holes from 51' to 55' in 3/8" holes
 With Screen - 15 gpm w/23' drawdown
 full recovery in 3 minutes
 Discover split casing @ 51-54'
 Rocks coming in casing
 Push screen to 51-54' - can't drill below 52'
 11/2
 brown sand & water - too
 much sand to pump.

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DATE STARTED June 12, 1975

CREW Henry Horner

MFG. Johnson

HRS. PUMPED 8 @ 20 GPM DRAWDOWN 17 FT.

DATE	DEPTH FROM - TO	FORMATION
	0'-15'	Mud & Sand
	15'-30'	Gravel & Sand
	30'-31'	Brown Clay
	31'-46'	Gravel & Sand
	46'-62'	Blue Clay, Sand & Water
	62'-81'	Sand, Gravel & Water

TASTE

APPEARANCE FRESH

24 HOURS
IRON
CHLORIDES

24 HOURS IRON CHLORIDES

24 HOURS IRON CHLORIDES

ALKALINITY

ALKALINITY _____ pH _____

SPECIAL NOTES:

This well is presently being used as the school's water source.

WELL LOG

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH

LOCATION Ekwok House Well #1 for Sonny Nelson

DATE COMPLETED Oct. 7, 1974

CREW

Alex Sheldon

DATE STARTED

Oct. 1, 1974

TOTAL DEPTH OF WELL 37 FT. CASING INSTALLED 39' DIAMETER 6" LENGTH 2'

MFG. Johnson

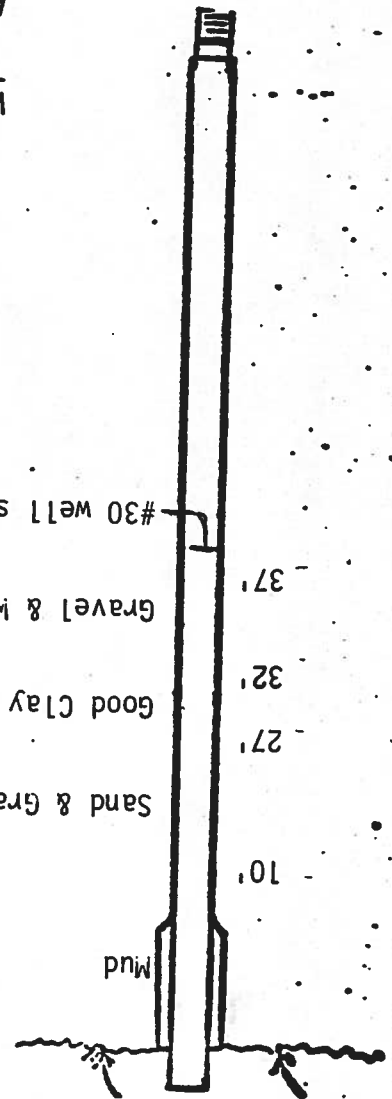
SCREEN SIZE 30

GROUT none

STATIC WATER LEVEL HRS. PUMPED 8 @ 5 GPM DRAWDOWN 2 FT.

DEVELOPMENT PROCEDURES

DATE	DEPTH FROM - TO	FORMATION
	0'-10'	Mud
	10'-27'	Sand & Gravel
	27'-32'	Good Clay
	32'-37'	Gravel & Water



SPECIAL NOTES:

TDS

ALKALINITY

pH

AFTER 24 HOURS

IRON

CHLORIDES

WATER DATA FIELD TEST

TASTE

APPEARANCE FRESH

WELL LOG

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH

LOCATION Ekwok House Well #2
for Phillip Akelkok

DATE STARTED Oct. 8, 1974

DATE COMPLETED Oct. 15, 1974

CREW Henry Horner

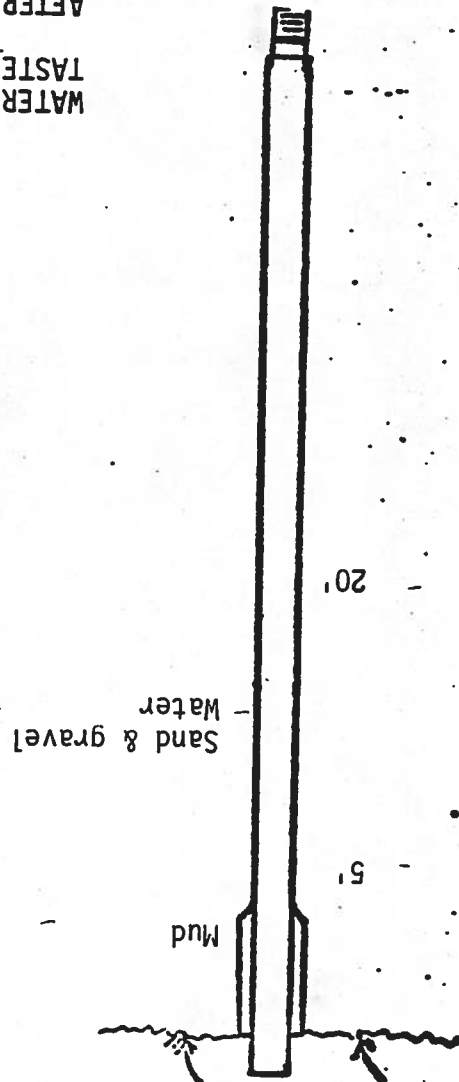
TOTAL DEPTH OF WELL 20 FT. CASING INSTALLED 19' DIAMETER 6"

GROUT SCREEN SIZE MFG. LENGTH

STATIC WATER LEVEL 15' HRS. PUMPED @ GPM DRAWDOWN FT.

DEVELOPMENT PROCEDURES

DATE	DEPTH FROM - TO	FORMATION
	0'-5'	Mud
	5'-20'	Sand & Gravel



SPECIAL NOTES:

WATER DATA FIELD TEST
TASTE
APPEARANCE FRESH
AFTER 24 HOURS
IRON
CHLORIDES
TDS
ALKALINITY
PH

WELL LOG

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH

LOCATION Ekwok House Well #3
for Alex Nelson Sr.

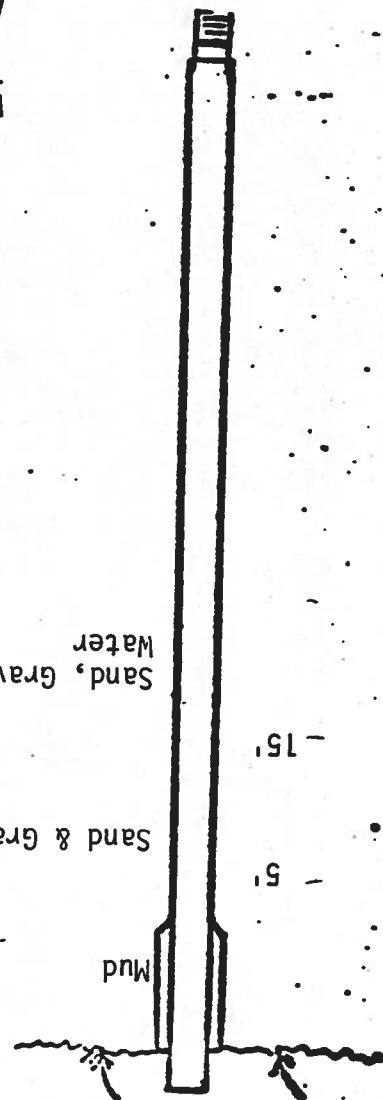
DATE COMPLETED Oct. 20, 1974

CREW

Henry Horner

DATE STARTED Oct. 16, 1974

TOTAL DEPTH OF WELL 20 FT. CASING INSTALLED 20' DIAMETER 6" GROUT SCREEN SIZE MFG. LENGTH STATIC WATER LEVEL 15' HRS. PUMPED 3 @ 5 GPM DRAWDOWN FT. DEVELOPMENT PROCEDURES



DATE	DEPTH FROM - TO	FORMATION
	0'-5'	Mud
	5'-15'	Sand & Gravel
	15'-20'	Sand, gravel & water

WATER DATA FIELD TEST

TASTE

APPEARANCE FRESH

AFTER 24 HOURS

IRON

CHLORIDES

pH

ALKALINITY

TDS

SPECIAL NOTES:

WELL LOG

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH

LOCATION Ekwok House Well #4 for Billy Hurley
 DATE COMPLETED Oct. 23, 1974
 CREW Henry Horner
 DATE STARTED Oct. 21, 1974
 TOTAL DEPTH OF WELL 15 FT. CASING INSTALLED 15' DIAMETER
 GROUT none SCREEN SIZE -- MFG. -- LENGTH --
 STATIC WATER LEVEL -- HRS. PUMPED -- @ -- GPM DRAWDOWN -- FT.
 DEVELOPMENT PROCEDURES

DATE	DEPTH FROM - TO	FORMATION
	0'-4'	Mud
	4'-5'	Sand
	5'-15'	Water

WATER DATA FIELD TEST

APPEARANCE FRESH

AFTER 24 HOURS

IRON

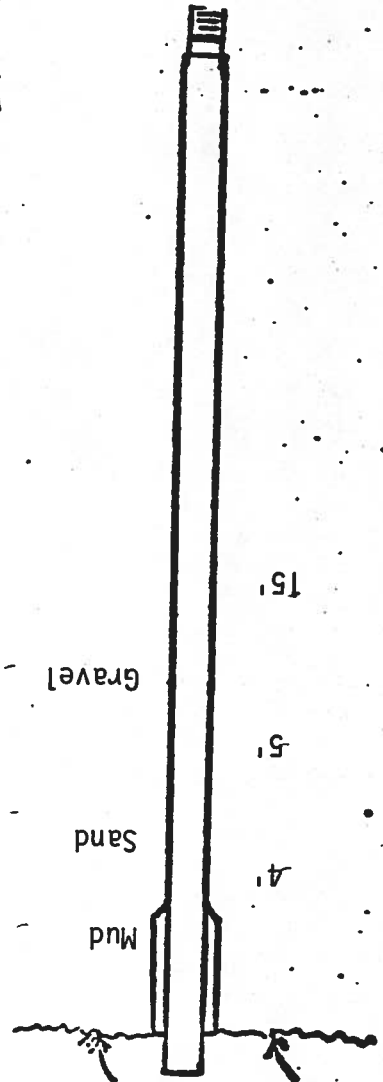
CHLORIDES

pH

ALKALINITY

TDS

SPECIAL NOTES:



WELL LOG

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH

LOCATION Ekok House Well #5
for Hassillie Nicholas

DATE STARTED Oct. 23, 1974

DATE COMPLETED Oct. 26, 1974

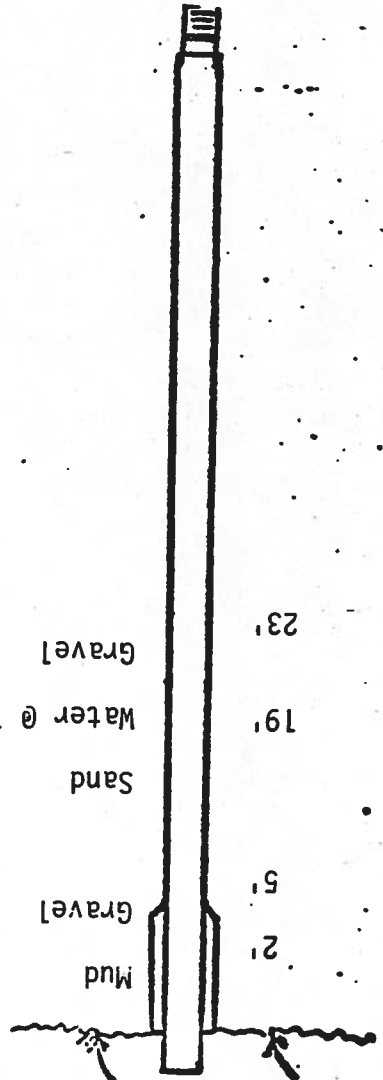
CREW Henry Horner

TOTAL DEPTH OF WELL 22 FT. CASING INSTALLED 23'-9" DIAMETER 6"

GROUT none SCREEN SIZE -- MFG. --- LENGTH --

STATIC WATER LEVEL 19' HRS. PUMPED -- @ -- GPM DRAWDOWN -- FT.

DEVELOPMENT PROCEDURES



SPECIAL NOTES:

WATER DATA FIELD TEST
TASTE
APPEARANCE FRESH
AFTER 24 HOURS IRON CHLORIDES
TDS ALKALINITY pH

DATE	DEPTH FROM - TO	FORMATION
	0-2'	Mud
	2'-5'	Gravel
	5'-19'	Sand
	19'-23'	Water & Gravel

WELL LOG

U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH

LOCATION Ekwok House Well #6 for Duncan McCloud DATE STARTED Nov. 11, 1974

DATE COMPLETED Nov. 16, 1974

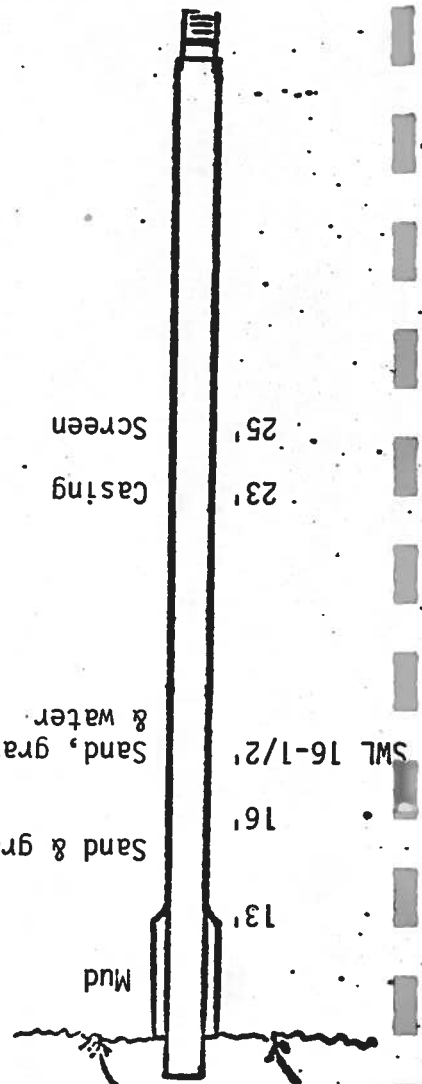
CREW Henry Horner

TOTAL DEPTH OF WELL 25 FT. CASING INSTALLED 23' DIAMETER 6"

GROUT -- SCREEN SIZE 30 MFG. Johnson LENGTH 5'

STATIC WATER LEVEL 16-1/2 HRS. PUMPED 8 @ 15 GPM DRAWDOWN 4 FT.

DEVELOPMENT PROCEDURES



SPECIAL NOTES:

WATER DATA FIELD TEST
TASTE
APPEARANCE FRESH
AFTER 24 HOURS IRON CHLORIDES
TDS ALKALINITY pH

DATE	DEPTH FROM - TO	FORMATION
	0'-13'	Mud
	13'-16'	Sand & Gravel
	16'-25'	Sand, Gravel & Water

P. O. Box 3118
St. Paul, Minn. 55165

Johnson Division
Universal Oil Products Co.
1950 Old Highway 8
Saint Paul, Minnesota

Sample taken by Well Driller (Alex Sheldon & Henry Horner)

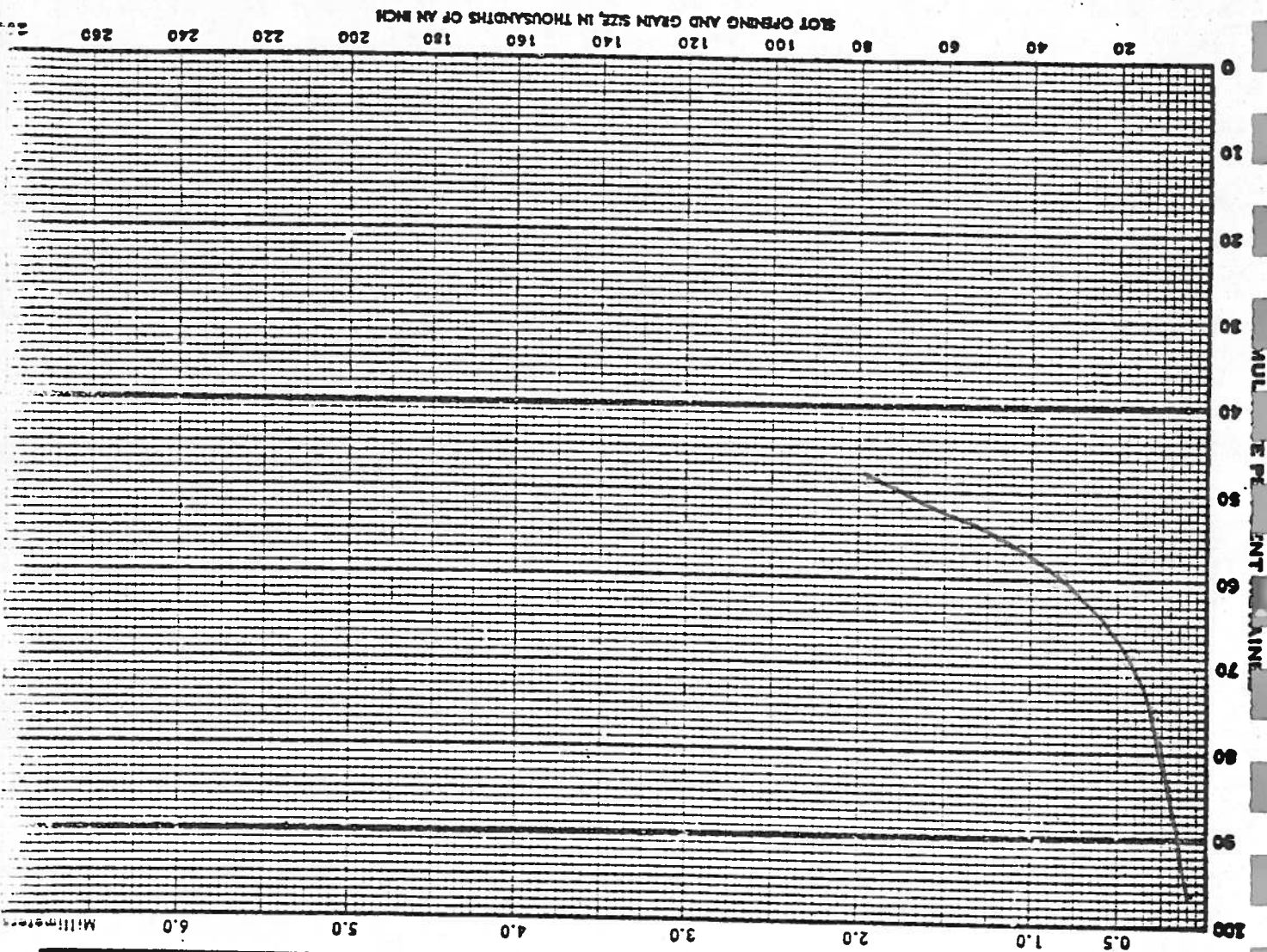
Town Ekwok

State Alaska

Date 9-27-74

From Well No. 2 - School Well

Remarks Sand Analysis performed in the field



SIEVE OPENINGS			
.250			
.187			
.150			
.125			
.106			
.085	121.7	121.7	47%
.075			
.063	39.6	161.3	62%
.053			
.043			
.033			
.023	9.0	170.3	65%
.016	10.2	180.4	69%
.012	17.7	198.1	76%
.006	37.6	235.7	90%
IN PAN	26.0	261.1	

261.1

Notes: Small slot screen installed because was on hand. Well supplied sufficient water to the school.

(transmitting capacity of screen is 75 gpm).

Recommended Slot Opening: Installed #30

Recommended Screen: Dia. 5 in. Length 5 ft.

was installed

By: Ken Harper

COST SUMMARY FOR EXPENSES

ASSOCIATED W/WELL DRILLING

IN THE VILLAGE OF EKWOK - FOR SCHOOL WELL

1. Drilling manhours costs; includes drilling, bailing, driving casing, setting screens, development, setting pumps, test pumping, abandonment, fishing tools.

DRILLING MH COST

\$12,821.54

2. Other manhour costs; includes travel time, standby time, site preparation, rig repair, loading and unloading equipment

OTHER MH COST

\$ 9,098.70

TOTAL MH COST

\$21,920.24

4. Travel expense; includes expenses associated with transportation of drilling crews,

TRAVEL EXPENSE

\$ 1,316.63

5. Cost to move rig; includes transportation costs for moving major well drilling items only

COST TO MOVE RIG

\$ 700.00

6. Supply purchases; purchase of all well supplies including transportation

SUPPLY PURCHASES

\$ 6,000.81

TOTAL COSTS

\$29,937.68

8. #Wells/Total Ft

3/221

9. Drilling Labor Cost/Ft

\$ 58.02

10. Total Cost/Ft

\$ 135.46

COST SUMMARY FOR EXPENSES

ASSOCIATED W/WELL DRILLING

IN THE VILLAGE OF EKWOK - FOR HOUSE WELLS

1. Drilling manhours costs; includes drilling, bailing, driving casing, setting screens, development, setting pumps, test pumping, abandonment, fishing tools.

DRILLING MH COST

\$4,776.94

2. Other manhour costs; includes travel time, standby time, site preparation, rig repair, loading and unloading equipment

OTHER MH COST

\$1,711.12

TOTAL MH COST

\$6,488.06

4. Travel expense; includes expenses associated with transportation of drilling crews.

TRAVEL EXPENSE

* See below

5. Cost to move rig; includes transportation costs for moving major well drilling items only

COST TO MOVE RIG

* See below

6. Supply purchases; purchase of all well supplies including transportation

SUPPLY PURCHASES

\$286.00

TOTAL COSTS

\$6,774.06

8. #Wells/Total FT

6/136

9. Drilling Labor Cost/Ft

\$35.12

10. Total Cost/Ft

\$49.81

- 4) Travel expense-covered under cost summary for school in Ekwok

- 5) Cost to move rig-covered under cost summary for school well in Ekwok

COST SUMMARY FOR EXPENSES

ASSOCIATED W/WELL DRILLING

IN THE VILLAGE OF EKWOK - BOTH SCHOOL & HOUSE WELLS

1. Drilling manhours costs; includes drilling, bailing, driving casing, setting screens, development, setting pumps, test pumping, abandonment, fishing tools.

2. Other manhour costs; includes travel time, standby time, site preparation, rig repair, loading and unloading equipment

OTHER MH COST

\$ 10,809.82

TOTAL MH COST

\$ 28,408.30

4. Travel expense; includes expenses associated with transportation of drilling crews.

TRAVEL EXPENSE

\$ 1,316.63

5. Cost to move rig; includes transportation costs for moving major well drilling items only

COST TO MOVE RIG

\$ 700.00

6. Supply purchases; purchase of all well supplies including transportation

SUPPLY PURCHASES

\$ 6,286.81

TOTAL COSTS

\$ 36,711.74

8. #Wells/Total FT

9/357

9. Drilling Labor Cost/Ft

\$ 49.29

10. Total Cost/Ft

\$ 102.83

EKWOK SCHOOL WELL

Dрил rig arrived from Aleknagik by barge July 23, 1974. The rig was moved from the beach to the school site by Clyde Baldwin with the help of village labor. Well no. 1 was started August 1, 1974. Water with strong sulfur smell was encountered at 35', continued drilling to 65'. Casting broke at 50'. Water at 35' will not produce 10 g.p.m., decided to abandon hole.

Drilling for well no. 2 began August 15, 1974. Drilled to and set casing at 75', with 16 3/8" hole perforations in casing at 51' to 55'. Discovered split in casing at 54', rocks coming in casing. Slipped in slotted casing which stopped large rocks from entering casing, however too much silt and sand still entering casing. Pushed No. 30 Johnson Well Screen to 54', could not drill below 58'. Open hole test pumping produced 15 g.p.m. with 23' drawdown with full recovery in 3 minutes. Moved drill rig to village house well locations October 1, 1974, drilled four wells. Returned to school well no. 2 October 28, 1974, started bailing hole and pumping water. Sand still coming in hole, pump plugging continuously. Will drill new hole later, returned to drilling village house wells November 9, 1974. The drill rig wintered at Ekwok and drilling on school well no. 3 started June 12, 1975. Drilled 81 feet and installed 80 feet of casing, with No. 20 Johnson Screen 5 feet long. Open hole test pumping for eight hours produced 20 g.p.m. with 17 feet drawdown and full recovery in 3 minutes. Well was completed July 4, 1975. This well is presently being used as the school's water source.

EKWOK HOUSE WELLS

On October 1, 1974 Alex Sheldon and Henry Horner moved drill rig from school well no. 2. The rig was set up and drilling started on village house well no. 1, for Mr. Sonny Nelson. The village requested drilling to stop at a depth of 35 feet. The IHS previously recommended utilizing the water at the 75 foot level, realizing that the water at 35 feet may be insufficient and/or disappears during winter. The IHS also recommended one well for groups of three or four houses. House well no. 1 was drilled and cased at a depth of 37 feet. A No. 30 Johnson Well Screen, 2 feet long, was installed. Open hole test pumping produced 5 g.p.m., well was completed October 7, 1974.

Drilling for village house well no. 2 for Philip Akeikok started October 8, 1974. Sheldon and Horner drilled to a depth of 20 feet and 19 feet of thin wall pre-slotted casing was installed. Water was reached at 15 feet. Well was completed by Horner October 16, 1974. Alex Sheldon returned to Anchorage October 14, 1974 for a new job assignment.

Henry Horner started drilling house well no. 3 for Alex Nelson, Sr. on October 16, 1974. Henry drilled 20 feet and installing 20 feet of thin wall pre-slotted casing. Water was reached at 15 feet. Open hole test pumping produced 5 g.p.m. Well was completed October 20, 1974. Well No. 4 for Billy Hurley started October 21, and casing was installed 15 ft. Henry cut slots in 6" casing with torch, for Massillie Nicholas October 23, 1974, drilled 22 ft. Water at 19 feet slots were cut in 6" casing and installed to a depth of 23 feet 9 inches. Well No. 5 was completed October 26, 1974.

Horner returned to working on school well no. 2 October 28 thru November 8. After bailing and pumping effort, school well no. 2 was abandoned.

Henry returned to village wells and started drilling house well No. 6 for Duncan McCloud on November 11, 1974. Well was drilled to 25 feet with casing set to 23 feet. A 5' long no. 30 Johnson Well Screen was used. Open hole test pumping for eight hours produced 15 g.p.m., with a drawdown of a foot. Completed well on November 16, 1974.