PERMUTIT. CO. DIV. OF SYBRON CORP
101 N. 33 RD. PHILA.
MR. STAUFFER -OF- AMERICK. PA.

CHLORIDE INTRUSION

ION EXCHANGERS

BA-2-1600

WELL SPECS.
PUMP 220' D.P.
265' W.D.
37. G.P.M.

CHLORIDE 105 P.P.M.

A. A. GRAY
P.O. BOX 17
DEER ISLE. ME.
04627

MR. J. G. SPETH
STAFF ATTORNEY
NATURAL RESOURCES DEFENSE COUNCIL
WASHINGTON, D.C.
202 - 387 - 2855.

Date 9/23/72

MEMO TO: Mr. & Mrs. Brainard Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C . D. Snead, Jr.

FROM: ~~R. C. Flow~~ J.H. Gray

SUBJECT: Chloride Content of Water from Callahan well.

Date	SAMPLE TAKEN FROM	Chlorides p.p.m.
9/23/72	Callahan New Well	5
9/23/72	Farnham Tap	5

Date September 10, 1972

MEMO TO: Mr. & Mrs. Brainard Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C. D. Snead, Jr.

FROM: R. C. Flow

SUBJECT: Chloride Content of Water from Callahan well.

Date	SAMPLE TAKEN FROM	Chlorides p.p.m.
9/10	Callahan New Well	5
9/9	Farnham Tap	5

Date ~~September 5, 1972~~

MEMO TO: Mr. & Mrs. Brainard Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C. D. Snead, Jr.

FROM: ~~R. G. Flow~~ S. H. Gray

SUBJECT: Chloride Content of Water from Callahan well.

Date	SAMPLE TAKEN FROM	Chlorides p.p.m.
9/5	~~Callahan New Well~~	5
9/5	~~Farnham Tap~~	5

July 30th, 1973

Mr. Frederick M. Beck
Callahan Mining Corporation
41 Union Wharf
Portland, Maine 04111

Dear Fred:

Thank you for reporting last week as to the recent tests of the various wells in Harborside. I request that you let all parties knew as soon as the current tests are complete. These tests should be as complete as possible, so that we all know what the current situation is as to the possibility of using any of the wells.

I hope that all of them continue to show a reduction in minerals, especially salt, and that they are found to be satisfactory for general use.

Of course, Arnold Veague and I have been awaiting the opportunity of discussing the entire situation, especially plans for the future with Charles Snead. Do you know if he expects to be in Maine or not?

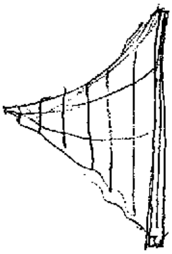
Please keep me fully informed and let me know when the next tests are received, which should be done within the next two weeks.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Arnold L. Veague, Esq.
Albert E. Sandecki



✓ BRECK — LIMITATION

✓

10 AM - 25 JULY 72

DEPT. HEALTH + WELFARE

AUGUSTA 1-289-2727

155-1212.

CHECK FOR 2ND

TIRES OF STATE

PUB HEALTH LAB.

AUGUSTA. 04330

RICK BOSTIC

* ATTORNEY'S FUND *

Savings account opened on
September 10th 1970 at the
Penobscot Savings Bank

ACCT # 38434

Total deposited... $ 213.50
Approx interest....$ 25.00
Total to Aug.1972. $ 238.50

1971 Bills
1972 - NOT COMPLETED

Total - $34.96

May thru Aug. 1971

N. J. Bell

Date	Place	Area - No.	Amt.
5-4	Dun Dun	207-348-2881	2.80
6-1	Dun Dale	207-348-2881	1.00
? 6-11	Blue Hill	207-374-5643	7.30

New England Tel

6-4	Gray	207-657-3777	.55
6-4	Augusta	622-3101	1.95
6-7	Dun Dale	348-2881	.20
6-8	Dun Dale	348-2881	.48
6-24	" "	"	.62
6-29	" "	"	.76
6-29	Portland	207-772-3789	.55
6-29	Dun Dale	348-2881	.20
7-3	Dun Dale	" "	.69
7-13	" "	" "	.27
7-15	Portland	207-772-3789	2.53
7-16	Gray	207-657-3777	.55
7-16	"	"	1.35

(Cont.)

New England Tel

Date	Place	Area Number	Cent
7-19	Bar Isle	207-348-2881	.20
7-19	"	347-6670	.48
7-27	Portland	772-3789	.91
7-30	Gray	657-3777	1.95
7-31	Bar Isle	348-6670	.34
8-6	Portland	772-3789	.55
8-11	Bar Isle	348-2881	.41
8-11	Brunswick	729-0126	.50
8-11	Ellsworth	667-2525	.30
8-13	Bar Isle	348-2881	.20
8-13	Ellsworth	667-8663	.30
8-13	"	667-8212	.30
8-16	"	"	.50
8-16	Bar Isle	348-2881	.41
8-18	"	"	.76
8-18	New York	212-826-2950	3.20
8-20	Augusta	207-289-2291	.45
8-25	Bar Isle	348-2881	.20
8-26	"	"	.20

TOTAL PHONE BILLS CONCERNING
WATER SITUATION BETWEEN
MAY & AUGUST 1971 = $ 33.75
AUGUST 1971 - AUGUST 1972. APPROX FIGURE 60.00

33.75 – EXACT
60.00 – EST.
93.75
8.00 POSTAGE APPROX.
101.75 APPROX EXPENDITURE TO DATE AUG 1972

3:30 PM WEDNESDAY

INFO ON OBTAINING FEDERAL MONEY FOR BASIC RESEARCH EQUIPMENT. FOR N.S.S.F. PERK & ELMER 403 45,000 WITH PLUMBING - TO MONITOR IMPOUNDED WATERS AT CALLAHAN MINE-SITE. DR. CAWLEY - FDRA.

ECOLOGICAL SOCIETY OF AMERICA

P.O. BOX 6697

COLLEGE STATION

DURHAM.

NORTH CAROLINA.

27708.

~~MARGARET SMITH (ATTORNEY)~~

215 LO 4 3921

MRS. ANDERSON

WED. 3:30 PM - SEPT. 22.

WELL WATER PROBLEM.

DR. RUTH PATRICK:

SUGGESTED.

MR. GUS SPETH.
WASHINGTON, D.C.
(ECOLOGICAL SOCIETY OF AMERICA)
FORD FOUNDATION GRANTS.
(CHARGES FOR EXPENSES ONLY)

DR. PATRICK HOME PHONE:
215 233 0941

Piedmont Mineral Associates:

Surface drilling work at Piedmont Mineral Associates, the partnership of Callahan and The New Jersey Zinc Company in Central Virginia, continues to expand zinc-copper mineralization on one of the partnership properties. Funds have been authorized for further drilling and for underground work at the property to test the continuity of mineralization and obtain bulk metallurgical samples. Callahan is project manager and has a 49% interest requiring specified contributions over the first three years of the partnership.

Manufacturing:

Aggregate manufacturing profits rose 7% over the first quarter of 1973. Sales of The Flexaust Company were at a record level but profits were down due to higher material costs. Price increases to be instituted shortly are expected to improve results. As previously reported, Pathway Bellows, Inc. was awarded a second five-year program early in the year totalling $2,000,000 from Union Carbide Corporation for the manufacture of expansion joints for nuclear fuel enrichment plants. Pathway's profits were up substantially from the year ago quarter on record sales volume.

Arctic Natural Gas and Oil:

In the Canadian Arctic Islands, the deep drilling test of potential hydrocarbon structures at Drake Point on Melville Island was terminated in early March at 17,766 feet near maximum rig depth and the test was completed as a gas well in the upper Drake Point gas zone encountered early in the drilling. As reported in our 1973 annual report, a 2% gross overriding royalty was acquired in January on some 1,300,000 acres of permit lands in the southeast sector of Banks Island by Callahan and its 80% owned subsidiary, Pinnacle Exploration, Inc.

Dividend:

On April 8, 1974, the Board of Directors declared a cash dividend of 15¢ per share and a 2% stock dividend both payable June 5, 1974 to shareholders of record May 8, 1974.

CHARLES D. SNEAD, JR.
President

April 30, 1974

CALLAHAN MINING
CORPORATION

First Quarter Report

MARCH 31, 1974

277 PARK AVENUE, NEW YORK, N.Y. 10017

DIVISIONS AND SUBSIDIARIES

The Flexaust Company

Pathway Bellows, Inc.

Pinnacle Exploration, Inc.

To Our Shareholders:

Consolidated net income for the first quarter of 1974 was at an all-time high of $953,000, or 28¢ a share, as compared with $429,000, or 12¢ a share, for the first three months of 1973. In each quarter, income included 2¢ a share from non-recurring transactions.

Silver:

Record silver prices increased revenue from the Galena Mine in Idaho for the first quarter to $1,318,000 up from $433,000 for the first three months of 1973, despite a mill shutdown of nearly two weeks in January due to tailings pond damage from severe floods in the Northwest. 44,134 tons of ore with a grade of 20 ounces of silver were milled during the quarter as compared to 46,845 tons with a grade of 20.8 ounces milled during the initial quarter of 1973. The average silver price on first quarter 1974 smelter settlements equaled $4.47 per ounce as compared to $2.13 per ounce for the comparable period of 1973.

At the Coeur Project, which adjoins the Galena Mine to the west and in which Callahan has a 5% interest, American Smelting and Refining Company, the operator, has announced that feasibility studies for construction of a 450 ton a day mill are underway after settlement of differences with the property owner, Coeur d'Alene Mines Corporation.

Consolidated Statements of Income (Unaudited)

	(000's omitted) 3 Months to March 31	
	1974	1973
Revenues:		
Net sales-manufacturing	$2,476	$1,946
Galena Mine	1,318	433
Interest and other income	251	260
	4,045	2,639
Costs and expenses:		
Manufacturing	2,052	1,555
Exploration, engineering and other mineral expenses	222	71
	2,274	1,626
Income before corporate expenses	1,771	1,013
Corporate	224	234
	1,547	779
Federal and state income taxes	594	350
Net Income	$ 953	$ 429
Per share of capital stock (a), (b)	$ .28	$ .12
Average number of shares outstanding (b)	3,465	3,466

(a) Includes non-recurring gains of 2¢ per share in each quarter.
(b) Adjusted for 2% stock dividend declared April 8, 1974.

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

SE-1 Rev. 8-66

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

[redacted] Number _____ Date of Collection _____ Time of Collection _____

[redacted]rce of Water ☐ Well, ☐ Spring, ☒ Other _____ Located on Property of _____

Well or spring, how lined? ☐ rock, ☐ concrete, ☐ tile, ☐ other _____ How covered? ☐ boards, ☐ concrete, ☐ other _____ Is top elevated above ground? ☒ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name Richard L. Farrell

Street or RFD _____

Post Office _____ Zip Code

Kind of pipe used ☒ plastic ☐ galvanized ☒ copper ☐ other _____

Length 60 ft.

If a well, was it ☐ dug, ☐ driven, ☐ drilled?

How long ago? _____

Depth? _____

Distance from nearest privy _____ ft.; stable _____ ft.; barnyard _____ ft.; sinkdrain 150 ft.; public or private sewer _____ ft.; septic tank and laterals 150 ft.; garden _____ ft.; manure pile _____ ft.; cesspool _____ ft.; other _____ ft. Nature of soil ☒ clay ☐ sand ☐ gravel ☐ other _____ Does the water have an unpleasant odor or taste? ☐ Yes ☒ No How is water drawn ☐ pail ☒ faucet ☐ other _____

Method of purification ☐ boiling ☐ chlorination ☐ other _____ Is water used by city or town? ☐ Yes ☒ No

If yes, give name of water company _____ Any change to supply since last analysis? ☐ Yes ☒ No If Yes, what? _____ Is water used by a ☐ School ☐ Private Home ☐ VA ☐ FHA ☐ Other _____ or by a licensed establishment such as:

☐ Boarding Home ☒ Eating Place ☒ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls') ☐ Nursing Home ☐ Other _____ Located in city or town of _____

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 348168 Date FEB 22 1967

☒ SATISFACTORY ☐ QUESTIONABLE ☐ UNSATISFACTORY

(Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☐ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☐ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☐ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. ☐ _____

[redacted]ision of Sanitary Engineering

CUSHING WELL.

AUG 26 1968

SE-1 Rev. 3-66

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number W-37 Date of Collection August 26, 1968 Time of Collection 9:15 AM

Source of Water ☑ Well, ☐ Spring, ☐ Other _____ Located on Property of Elliot Cushing

Well or spring, how lined? ☑ rock, ☐ concrete, ☐ tile, ☐ other _____ How covered? ☑ boards, ☐ concrete, ☐ other _____ Is top elevated above ground? ☐ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name Callahan Mining Corporation

Street or RFD _____

Post Office Harborside, Me 04642 Zip Code

Kind of pipe used ☑ plastic ☐ galvanized ☐ copper ☐ other _____

Length 80 ft.

If a well, was it ☑ dug, ☐ driven, ☐ drilled?

How long ago? 55 years

Depth? 14½ ft.

Distance from nearest privy _____ ft.; stable _____ ft.; barnyard _____ ft.; sinkdrain 100 ft.; public or private sewer _____ ft.; septic tank and laterals 150 ft.; garden 50 ft.; manure pile _____ ft.; cesspool _____ ft.; other _____ ft. Nature of soil ☑ clay ☐ sand ☐ gravel ☐ other _____ Does the water have an unpleasant odor or taste? ☐ Yes ☑ No How is water drawn ☐ pail ☑ faucet ☐ other _____

Method of purification ☐ boiling ☐ chlorination ☐ other NONE Is water used by city or town? ☐ Yes ☑ No

If yes, give name of water company (THEY DON'T DRINK THIS WATER) Any change to supply since last analysis? ☐ Yes ☑ No If Yes, what? _____ Is water used by a ☐ School ☐ Private Home ☐ VA ☐ FHA ☐ Other _____ or by a licensed establishment such as:

☐ Boarding Home ☐ Eating Place ☐ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls') ☐ Nursing Home ☐ Other _____ Located in city or town of Harborside, Maine

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 368227 Date SEP 6 1968

☐ SATISFACTORY ☒ QUESTIONABLE ☐ UNSATISFACTORY

(Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☒ The bacteriological examination showed the presence of a ☐ small, ☒ large, number of dangerous bacteria (Coliform Group).
2. ☒ ~~The water is probably naturally good but not~~ the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☒ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☒ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☒ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See ... paragraph on reverse side.)
12. ☐ _____

SEP 1968 RECEIVED CALLAHAN MINING CORP. HARBORSIDE, ME.

Division of Sanitary Engineering

(FIRST TEST NEW WELL)

AUG 1 1968

SE-1 Rev. 9/65

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number 197 Date of Collection Aug 2 1968 Time of Collection 2:30 P.M.

Source of Water ☐ Well, ☐ Spring, ☒ Other Drilled Well Located on Property of Bernard L. Farnham

Well or spring, how lined? ☒ rock, ☐ concrete, ☐ ., ☐ other _____ How covered? ☐ boards, ☐ concrete, ☒ other Metal Cap Is top elevated above ground? ☒ Yes, ☐ No

FILL IN BOX WITH NAME & ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name MARIAN A FARNHAM

Street or RFD _____

Post Office HARBORSIDE State MAINE 04642 Zip Code

Kind of pipe used ☐ plastic ☐ galvanized ☒ copper ☐ lead ☐ other _____

Length 30 ft.

If a well, was it ☐ dug, ☐ driven, ☒ drilled?

How long ago? 2 weeks

Depth? 300 ft.

Distance from nearest privy None ft.; stable None ft.; barnyard None ft.; sinkdrain None ft.; public or private sewer None ft.; septic tank & laterals 40 ft.; garden None ft.; manure pile None ft.; cesspool None ft.; other None ft. Nature of soil ☒ clay ☐ sand ☐ gravel ☐ other _____ Does the water have an unpleasant odor or taste? ☐ Yes ☒ No How is water drawn ☐ pail ☒ faucet ☐ other _____

Method of purification ☐ boiling ☐ chlorination ☐ other None Is water used by city or town? ☐ Yes ☒ No

If yes, give name of water company _____ Any change to supply since last analysis? ☐ Yes ☐ No If Yes what? First analysis Is water used by a ☐ School ☐ Private home ☐ Other _____ or by a licensed establishment such as:

☐ Boarding Home ☒ Eating Place ☒ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' & Girls') ☐ Nursing Home Located in city or town of Stonington

DO NOT WRITE BELOW THIS LINE

Serial Number 367014

WATER ANALYSIS REPORT

Date AUG 14 1968

☒ Satisfactory X

☐ Questionable (Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.)

☐ Unsatisfactory (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria. (Coliform Group)
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. After the supply is protected, another sample may be submitted for analysis. Carefully follow directions to prevent contamination of the sample. (See paragraph No. 2 on enclosed form SE-1A)
3. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
4. ☒ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
5. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
6. ☐ Location and removal of the sources of pollution, listed in 1, 4 and/or 5, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
7. ☐ Locating and removing the sources of pollution, listed in 4 and/or 5, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
8. ☐ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☐ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
9. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
10. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on enclosed form SE-1A)
11. ☒ Because this well is indicated by you to be nearer to your septic tank and laterals than we recommend, you should be aware of the fact that this water may not remain at its present satisfactory quality in the future.

[signature], Director
Division of Sanitary Engineering

SUPPLEMENTAL EXPLANATION OF REPORT

4. The well or spring should be protected by providing a good water-tight cover and wall, constructed preferably of concrete, in the manner shown below this report. A properly designed pump or overflow pipe should be installed in such a manner that no waste water can possibly flow back into the water supply. After proper protection has been provided, a safe water should be obtained from this source. Just before finally sealing the cover the water should be sterilized to eliminate any bacteria which may have been introduced into the source of supply either before or during the construction process.

LEAD — Any water used for drinking or culinary purposes which is conducted through a lead pipe, or a pipe containing lead, is dangerous to use, irrespective of whether or not the sample tested shows the presence of lead. We do not approve nor recommend the use of water for drinking or culinary purposes which is conducted through a lead pipe or pipe containing lead. All such pipe should be removed at once, and replaced by plastic, or other corrosion resistant alloy pipe, cement-lined pipe, galvanized wrought iron, galvanized steel, or similar type pipes.

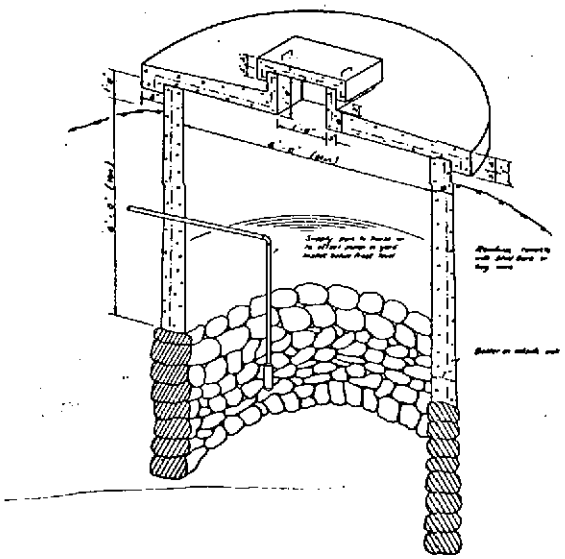
COPPER — Copper pipe or tubing is unsuited for conveying water from the source since many of our ground waters are soft and cause excessive corrosion of this metal. Copper corrosion tends to cause green stains which are apt to color porcelain fixtures and "blue-water" may result on the addition of soap or detergent. A bitter taste may be imparted to the water due to the dissolved copper. For these reasons we suggest the use of plastic, cement-lined, galvanized iron or steel or similar type pipes.

DIRECTIONS FOR THE TEMPORARY DISINFECTION OF A DOMESTIC WATER SUPPLY

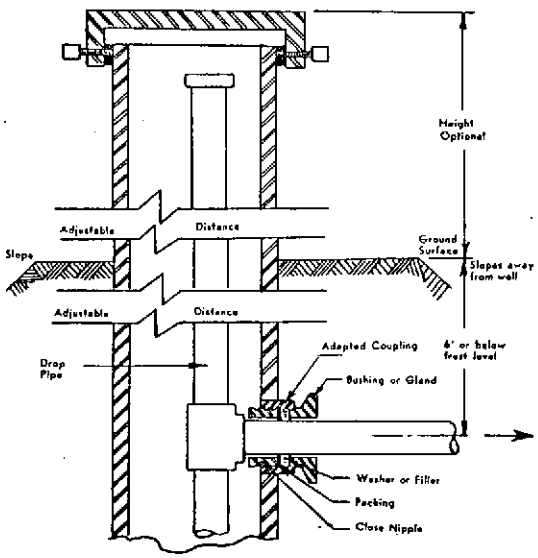
Temporary disinfection of a domestic water supply is for the purpose of eliminating bacteria that may have been introduced into the water supply because of inadequate covers, or lack of other necessary protection or during the process of repairing, construction or remodeling the source of supply.

This sterilization may be accomplished by thoroughly mixing about two quarts of bleach water, Clorox, Dazzle, or similar product, obtained at grocery or hardware stores, in a pail of water, pour this solution into the well, spring, reservoir, or cistern and then stir the water, if possible, so as to thoroughly mix the disinfectant in the water supply. Allow the mixture to stand a few hours and then pump it out through the entire water system, opening all the various faucets, sill-cocks, and similar outlets, until the water is free from odor or taste of chlorine.

DUG WELL - WITH MANHOLE

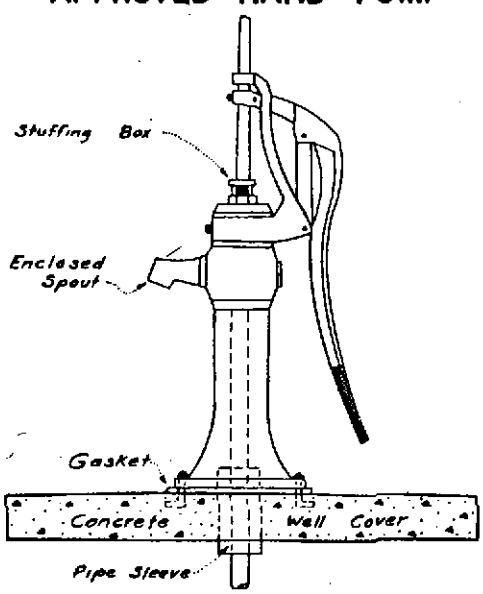


DRILLED WELL — SANITARY PUMP CONNECTION
SHALLOW WELL OR SUBMERGED PUMP

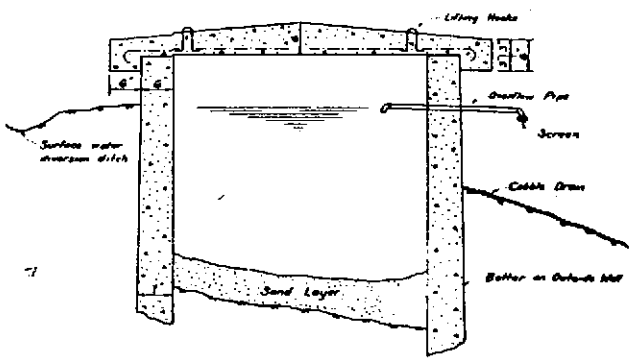


Drawing not to scale

APPROVED HAND PUMP



SPRING



(2ND TEST NEW WELL)

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

SE-1 Rev. 3-63

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number ____ Date of Collection 5/1968 Time of Collection 1:45 PM
Source of Water ☐ Well, ☐ Spring, ☒ Other Faucet Located on Property of [illegible]
Well or spring, how lined? ☐ rock, ☐ concrete, ☐ tile, ☐ other ____ How covered? ☐ boards, ☐ concrete, ☐ other [illegible] Is top elevated above ground? ☑ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name Marian A Farnham
Street or RFD ____
Post Office Harborside, Maine 04642 Zip Code

Kind of pipe used ☑ plastic ☐ galvanized ☑ copper ☐ other ____
Length 30 ft.
If a well, was it ☐ dug, ☐ driven, ☑ drilled?
How long ago? about 4 months
Depth? 300 ft.

Distance from: nearest privy None ft.; stable None ft.; barnyard None ft.; sinkdrain None ft.; public or private sewer ____ ft.; septic tank and laterals 65 ft.; garden 70 ft.; manure pile None ft.; cesspool None ft.; other None ft. Nature of soil ☑ clay ☐ sand ☐ gravel ☐ other ____ Does the water have an unpleasant odor or taste? ☑ Yes ☐ No How is water drawn ☐ pail ☑ faucet ☐ other ____
Method of purification ☐ boiling ☐ chlorination ☐ other None Is water used by city or town? ☐ Yes ☑ No
If yes, give name of water company ____ Any change to supply since last analysis? ☐ Yes ☑ No If Yes, what? ____ Is water used by a ☐ School ☐ Private Home ☐ VA ☐ FHA ☐ Other ____ or by a licensed establishment such as:
☐ Boarding Home ☑ Eating Place ☑ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls') ☐ Nursing Home ☐ Other ____ Located in city or town of Brooksville

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 371345 Date DEC 18 1968

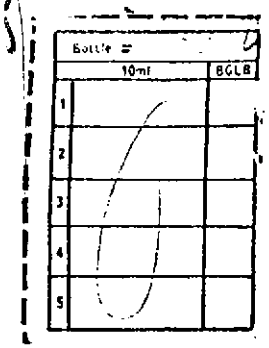
☐ SATISFACTORY ☐ QUESTIONABLE (Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) ☒ UNSATISFACTORY (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☒ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☒ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☒ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. ☐ XX Unsatisfactory due to high chloride content. 750. P.P.M.

Division of Sanitary Engineering

BACTERIA



6

PARTS PER MILLION

Serial No. 371345
Start of Analysis DEC 2 1963
Bottle No. T53
Sequence No. 21
Truck No. 2

TURBIDITY

RESULTS 0

COLOR

RESULTS 0

NITRITES

RESULTS .015

FREE AMMONIA

RESULTS .01

ALBUM.AMM

RESULTS .012

SEDIMENT and ODOR

0 0

NITRATES

RESULTS .015

pH

RESULTS 7.8

CHLORIDES

Result 750.

HARDNESS

Result 310.

COPPER

Result 2

IRON

RESULTS 0

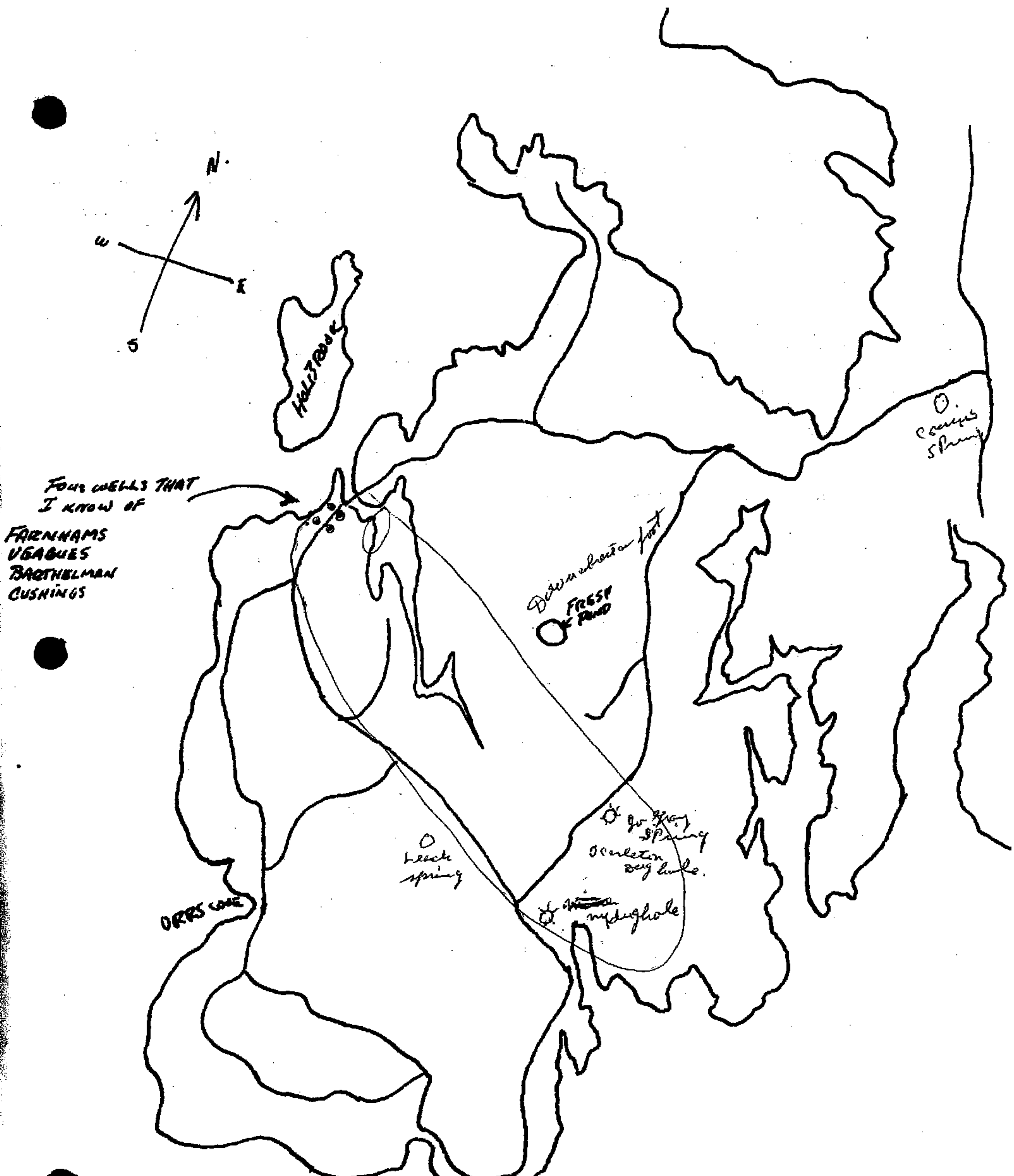
MANGANESE

RESULTS 0

RESULTS

RESULTS

RESULTS



All ways that area circled was on the same vein of water

See other side

I have only heard holes ive marked went dry, guess they did tho. any dry hole here went away down to almost a suck, then suddenly filled full up - dont know why unless Blasting shook up something somewhere. I understand most wells etc up town are dry or very low. Spring at indian Bar is very low, I never knew it to stay this low for so long. We have had two rains about 1" each which didnt do any good so far as I can see

Of course this drought has had its effects also this the Blasting has not been helpful.

Reading your letter first time that you called muskly or Polecat, reading again this morning find you said Polack.

Someone got a fair sized Boat stuck on Room 9 Ledges then he dropped dead in the Cabin.

Little else is now

Fg

3RD TEST
NEW WELL

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

SE-1 Rev. 3-66

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Sample Number V 11 Date of Collection Dec 27, 1968 Time of Collection 11:35 A.M.
Source of Water ☒ Well, ☐ Spring, ☐ Other Drilled Located on Property of Brainard L. Farnham
Well or spring, how lined? ☒ rock, ☐ concrete, ☐ tile, ☐ other _____ How covered? ☐ boards, ☐ concrete, ☒ other metal cap Is top elevated above ground? ☒ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name MARIAN A FARNHAM
Street or RFD _____
Post Office HARBORSIDE, MAINE 04642
Zip Code

Kind of pipe used ☒ plastic ☐ galvanized ☒ copper ☐ other _____
Length 30 ft.
If a well, was it ☐ dug, ☐ driven, ☒ drilled?
How long ago? 5 months!
Depth? 300 ft

Distance from nearest privy none ft.; stable none ft.; barnyard none ft.; sinkdrain none ft.; public or private sewer none ft.; septic tank and laterals 65 ft.; garden 70 ft.; manure pile none ft.; cesspool none ft.; other _____ ft. Nature of soil ☒ clay ☐ sand ☐ gravel ☐ other _____ Does the water have an unpleasant odor or taste? ☒ Yes ☐ No How is water drawn ☐ pail ☒ faucet ☐ other _____
Method of purification ☐ boiling ☐ chlorination ☐ other none Is water used by city or town? ☐ Yes ☒ No
If yes, give name of water company _____ Any change to supply since last analysis? ☒ Yes ☐ No If Yes, what? Pump raised 100 ft in well. Is water used by a ☐ School ☐ Private Home ☐ VA ☐ FHA ☐ Other _____ or by a licensed establishment such as:
☐ Boarding Home ☒ Eating Place ☒ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls') ☐ Nursing Home ☐ Other _____ Located in city or town of Brooksville.

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 371716 Date JAN 6 1969

☒ SATISFACTORY ☐ QUESTIONABLE (Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) ☐ UNSATISFACTORY (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

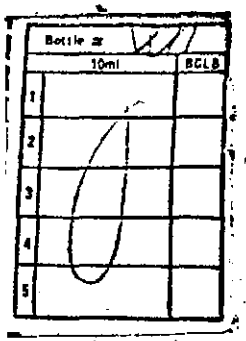
1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☒ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☐ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☐ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. ☐ _____

Division of Sanitary Engineering

COLIFORM BACTERIA

RESULTS IN

PARTS PER MILLION



Serial No. 371716

Start of Analysis DEC 28 1968

Bottle No. VII

Sequence No. 17

Truck No. 8

TURBIDITY

RESULTS 0

COLOR

RESULTS 0

NITRITES

RESULTS T

FREE AMMONIA

RESULTS 0

ALBUM. AMMON

RESULTS .002

SEDIMENT and ODOR

0 0

NITRATES

RESULTS .12

pH

Result 6.9

CHLORIDES

RESULTS 80.

HARDNESS

Result 126.

COPPER

T

IRON

RESULTS

MANGANESE

RESULTS

RESULTS

RESULTS

RESULTS

4TH TEST
NEW WELL

APR 2 1969
SE-1 Rev. 3-66

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number [illegible] Date of Collection [illegible] 4, 1969 Time of Collection 10:15 A.M.
Source of Water ☑ Well, ☐ Spring, ☐ Other [illegible] Located on Property of [illegible]
Well or spring, how lined? ☐ rock, ☐ concrete, ☐ tile, ☐ other ______ How covered? ☐ boards, ☐ concrete,
☑ other [illegible] Is top elevated above ground? ☑ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name MARIAN A FARNHAM
Street or RFD ______
Post Office HARBORSIDE, MAINE 04642
Zip Code

Kind of pipe used ☑ plastic ☐ galvanized ☐ copper ☐ other ______
Length 30 ft.
If a well, was it ☐ dug, ☐ driven, ☑ drilled?
How long ago? [illegible]
Depth? 300 ft

Distance from nearest privy None ft.; stable None ft.; barnyard None ft.; sinkdrain None ft.; public or private sewer None ft.; septic tank and laterals 45 ft.; garden 70 ft.; manure pile None ft.; cesspool None ft.; other ______ ft. Nature of soil ☑ clay ☐ sand ☐ gravel ☐ other ______ Does the water have an unpleasant odor or taste? ☑ Yes ☐ No How is water drawn ☐ pail ☑ faucet ☐ other ______
Method of purification ☐ boiling ☐ chlorination ☐ other None Is water used by city or town? ☐ Yes ☑ No
If yes, give name of water company ______ Any change to supply since last analysis?
☐ Yes ☐ No If Yes, what? ______ Is water used by a ☐ School ☐ Private Home
☐ VA ☐ FHA ☐ Other ______ or by a licensed establishment such as:
☐ Boarding Home ☐ Eating Place ☐ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls')
☐ Nursing Home ☐ Other ______ Located in city or town of Brooksville

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 373262 Date APR 11 1969

☐ SATISFACTORY ☐ QUESTIONABLE ☒ UNSATISFACTORY

(Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) (Indicates continuing unsafe conditions.)

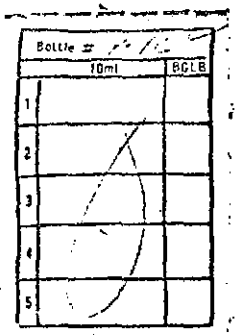
An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☒ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☒ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☒ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. ☑ XX Unsatisfactory due to high chloride content. 360. P.P.M.
This sample is unsatisfactory. See #5 Need of [illegible]
[illegible]

COLIFORM BACTERIA

RESULTS IN

PARTS PER MILLION



Serial No. 373262

Start of Analysis APR 5 1969

Bottle No. H16 Apr

Sequence No. 6

Truck No. 2

TURBIDITY

RESULTS 0

COLOR

RESULTS 0

NITRITES

RESULTS .018

FREE AMMONIA

RESULTS .002

ALBUM. AMMON

RESULTS .008

SEDIMENT and ODOR

60

NITRATES

RESULTS .01

pH

RESULTS 7.6

CHLORIDES

Result 360.

HARDNESS

Result 246.

COPPER

Result

IRON

RESULTS

MANGANESE

RESULTS

RESULTS

RESULTS

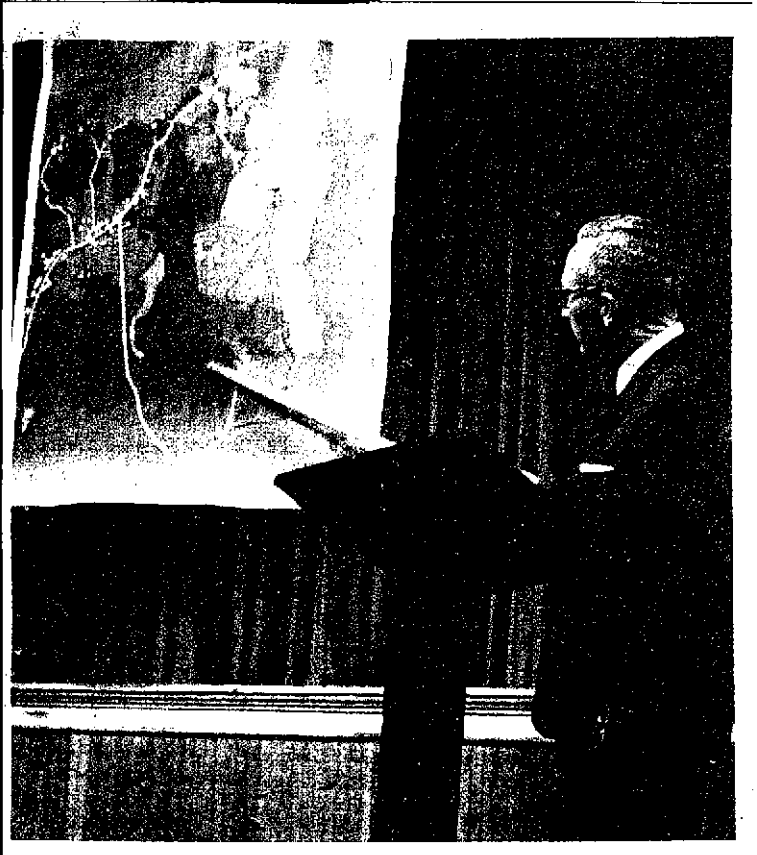
RESULTS

Callahan announces open pit mine in Harborside; to yield copper, zinc

BROOKSVILLE--A payroll of 60 to 70 persons and a $1 million-a-year boost to Brooksville and the area's economy in wages, goods and services are envisioned if Callahan Mining Corporation is successful in developing a 400-ton-a-day zinc-copper mine on Cape Rosier.

These, and other benefits, were outlined by Callahan officials at a special public meeting in the South Brooksville Municipal building Friday night.

More than 150 people were present to hear the president and a vice-president of the company describe the mining operation, its benefits, and call on townspeople and others to help them in bringing the mine into operation.



JACK JAMES, Callahan vice-president in charge of natural resource activities, explains the proposed mine at Harborside at a public meeting in South Brooksville.--Packet photo.

CALLING FOR support of local people, particularly in passing legislation authorizing temporary draining of Goose Pond at Goose Falls, Joseph T. Hall, president of the company, also asked that persons favoring the mine help persuade those opposed to join and "help us find ways for us to be as good citizens as we can."

The legislation will be considered at the special session of the Maine Legislature convening Monday. Co-sponsored by State Rep. Gordon Richardson, Stonington, the bill would allow the draining of the tidal pond. The bill has no provisions for taking of land, said Charles Snead, attorney for the company.

"We want to drain the pond," Hall said. "Some (state agencies) feel present statutes are adequate, but we want to be absolutely sure so we are asking for the bill in the special session."

JACK JAMES, Callahan vice-president, explained the proposed open pit mining installation.

The main ore body lies below Goose Pond at Harborside, meaning the pond must be drained in order to reach the ore. It has been determined, he said in answer to a question, that an open pit operation was the only practical method of removing the ore.

Under Callahan's plan, the pond would be dammed at both the inlet and tidal outlet. The pit, located on the western shore, would eventually reach 600 feet in diameter and would be 300 feet deep.

Waste, that is rock not containing ore, would be trucked on the west side of the pond behind a hill so it would be hidden from view.

THE MILL and concentrator would also be located behind the hill so it would not be visible from the coast.

Ore would be transported to the mill by truck.

Since dust is very destructive to the machinery involved, all roads would be kept well maintained and watered to eliminate dust, James said.

The mill would consist of a series of crushers which would reduce the ore to the consistency of corn meal. The ore would then be fed to the flotation section where chemicals would be added to float off the valuable minerals (copper and zinc concentrates) with the waste (tailings) being transported behind the hill.

"THERE WOULD be no pollution or contamination," James said. Constant checks would be made to see that there was no pollution in the waste water. He said the Maine Department of Sea and Shore Fisheries had reviewed their pollution control and given their approval.

The mill would have a capacity of about 400 tons a day and would produce 20 to 22,000 tons of concentrates a year.

PERRY SMITH, Brooksville, speaks in favor of the mine declaring opposition to the mine isn't doing the town any good.--Packet photo.

No decision has been made as yet as to how the concentrates would be shipped.

JAMES SAID the installation would cost over $2,000,000. Except for the technical staff of five or six people, all of the 60 to 70 work force would be obtained locally, if possible.

"The workers would need normal skills that are already found in this area," James said. "We will need drillers, shovel operators, truck, grader and bulldozer drivers, mill workers, mechanics, welders, electricians, plumbers, clerks, typists, security guards."

Asked by Jack Wiggins, Brooklin, what the expected life of the mine was, James replied they did not know. "We have sufficient ore to start an operation and keep it going more than seven or eight years. How much more depends on future exploration which is still being carried out in the area."

WHEN ALL the ore is removed from the pit, he said, the dams would be removed and Goose Pond flooded and returned to its original state.

"It will be just like it was except for a new, small, cove at one edge of the pond," he said.

He added that Callahan was determined to be as unobtrusive as possible, and to cause as little damage as possible.

"We have checked with wildlife experts, and the Maine Department of Inland Fisheries and Game," he said. They say the mine will have no adverse effect on wildlife.

SOME OPPOSITION to the mine was evidenced during the question and answer period, but applause indicated the crowd at the meeting was strongly pro-mine.

Brainard Farnham, whose prop-

(Turn to MINE on page 6)

MORE ABOUT:

Mine

(Continued from page 1)

erty adjoins the Callahan location, was the chief vocal opponent.

Damming up the pond, he said, would ruin one of the best winter harbors along the coast, since it would then freeze up like the rest.

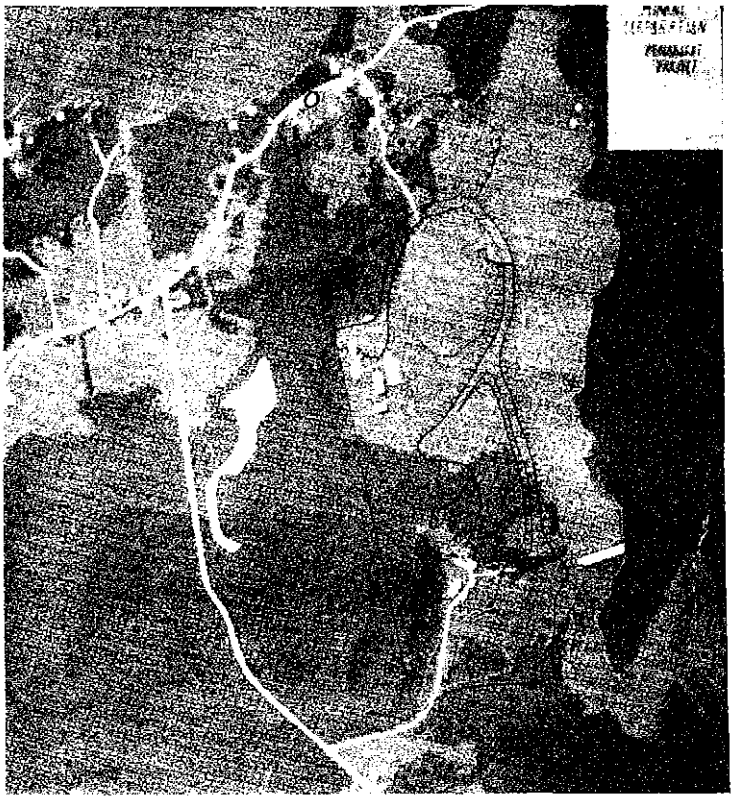
"The falls are a natural attraction, and when the mine is through it will leave a desolate, barren waste. And if you lived as close to it as I do you would find the sound and smell of blasting and burning diesel fuel most unpleasant."

He said he would not object if the mine were to be underground, but he objected most violently to an open pit.

JAMES SAID the mine had no control over where the ore is located--it happens to be under the pond and so the pond must be drained to reach it. He said the area would not be left desolate, because the pond would be reflooded.

"It is true there will have to be blasting," he said. "But it is erroneous to think of it as a sharp report; the blasts are timed so that they don't go off all at once--it's more of a 'whoof'. It's also different from an underground mine in its frequency; it's much less, maybe only once a week."

He said that Callahan would correct any damage it might be responsible for, such as ruining a well. The comment was in answer to another question of Farnham's.



MAP OF PROPOSED Callahan Mining Corporation mine site at Goose Pond, Harborside, showing location of proposed dams. Circular area indicates where the open pit would be. Lines indicate roads to waste area behind hill. Location of mill and concentrator behind hill is also indicated.--Packet photo.

PHIL CURTIS, Brooksville, asked if the mine officials had taken into consideration what damage the heavy trucking might do to roads. James said the heavy trucking would all be on company built and maintained roads on the mine property from the pit to the mill and disposal area.

Perry Smith, Brooksville, said he felt the opposition to the mine was in the small minority.

"There is always some damage to someone whenever something new comes in," he said, "people who have homes in the way of a new throughway must move. We all hate to see something which changes the environment--but then I guess that's what we call progress. There are some good people opposed to this for good reasons, and there are others opposed that aren't so good, and they aren't doing the town any good. You either go ahead or you go backwards.

"The picture is very clear: 75 years ago we had 300 poll tax payers in town, today we have 180. That's going ahead? I hope and pray that you go ahead with the mine!"

Vernon Ryan, Brooksville, expressed the view that the town should be asking the mine "what should we do to help you?"

IN EXPLAINING the mine, Hall gave a background on the Callahan Mining Corporation.

Falls, and noted that the $1,000,000 installation would be a big boos to the town's tax rolls.

"THIS INSTALLATION is important to the whole state o Maine," he said, "for if industry at large finds the state welcomes Callahan and we have a profitable operation, others will come."

He said construction could star within a month after the required legislation is passed and, barring unforeseen difficulties, the mine could be operating by mid-1967

— WELL —

DAY PRIOR TO WELLS GOING OUT OR MORNING BEFORE
2 EMPLOYEES FROM MINE CAME TO ASK MARIAN "IF SHE HAD WATER"

JULY 13, 1968 — 10:30 - 10:45 AM CLEAR WATER
12:10 PM CLOUDY WATER. NO NAMES WERE ASKED OR GIVEN BY THESE TWO EMPLOYEES
MR. WM. VEAGUE'S WELL OUT THIS AM.

MR. MAESTRETTI — 12:45 pm CAME OVER GAVE HIM SAMPLES AND INFORMED HIM OF SITUATION. HE WENT TO SEE MR VEAGUE. (WOULD TEST WATER SAMPLES AT MINE FOR MINERAL CONTENT)

MR. MAESTRETTI & MR. MALCOLM — RETURNED IN AFTERNOON TO INSPECT WELL WITH BRAINARD L. FARNHAM

APPROX 2:30 pm THANKS FOR VEAGUES & OUR WELL. AS TEMPORARY WATER SUPPLY.

JULY 16 1968 — FOSS HERMON, MAINE STARTED DRILLING NEW WELL AT DIRECTIONS OF CALAHAN MINING ON TUESDAY 16 JULY 68 — ON 15 JULY SNEAD, MALCOLM & MAESTRETTI — MEASURED OLD WELL — STILL DOWN FROM SURFACE 35'
NEW WELL COMPLETED MORNING OF JULY 20TH — 380' DEPTH AND 7 GALLONS PER MINUTE.

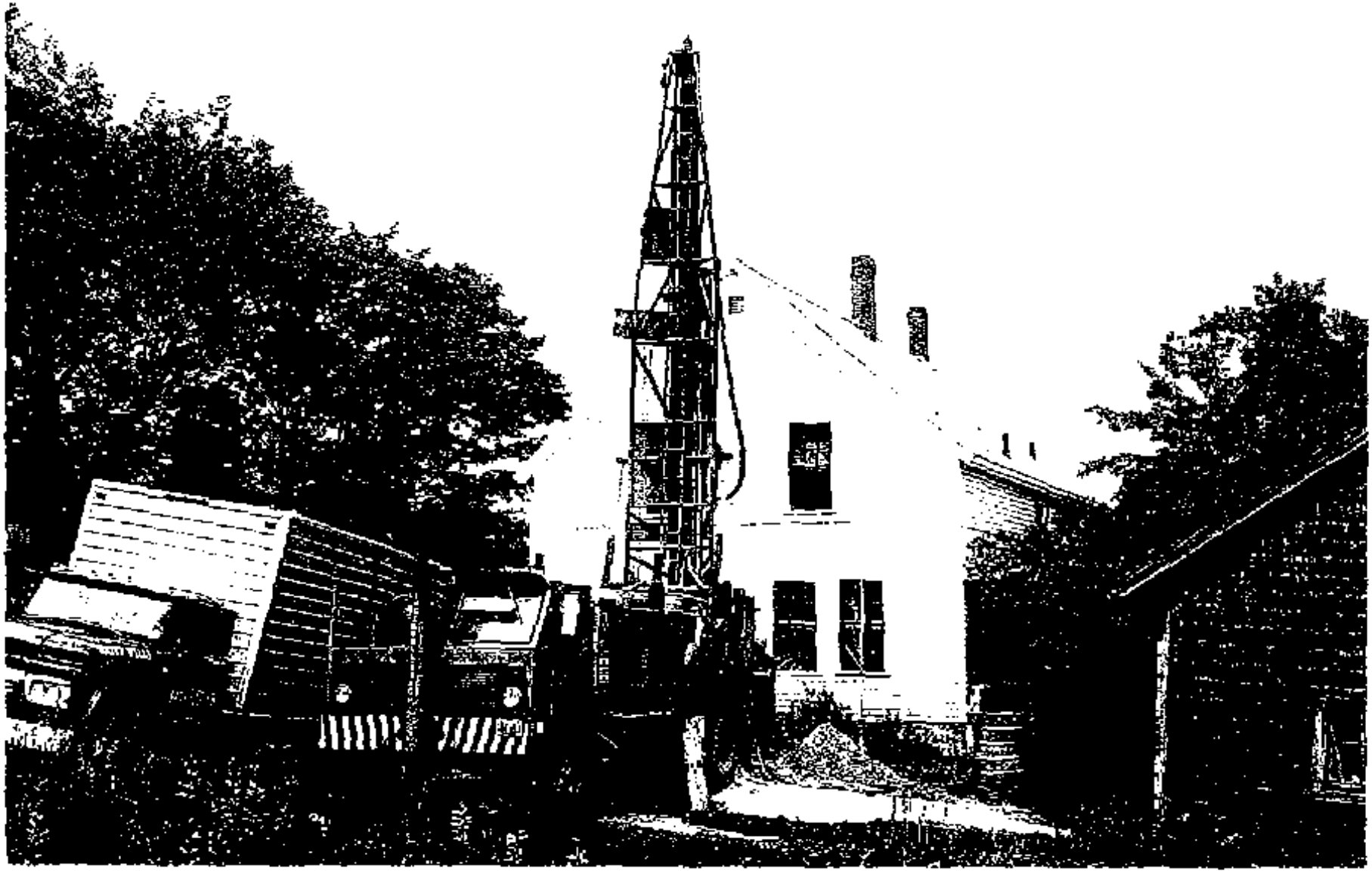
300' AT $7.00/FT.	=	$2,100.00
10" RESERVOIR	=	70.00
NEW JET PUMP $500.00		
TRADE VALUE OLD PUMP $100.00	=	400.00
TOTAL		$2570.00

Rozier Well Dry Callahan Drilling

A drilled well on the property of Albert Sandecki adjacent to the Callahan mine operation in Brooksville went dry Saturday. Sandecki, an artist wh. summers here, says that within three hours the Callahan company brought over a 250 gallon tank with a pump and hooked it into his system.

The company has hired the Paul E. Foss Co. of Herman, Maine, to drill a new well. The old one was only 63 feet. It is thought that the new one may have to go beyond 340 feet, the proposed depth of the nearby open pit mine.

Sandecki's winter home is Hadderfield, New Jersey.



DRILLING NEW WELL 16 JULY 1968 310' 7 GAL/M

DETAILS WELL.

DEPTH – 68'

NORMAL HEIGHT TO 10' BELOW CAP. (21 YEARS)

HEIGHT 13 JULY 1968 APPROX 35' BELOW CAP.

WELL LOCATION – HARBORSIDE, BROOKSVILLE, HANCOCK CO. STATE OF MAINE.

LOCATION – CASTINE "QUADRANGLE" C.G.I. MAP

APPROX. LOCATION OF WELL. { 250' S.E. POST #3 CLAIM #3137 / 200' S.W. EDGE OF OPEN PIT } 44° 21' 09" LAT. / 68° 48' 42" LONG.

ADJACENT TO MINE ROAD AT HARBORSIDE S.S.E. DIRECTION FROM ROAD TO HARBORSIDE.

ADJACENT TO CALLAHAN MINING CORPORATION – PENOBSCOT MINING CORPORATION CLAIM #74. P.M.C. #3137 STATE NUMBER.

APPROX DISTANCE. 1

WELL ORIGINALLY DRIVEN DECEMBER 1946 – 22 YEARS AGO

WELL HAS A WESTERLY DRIFT

FARNHAM FEELS IT WOULD NOT BE PRACTICAL TO EXTEND PRESENT WELL (SO NEAR TO PIT – WESTERLY DRIFT WOULD BIND DRILL).

NEW WELL & PIT LOCATION AT THE DISGRESSION OF BRAINARD FARNHAM & DRILLER.

PROVIDE NEW PIPING AT 6' DEPTH FROM WELL TO FARNHAM RESIDENCE.

- WELL -

REPLACEMENT OF WELL -

OR.

1.ST

HANCOCK COUNTY ATTORNEY (STAPLES)
LEGISLATIVE DOCUMENT 1597
TITLE 12
SECTIONS 4701 } SUIT BASIS
4709 }

APPEAL - STATE OF MAINE ATTORNEY GENERAL.

IF NO RESULTS

2ND. US. DEPARTMENT OF INTERIOR (DICK GRIFFITH)
U. S. COURTHOUSE
BOSTON, MASS.

APEX LAW (MINING ACT OF 1872)
SECTION 51

U. S. MINING LAW - FEDERAL COURT.

ATTORNEY - BAUMGARTNER.

ALBERT E. SANDECKI
HARBORSIDE,
MAINE 04642

PENOBSCOT UNIT
HARBORSIDE,
MAINE 04642
(AND)
PENOBSCOT MINING CORPORATION
CAHAHAN MINING CORPORATION

MR. JACK MALCOLM
MANAGER PENOBSCOT UNIT

NOT SENT DUE TO PROMPT RESPONSE ON CAHAHANS PART ON RETURN OF WATER SUPPLY

DEAR MR. MALCOLM:

THIS LETTER IS → IN REGARD TO THE WATER SUPPLY TO MY PERSON AND PROPERTY, AND THAT OF MR. + MRS. BRAINARD L. FARNHAM.

THIS WELL LOCATED APPROXIMATELY 250' SOUTHEASTERLY FROM POST # 3 OF CLAIM NUMBER 3137 AND APPROXIMATELY 200' FROM THE SOUTH WESTERLY EDGE OF YOUR FIRMS OPEN-PIT WORKINGS IN CLAIM NUMBER 74, HAS CEASED TO PRODUCE THE QUANTITY AND QUALITY OF WATER FOR WHICH IT HAS BEEN KNOWN FOR THE PAST 22 YEARS ON THE 13TH OF JULY 1968 AT NOON.

I FEEL YOUR FIRMS ACTIVITIES AT GOOSE FALLS POND HARBORSIDE, MAINE ARE THE CAUSE OF THIS SITUATION THEREFORE, I RESPECTFULLY REQUEST THAT THIS WATER SUPPLY BE RETURNED TO MY PERSON + PROPERTY AND THAT OF MR. + MRS. BRAINARD L. FARNHAM WITH EQUAL QUANTITY AND QUALITY ON OR BEFORE THE 22ND OF JUNE 1968.

Sincerely.
A. Sandecki

CC: J.T. HALL
C.O. SNEAD

January 17, 1972.

Mr. Frederick M. Beck
Callahan Mining Corporation
41 Union Wharf
Portland, Maine 04111

Dear Fred:

Thank you for your letter of January 12, 1972. Please keep me informed as to the Boring situation.

There are various matters I should like to discuss with you when I see you, including not only the water supply, but also the necessity to take care of the loss and repairs on the Farnhams' and others' equipment resulting from the salt water content and the proposed solutions for maintenance after Callahan ceases work at the mine.

I shall await further word from you and hope to hear soon.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:ld.

BC: Mr. and Mrs. Brainard Farnham
Mr. Albert Sandecki

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

March 16, 1972

Dear Albert:

After receiving your letter of March 7, 1972 and the enclosure, I sent the certificate to John Gray. I assume that Bill Fenton will proceed with the incorporation and keep us all informed.

Marian Farnham tells me that Mr. Hall and you have been corresponding. I shall be interested in learning what he reports to you on the well matter. I have written Fred Beck about the Borings, but I think there will be little progress there, under the circumstances.

Marian also said that you expect to be in Maine next month and I would suggest that we get together, review the situation and shall decide whether to proceed with litigation immediately.

I shall be interested in your report.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

March 30th 1972

Dear Mr. Greene:

Thank you for your letter of the 16th. I think you may have misunderstood Marian as to when I will be back to Harborside, probably no earlier that the last week in May of the first week of June.

Ordinarily I do get to Maine earlier but I am now and probably will be teaching all of our art classes until the end of May. My father has had some rough surgery and and will be a long while in recovering. He is back from the hospital now after seven hours under the knife so to speak and a total of three weeks in the hospital.

This more or less accounts for my slipping up on correspondence in the past and hope you understand.

Attached is some material concerning the reclamation and the water problem, hopefully the meeting in Boston will bring us an answer one way or another.

I don't know if you are aware of the reprimand I received from Fred Beck concerning my summary of the Goose Pond Reclamation Committee's work in the Brooksville Town Report. He seems to be rather upset at the recomendations as presented in the summary as those of mine and not the committee, also the mention of the purpose of incorporation for managing money Callahan is willing to put up for the restoration of the area.

He is basically right in his criticism as the committee never did vote on these recomendations etc. His letter of reprimand was however sent to all members of the new G.P.R.Society and I feel a need to respond and will do so shortly. I only hope to prevent the discrediting or eradication of the original committee's work so far.

I will send you a copy of both his letter and my reply as soon as I am able to get my mind to it. I hope this will not create any problems in the way of Fred's feelings towards working to remedye this water mess.

In your letter of the 16th you mention getting together soon for a rewiew of the situation and decide whether to proceed with litigation. I agree with this but if I am delayed in getting to Maine this Spring I think we should start the action as soon as possible, depending of course on the outcome of the Boston get together. In other words lets not wait on my getting to Maine... I'm sure everyone else involved is fed up and ready to start the legal processes moving.

Sincerely,

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

April 4, 1972

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N.J. 08033

Dear Albert:

Thank you for your letters of March 30 and 31, 1972 and the enclosures.

As to the Beck matter, I doubt if the Town would be particularly interested in more information and I think your report was basically in order. Probably Callahan does not want its participation shown, if possible.

I am inclined to think the matter will be closed on the basis of the correspondence. I hope so.

With reference to the water, first of all we will have to see what the mine does to remove the accumulation and more pressing at the moment, what they can do with Mr. Boring. Whatever they may agree, we do not know if the result would be good water.

I would suggest that without your saying anything to anyone, even the Farnhams, I proceed to draft the necessary complaints for damages. I cannot start this until later in April, but we should be ready to move in May or June.

Please let me know what parties I should include as Plaintiffs, limiting this, however, to those you are sure of. Before putting the papers into final form, we can inquire if others are to be added, but I do not want Callahan at this time to know we are preparing a suit.

I shall write you later as to the amounts of damages I recommend we seek. This is a difficult question.

Finally, I think Callahan may plan to close its mine in July, although there is some thought they might continue with ore available now until early fall.

I have heard nothing further on the corporation, but shall bear your thoughts in mind when the by-laws are drafted.

Sincerely yours,

WSG:RL

50 Tanner Street
Haddonfield,
New Jersey 08033
April 7, 1972

Mr. William Sherman Greene,Jr.
Attorney & Counsellor at Law
Sunset, Maine 04683

Dear Mr. Greene:

Thank you for your letter of the 4th, with comments on the letter from Mr. Beck.

Conversations with Dr. Ruth Patrick concerning the environmental monitoring of the area will be put in letter form and sent to Mr. John Gray, chairman of the new Goose Pond Reclamation Society. Dr. Patrick seemed rather concerned over the news of the 60' accumulation of water in the open-pit, and strongly recommended that water tests and monitoring be started as soon as possible.

I agree with your suggestion in drafting the necessary papers for litigation and will keep this in confidence. I amd pleased to see you will be working on this so that we may act quickly when and if the time comes this spring.

The only persons I am sure of as far as being plaintiffs would be: Mr.& Mrs. Farnham, Mr. William Veague, Mr. Clarance Barthelman and myself. Mr.& Mrs. Malcolm Gray may be included but I am not sure on this as they seem to be rather reluctant to participate. Mr. Barthelman is recovering from a heart problem and Bill Veague asked me not to approach him on this just now, when Bill was here last month he asked to handle this through him. Mr. Frank Greene was willing to participate and maybe he still is, I think this was more or less contingent on if his well was adversly affected, he still has a good volume of water but was unable to obtain the chloride count on his last water test sent to Augusta this past summer.

It looks as though I will be coming to Harborside the first week in June dependent on my fathers health, ordinarily I would be up sooner but our art classes continue until the end of May.

Hope this finds you and your wife in good health and Spring in Sunset is not too far off.

Sincerely,

April 14, 1972

Charles H. Okey, M.D.,
Laboratory Department
Department of Health & Welfare
State Office Building
Augusta, Maine 04330

Dear Dr. Okey:

For some time you have been sending monthly water test reports to Mr. and Mrs. Brainard Farnham of Harborside, Maine, in compliance with an arrangement they made with you. As they are clients of mine, they have requested that I now inform you that it appears unnecessary for them to receive such reports every month, and I request that you change the procedure so that such a report is received every three months.

In this connection I ask that you continue to show chloride and other mineral content on all your reports.

Thank you for your cooperation.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Mr. and Mrs. Brainard Farnham
Mr. Albert E. Sandecki

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

April 17, 1972

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

Dear Albert:

After talking with you last Friday, Mr. Boring phoned me from Harborside on Saturday. He was here for the weekend and reported that he had been talking things over with Snead and Beck and that he was going to see them with his family in Boston on April 25th. I misunderstood Beck as I thought he said May 25th.

Mr. Boring seemed to wish to cooperate generally and said that he was only asking for a small piece of land at the Pond. We did not discuss any details.

I shall keep you informed of any developments.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:KL

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

June 20, 1972

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

Dear Albert:

Callahan and Marion Farnham tell me that two wells were dug on Callahan property over the weekend to a depth of 200 feet. Apparently the total flow is approximately 10-12 gallons a minute.

Callhan will test the water twice within the next two weeks and hopefully it will be approved.

I understand the plan now is to transport the water from the wells by pipe to the reservoir and then use the existing underground pipes to the various parties involved. I have requested that Callahan thoroughly clean the reservoir to be sure that insofar as possible the water is not changed when stored there.

The tests will be made by James Sewall Company and the Augusta State Department of Health and Welfare. Callahan intends to keep pumping for a couple of weeks to be sure that a good test is obtained.

Let's hope that the water tests out satisfactorily.

Ineidentally, I understand that Callahan is filling the pit with the mud and debris, but I have heard nothing as to plans about the Cove pollution.

Finally, Callahan is looking over the Farnham's house and I hope will take care of any damage there.

Hope to see you next month and I shall keep you informed of developments.

Sincerely yours,

Wm. Sherman Greene, Jr

WSG:RL

June 28, 1972

Mr. Fred M. Beck
Callahan Mining Corporation
41 Union Wharf
Portland, Maine 04111

Dear Fred:

At the time your secretary informed me recently that the two wells on the Callahan property were producing approximately 12 gallons per minute, she also said tests of the water would be made by Sewall and Auguste. Naturally we all hope the tests will be satisfactory, and I request that you let me know as soon as Callahan receives them what they show.

In the meantime it is most important that regular and continued delivery of bottled water be carried out as heretofore, especially as more parties are now involved during the summer.

Incidentally, what are your plans as to cleaning up the Cove and the pit and filling in the pit? The effect of this work on the old wells has been discussed several times and becomes of importance in view of the current tests showing the usual high salt content.

Please keep me fully informed as promptly as possible.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Charles D. Snead, Jr., Esq.,
Albert E. Sandecki
Mr. and Mrs. Brainard Farnham

PENOBSCOT UNIT

CALLAHAN MINING CORPORATION

TO: All Conderned: DATE: July 13, 1972

FROM: Robert T. Howard COPIES:

SUBJECT: New Water Well

The pipe line is scheduled to be installed within a week. When Bangor-Hydro gets the power line to the pumps the new well water will be on its way over the mountain.

Yours truly,

Robt Howard

NEW WATER SUPPLY TESTS 22 PPM CHL.
O.K'D BY FRED BECK - ROBT. HOWARD.
JULY 25TH. 1972
CALLED BRYAN TO TELL HIM NEWS
HE ADVISED INDEPENDENT TEST OF WATER
FROM AUGUSTA - APPLIED FOR JULY 26.

July 25, 1972

Mr. Frederick M. Beck
Callahan Mining Corporation
41 Union Wharf
Portland, Maine 04111

Dear Fred:

We were glad to learn from Ralph Flow last week that the generator at the mine was pumping water from the two new wells to the reservoir, which I understood would be cleaned out several times and then re-tested. Of course, we must be sure that the water is satisfactory before putting it in the pipes for drinking use.

I would suggest that arrangements be made by Callahan to have State tests made every two weeks, if possible, after the new well water is used, to continue for at least a month during which time, of course, the fresh bottle water will be delivered as usual.

If there is anything I can do with the Bangor Hydro to get any necessary equipment, please let me know as, of course, this must be installed to be sure that the wells are operating and the water conveyed to the reservoir.

Finally, I hope that the traffic situation at the new mine entrance in Harborside has been adjusted to avoid as much noise, confusion and dust as possible. Many of the summer people and guests are now there, so that both permanent residents and others must be considered in every possible way.

I shall be glad to hear from you.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Albert E. Sandecki

Harborside,
Maine 04642
July 26, 1972

State of Maine
Department of Health & Welfare
Public Health Laboratory
Augusta, Maine 04330

Dear Sirs:

Enclosed is a check for two dollars for the water test bottles as instructed by telephone today by Mr. Dostic.

Would you please send the materials for testing well water as soon as possible.

Thank you.

Sincerely,

Albert E. Sandecki

Address to;

ALBERT SANDECKI

HARBORSIDE,

MAINE

04642

AMENDMENT TO THE

NOTICE ON WATER

JULY 28

1972

At the first annual meeting of the Goose Pond Reclamation Society, held on July 25th at 10am. Mr. Fred Beck, District Exploration Manager for the Callahan Mining Corporation announced that the new wells have been hooked up and are now being used as the source of DRINKING WATER in the system of this house and the others on the line in the vicinity of the open-pit mine.

The water bottles will NO LONGER BE PICKED UP as per previous schedule.
The new wells test at 7 p.p.m. Chlorides at the well head and 22 p.p.m. Chloride at the Farnham Tap as of July 25th 1972.

PLEASE FEEL FREE to use the water as you ordinarily would for cooking, drinking, washing and flushing with the understanding that excessive waste of water would exert the capacity of the wells beyond the point of their ability to supply the six homes now on the line.

Sincerely,

Albert Sandecki

August 7, 1972

Mr. Frederick M. Beck,
Callahan Mining Corporation
41 Union Wharf
Portland, Maine 04111

Dear Fred:

Thank you for your letter of August 3, 1972. I am glad that the water situation in Harborside seems to be improving.

It is my understanding that Callahan tests, which I have been receiving, confirm that the chloride content is very low. I request that Callahan continue to make these tests weekly for at least a two month period to establish the situation over a sufficient period of time for a possible anticipated stable record.

Also, I think a monthly Augusta test should be made by Callahan to confirm their findings, including all of the minerals which we have discussed before.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Charles D. Snead, Jr., Esq.,
Albert E. Sandecki

50 Tanner Street
Haddonfield,
New Jersey 08033
September 19,1972

Mr. William Sherman Greene,Jr.
Attorney & Counsellor at Law
Sunset, Maine 04683

Dear Sherm:

I am in hopes of this letter crossing one from you in the mail, as such is the usual case.

When I left Harborside Charlie Snead was to be up to the mine sometime within the first two weeks of September, did you have a meeting with him ?

What if anything has developed ?

I ammrather concerned with the rather "low profile" that Callahan seems to have adopted.... no doubt the strong article in this months National Fisherman did not sit too well with them.

The preliminary test results of the Goose Cove sediments by the Army Corps of Engineers is also a shocking situation. I understand further test results are forthcoming with I'm sure strong directives for the removal of the silt.

I had one other concern in relation to the test for the newly drilled well located near the tailings area of the mine. As I recall we,(I) never saw a completed test sheet on the mineral content of the water. The initial test taken on July 5th does not indicate the mineral results, according to my records. I believe there was another test taken at the end of August but the results were never made known. Perhaps you have this test results, or Fred Beck may.

All in All,, I would like to know if there has been any new developments.

Sincerely,

Albert Sandecki

September 15, 1972

Charles W. Snead, Jr., Esq.,
Callahan Mining Corporation,
277 Park Avenue
New York, N Y 10017

Dear Charles Snead:

I shall look forward to seeing you and Fred Beck during the week of September 25th and hope that you will give me a little advanced notice, so I am sure to be available.

It is most important that the water situation at Callahan be determined at once, principally the placing of all water lines underground and consideration of how to protect the reservoir, and in fact, the continued use of the reservoir.

Of course, we must determine what steps to take as to assuring fresh water, which subject has been postponed for some time.

I shall look forward to hearing from you soon.

Cordially yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Mr. Albert E. Sandecki
Mr. and Mrs. Brainard Farnham

October 2, 1972

Charles D. Snead, Jr., Esq.,
Callahan Mining Corp.,
277 Park Avenue
New York, N Y 10017

Dear Charles Snead:

This letter will confirm our conference last Thursday, at which time you and Fred Beck discussed with me numerous matters affecting the water supply at Harborside.

First and most important you have agreed to cover to a depth of two feet dirt fill, the plastic pipes running from the two new wells to the reservoir. This work is to be started on October 15th and completed immediately to avoid freezing, unless a State Water test shows the chloride content of the old Callhan well, or any other former well, to be satisfactory prior to October 15th, 1972.

1. The winterizing shall also include the maintenance and repair of the entire system and daily checking of any motors used to supply electricity at the two new wells. Also any proposed flow of water to avoid freezing to be checked daily.

2. An immediate water test is to be taken from the Farnham's tap and sent to Augusta for processing, which will include all mineral contents to be tested.

3. The matter of Callshan's financial responsiblity hereafter as to not only the present wells, but maintenance and service and the possibility of further new wells, including the proposed Water Company, is tabled until a determination appears definite as to the use of the old wells on the Callahan and Farnham property, after a period of time following the filling of the pit.

   This point is not subject to the winterizing of the present system.

4. I am preparing a list of the extra expenses incurred by Mr. and Mrs. Farnham and Albert Sandecki for equipment, water tests and other extra items which I feel were incurred by reason of the chloride in the wells. I shall send this to you upon completion for consideration as to settlement of such claims.

5. I have discussed with Mr. and Mrs. Farnham the above suggestions as well as the other matters we discussed in our conference, and I hope to have their final decision next week in plenty of time before the October 15th date, as to accepting your suggestions.

I shall report to you as soon as possible and understand that in the meantime the above mentioned test is to be made and forwarded to Augusta.

Of course, the tests every three days, which Fred referred to, are to be continued

Charles D. Snead, Jrs., Esq. October 2, 1972

and I shall be interested in learning what they show at the old Callahan well.

Cordially yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Mr. and Mrs. Brainard Farnham
Mr. Albert E. Sandecki
Mr. Fred M. Beck

November 21, 1972

Mr. Frederick M. Beck
Callahan Mining Corporation
41 Union Wharf,
Portland, Maine 04111

Dear Fred:

As I have not heard anything from you. I assume that the winterizing of the two wells at Callahan has been completed. I hope that the lines and the wells are fully protected for the winter.

When we last discussed the water situation a couple of weeks ago, you told me you would check the Augusta water reports and let me know the results. I have not heard from you nor anyone else. It is most important that we have the complete mineral count on these tests as soon as possible and I hope you can give me the report for both the one in October and the other one earlier this summer in detail.

As I have told you and Charles Snead several times, we will have to work out at an early date arrangements for the continuing servicing of any wells involved at the mine or elsewhere for my clients, so that they will be fully protected in the future. When we last met, this was mentioned, but no decisions were arrived at as you wished to await further reports from Augusta as to the wells.

Please let me have your full report as to these matters, so that all parties may proceed as necessary. Thank you.

Very truly yours,

Wm. Sherman Greene, Jr.

WSGrnL

bc: Charles D. Snead, Jr.
Albert E. Sandecki
Mr. and Mrs. Brainard Farnham

WATER PROBLEM

PIPE COLLAPSED 1½ TO 2' GRAVEL

DEC. 7TH 12:30 pm – DEC 8 – 12 pm
NO WATER –

SNOW LEAVING HOUSE – NO KEY.

WATER TEST AUGUSTA

5.4 PH
.1 CU
.05 IRON
11 CHL.

PB
ZN
} NO TEST RESULTS WILL SEND LATER.

CALL TO FARNHAM'S DEC 9TH

FARNHAM'S CALLED DEC 14TH 6:30 pm
BACK ON OLD WELL – HIGH CHL.
2 WKS – ACCORDING TO ALTON DOW
SICK IN PROBLEM. BOARDING LICENSE REMOVED
CALLED GRANGE – WILL CONTACT BECK
TONITE – SNGRD TONIGHT OR TOMORROW
AT OFFICE –
BECK CALLED AT 10:30 pm WILL GO TO
HARBORSIDE TO STRAIGHTEN OUT SITUATION
WILL KEEP MR UP TO DATE.

BECK 207 865-3060

SNEAD 203 366-5960

CUSTOMER'S RECORD COPY OF PERSONAL MONEY ORDER

PENOBSCOT SAVINGS BANK

BANGOR & ELLSWORTH, MAINE

No. 057772

PURPOSE *On Account - Assistance with Collahan/Harborside Problems*

Feb. 5, 19*73*

PAYEE *Wm. Sherman Green, Jr.*

[illegible] CTS

The customer procuring the Personal Money Order form, corresponding in number and amount to that shown hereon, agrees to insert thereon in ink, the date, payee, his signature and address and assumes responsibility for all events made possible by his failure to do so.

THIS COPY NOT NEGOTIABLE

Guy F. Hunter Jr.
SIGNATURE OF DRAWER

Winterport, Maine.
ADDRESS

KEEP THIS COPY AS YOUR RECORD

2-5-73

Mr. Green

As Albert S. discussed with you, here is a little "green" for your greatly apreciated assistance with our various problems at Harborside.

This in no way implies that we consider our account with you as paid up - Please Keep us advised

Thanks again,

B

Water Deal

GUY F. HUNTER, JR.
RETA F. HUNTER

No. 83434

Date	Withdrawals	Deposits	Interest	Balance	
SEP. 4.7[illegible]		152.25		152.25	21A
10.7[illegible]		61.25		213.50	21B
88 88			14.91	228.41	4B PS
15 72			.95	229.36	4B PS
15 72			.95	230.31	4B PS
15 72			.96	231.27	4B PS
15 72			.96	232.23	4B PS
15 72			.97	233.20	4B PS
15 72			.97	234.17	4B PS
15 72			.97	235.14	4B PS
15 72			.98	236.12	4B PS
15 72			.98	237.10	4B PS
15 72			.99	238.09	4B PS
15 72			.99	239.08	4B PS
15 73			1.00	240.08	4B PS
5.73	125.00		*26.58*	115.08	4B PS

NOTIFY BANK OF ANY CHANGE OF ADDRESS

Penobscot Savings Bank
Bangor, Maine

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

February 5, 1973

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

Dear Albert:

Thank you for your letter of February 1, 1973. Please let me know what you hear from Beck.

There are numerous problems and I hope that Callahan can work things out along th lines you mention.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:RL

February 7, 1973

Mr. Guy F. Hunter, Jr.,
Winterport,
Maine 04496

Dear Bill:

Thank you for your check for $150.00 in the Sandecki-Farnham matter. I appreciate your thinking of me.

Hope we can work things out this summer one way or another.

Please give my regards to the family.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

cc: Mr. Albert E. Sandecki
50 Tanner St.,
Haddonfield, N.J. 08033

February 15th 1973

Mr. William Sherman Greene, Jr.
Attorney & Counsellor at Law
Sunset, Maine 04683

Dear Sherman:

Considering the letter I received today from Marian I guess there is no real need to bother you, but I felt you should at least be made aware of the most recent break down of the "temporary water system"...

I do not know just when it happened but from the date of Marian's letter sometime the week of the 5th of February.

Frank Snow has been working on the pipe which has"32 holes in it"according to Marian. Somehow the pipe does not drain sufficiently from the well head to the storage tank and consequently freezes up.

As Marian puts it there is much more trouble this winter than last with the water system.

She did not call you in regard to this latest problem as Brainard told her not to and Frank Snow and his crew are doing their best to get the water running again.

By the time you receive this the problem will probably be resolved and I imagine there would be little for you to do. As I said before I thought you would want to be advised of the breakdowns.

I feel badly about the Farnhams having to put up with the continual irritation of this water problem, it shows in the tone of Marian's weekly letters to me.

I have heard nothing from Fred Beck in reference to the dredging of Goose Cove and other priorities of the GPRS. He did write andinteresting rebuttal to Bob Dow's article in the March issue of the National Fisherman, (enclosed)xx. Not much love lost between Mr. Dow & Mr. Beck.

Not a drop (flake) of snow here in South Jersey yet, our girls are rather dissapointed.

Sincerely,

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

February 23, 1973

Dear Albert:

Thank you for your letter of February 15th, 1973. It is my understanding that the water is under control at Harborside, after the last repairs. I talked with them recently.

We must have a final show-down with Callahan this summer, so that satisfactory arrangements are made.

Best regards.

Sincerely,

WSG:RL

Mr. Albert E. Sandecki
50 Tanner Road
Haddonfield, N J 08033

February 28, 1973

Charles D. Snead, Jr., Esq.,
Callahan Mining Corporation
277 Park Avenue
New York, N Y 10017

Dear Charles Snead:

As you probably know, the water pipes at Callahan froze again Monday, February 26, 1973, for the third or fourth time this winter. Fortunately it appears there was ample water in the tank to take care of the various houses using it and Frank Snow has been working on the pipes.

It seems to me that even if the pipes from the new wells were buried to avoid freezing, as they should have been last fall, they are a long ways off.

I would recommend that a new well be drilled by Callahan somewhere in the Boring-Gray area to avoid the use of the reservoir and the two new wells. If such a new well would test out for a period of time, perhaps this would solve a satisfactory and continuous water supply.

In any event, it should be tried.

Under all other circumstances, I am sure Callahan agrees that this summer a final disposition of the water problem must be agreed to.

I shall appreciate your comments.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:KL

cc: Albert E. Sandecki
50 Tanner St.
Haddonfield, N J 08033

Date July 25, 1972

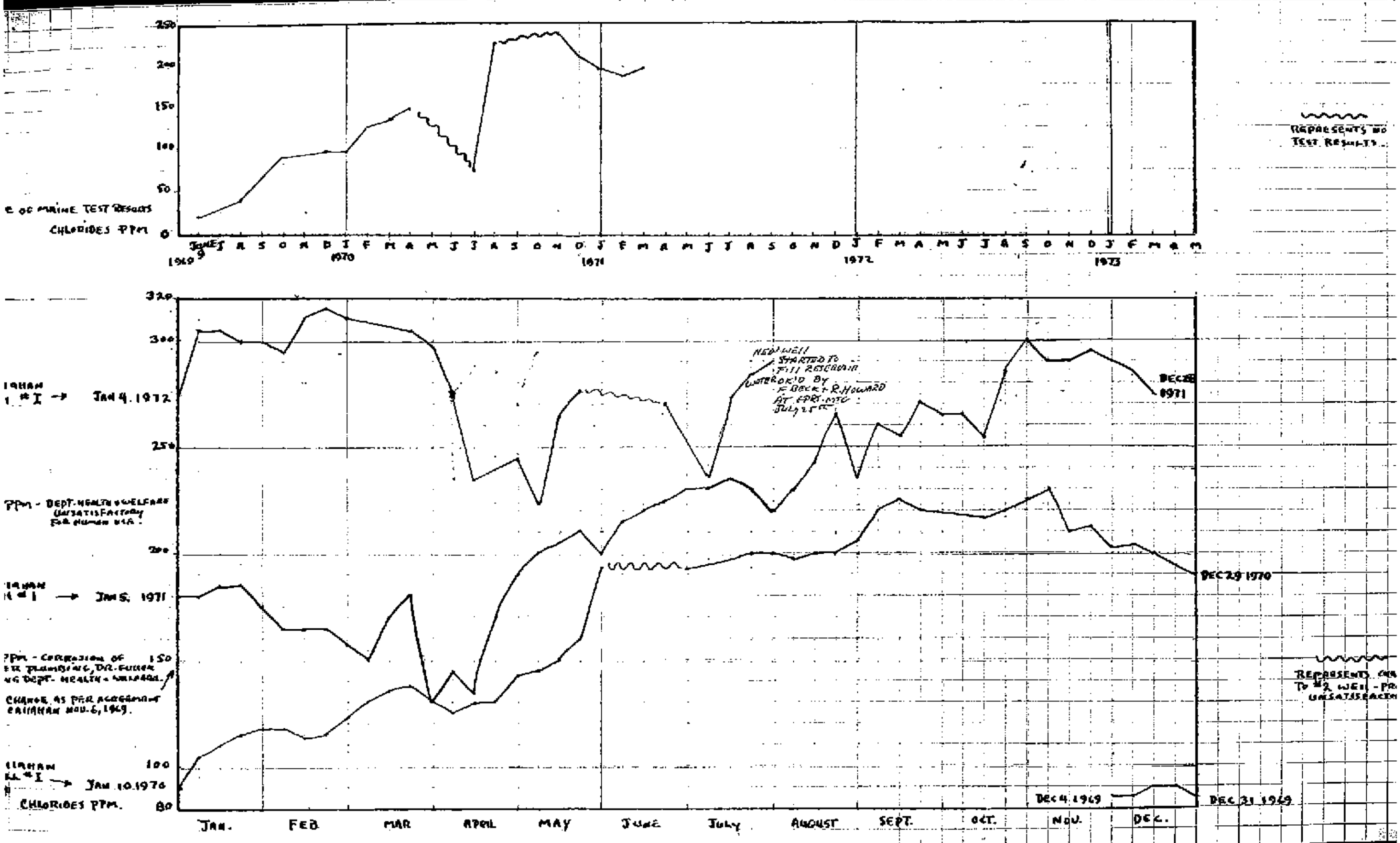
MEMO TO: Mr. & Mrs. Brainerd Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C. D. Snead, Jr.

FROM: R. C. Flow

SUBJECT: Chloride Content of Water from Callahan New wells

Date	Sample Taker From	Chlorides p.p.m.
7/25	Callahan New Wells	7
7/25	Farnham Tap	22



OF MARINE TEST RESULTS
CHLORIDES PPM
250
200
150
100
50
0
1969
1970
1971
1972
1973
REPRESENTS NO TEST RESULTS
JAN 4, 1972
JAN 5, 1971
JAN 10, 1970
PPM - DEPT. HEALTH & WELFARE UNSATISFACTORY FOR HUMAN USE.
CHANGE AS PER AGREEMENT NOV. 6, 1969.
CHLORIDES PPM.
300
250
200
150
100
80
NEW WELL STARTED TO FILL RESERVOIR
WATER OK'D BY F. BECK + R. HOWARD AT EPRI. MTG. JULY 25
DEC 28 1971
DEC 29 1970
DEC 4 1969
DEC 31 1969
REPRESENTS
JAN.
FEB.
MAR.
APRIL
MAY
JUNE
JULY
AUGUST
SEPT.
OCT.
NOV.
DEC.

March 29,1973

Mr. William Sherman Greene, Jr;
Attorney & Counsellor at Law
Sunset, Maine 04683

Dear Sherm:

Thank goodness all seems quiet on the water situation at this time. Aren't you glad it's not called Watergate.... Marian sent a waterteet off to Augusta the other day and hopefully all will check out satisfactorily.

As usual I would like to share a few points with you concerning the possible conclusion of the water situation this "spring". With all due respect to the glacial speed with which Callahan moves in regard to non profit matters, I think it would be propitious to set the wheels in motion on the drilling of the "new" well,come spring.

I believe this would only be proper considering the schedules that well drillers keep in laying out work convenient to where the rigs will be working. I do not know of the availability or number of well drillers who use the older driven method of putting down a well.

There will have to be a satisfactory agreement reached with Clarence Barthelman and Bill Veague conserning the winterizing of their pipe lines from the new well as their original affected Wells were winterized. This may require digging up the Town road (permits); along with Callahan's really never admitted to responsibility for draining Mr. Barthelman's well could conceivably tie any negotiations up as we all have agreed to stick together on this matter.

I know for a fact that Both the Barthelmans and the Veagues are growing increasingly impatient with Callahan's delay in obtaining a satisfactory and dependable water supply. Of course the Farnhams and the Gray's have met with most of the inconvenience of us all and they too are ready for a final clean up of the situation.

(cont.)

Jean and I are also concerned because we have rented the Cushing house for a total of 15 weeks this summer to 9 different families; some with small children. These people will be on vacation to get away from the turmoil and noise of every day (New Jersey) living. I would like them to enjoy their stay, for personal and practical reasons.

There will be tennants in the place starting the 3rd week of June and I've got my fingers crossed that the water jug brigade will not be reinstituted (as it was last summer) and for that matter if the well is to be drilled near the Cushing house or the Gray's property I hope it can be done before the people coming up for a rest arrive.

As interesting as it is to see a well drilled the constant noise can be nervewracking.

When I last spoke with Fred Beck he indicated that he and Charlie Snead both "looked over the proposed drill-site" and I'm glad that they did this as I think it is their responsibility to select the spot. Fred is a geologist and I'm sure he has some basis in knowledge for picking a certain place. This is which may be a helpful factor to us if they are not successful in bringing in a good water supply.

I don't know if you have received a reply from Charlie in regard to your letter of February 28th, but I'd be willing to bet you haven't.... If not, would you consider a somewhat forceful telephone call (collect) or a very persuasive letter concerning an early start on lining up a driller, trencher, plumber, piping and necessary fittings so that there might be a minimum of delay towards resolving the water problem. I mention these individuals and materials because they all have been the cause for delays in the past for just the maintenance of the present "temporary" system.

Snead may want some form of another "temporarily permanent agreement",(and I hope he doesn't) which could drag on through the summer. If an agreement is necessary I hope it can be handled smoothly and promptly with no aggravation for all our sakes.

Sincerely,

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

April 4th, 1973

Dear Albert:

Thank you for your letter dated March 29th, 1973.

I shall write and phone Charles Snead, requesting some decision, but I anticipate, as usual, we will have to keep after Callahan. I have, of course, not heard from him in answer to my last letter.

We are very busy just now winding up income taxes, but I shall let you know what I hear.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

Mr. Albert E. Sandecki
50 Tanner St.,
Haddonfield, N.J 08033

BILL URAGUE CALLED

5:30 PM 4/10/73

ARNOLD URAGUE TO JOIN?

CALLED GREENE + BRECK (THEIR DECISION ON WELL)

FOR WATER PROGRESS - NONE.

CALLED URAGUE BACK.

URAGUE TO CALL GREENE.

SUGGEST HE TALK TO ARNOLD URAGUE.

4/10/73.

SHERM GREENE. — 207 - 345 - 2551.

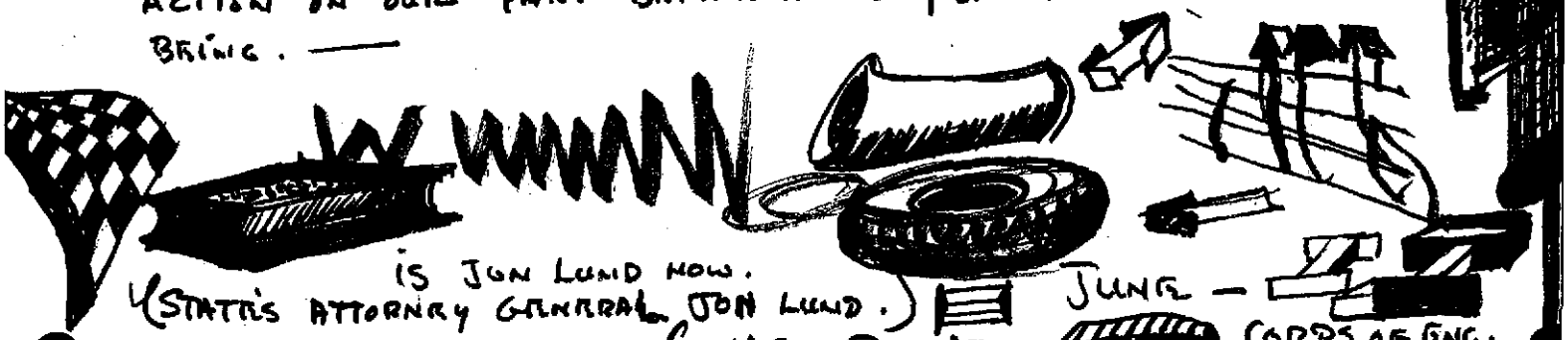
WELL WENT OUT JULY 13, 1968 10:30 AM.

JULY 13TH 1973 REPRESENTS BEGINING OF 6TH YEAR FOR DAMAGE

UNDERSTAND — THE STATUTE OF LIMITATIONS TAKES AFFECT ON THE 6TH YEAR IN STATE OF MAINE.. JULY 74

IS THIS 6TH YEAR SITUATION LIMITED BY THE BEGINING OR END OF THE 6TH YEAR ?? — (6th year.)

I AM GETTING PRESSURE FOR SOME COMITMENT ON CALLAHANS P OR LEGAL ACTION ON OUR PART BEFORE THIS 6 YEAR LIMITATION COMES INTO BEING. —



(STATES ATTORNEY GENERAL JON LUND.) IS JON LUND NOW.

JUNE — CORPS. OF ENG.

BECK — 207 965 3060 (WILL SEND PERMIT APPLICATIONS)

HAVE YOU MADE ANY ARRANGEMENTS — FOR DRILING A NEW WELL ? CONTRACTS ETC.

PERMITS FOR ROAD DISRUPTION FROM TOWN. SELECTMAN — NO (FORMAL REQUEST TO HELP. FOR TOWNS ACQUISITION OF LAND. (NO ANSWER)

BARTHALMANS — NOT AFFECTED. — GREENES WELL. — 48 HRS.

STEWELL RESULTS. → STEWELL WATER TEST RESULTS) FUNDS FOR AQUACULTURE + RECLAMATION APPROVED.

WAIT TO TEST WELLS IN JUNE — DRILL AT SIGHT SELECTED

C. SNEAD — 203 966 - 5960.

DOES CALLAHAN INTEND TO RECTIFY THIS WATER SITUATION BY (OR SPRING?) JULY 13TH OF THIS YEAR?)

SEPT 30TH 1969 (4 YRS AGO) TEMPORARY AGREEMENT.

AUGUST 1 69 DRAFT OF AGREEMENT.

BART'S WELL —

BILL VRAGUE — 617 433 5577

WILL CALL GREENE TONITE AND PRESENT THE IDEA TO HAVE ARNOLD VRAGU TALK TO GREENE ON WATER PROBLEM.

50 Tanner Street
Haddonfield,
New Jersey 08033
April 14th 1973

Mr. William Sherman Greene, Jr.
Attorney & Counsellor at Law
Sunset, Maine 04683

Dear Sherman:

I have looked over my records concerning the events on the loss of the original well. The following is a brief summary.

JULY 13th 1968.... 10:30 am (Well water was clear)

11:15 am. Approximate time of blast in the WEST wall of the mine pit area.

* At some time between 11:15 am. and 12:10 pm. two employees of Callahan came to the Farnham's house and asked Marian if, "she still had water." She told me this a day or so later and I asked if they had given their names, she said no.

12:10 pm. The well water turned cloudy, I understand this was caused by the lowering of the normal water level in the well casing permiting the casing wall sediment to mix with the water. (Two samples 1 clear, 1 with sediment, dated.)

* William Veague's well went out the same day. (no time recorded)

12:45 pm. I called Mr. Ted Maestretti,(then operations manager for Callahan) he came over and I gave him 2 samples of the water and informed him of the situation. He then went over to see Mr. Veague. Ted said he would test the water samples I gave him for mineral content at the mine lab.

2:30 pm. Mr. Maestretti and Jack Malcolm returned to inspect the Farnham's well with Brainard and me. About and hour later 2 tanks (approx.250 gal.cap.) were brought to the Farnhan's & Veague's house and a temporary water supply was begun.

JULY 15th 1968.... Mr. Snead, Malcolm & Maestretti came to measure the Farnham well and it was still down 35' from the surface.

JULY 16th 1968.... Mr. Foss from Hermon, Maine came to drill a new well alongside the Farnham house. On July 20th the well was completed at a depth of 310' at 7 Gallons per minute.

A few days later (no date or time recorded) Mr. PAUL E. FOSS moved his rig to the Veague house and started a well near their original well head only to loose andexpensive drill bit in the area below the casing. He then moved the rig alongside the house and put a well down. (No records on results)

As best I can recall it was somewhere along in this time period, between July 13th and the 17th that Mr. Barthelman's well dropped in level and he contacted Mr. Snead or Jack Malcolm that his well was also affected.

Jack Malcolm said to me at a later date that, "Callahan had to draw the line somewhere or they would be drilling wells for everybody on the Cape." Hence the selection of the 1,000' cut off point of the area affected by the draw down of the watertable by the open-pit mine.

Personally I think this was a very arbitrary decision on the conpanys part, but it might be a difficult thing to prove just how far the cone of depression of the watertable extended.

You also asked me when the new well started to show a high chloride content. My records indicate the well had always shown a "higher than normal salt content."

AUGUSTA TESTS:

AUGUST 14th 68..#367014 Satisfactory
but high salt.

DEC. 18th 1968..#371345 Unsatisactory
750 ppm. Chloride

JAN. 6th 1969...#371716 Satisfactory
80 ppm. Chloride
(pump was raised in casing 100')

APRIL 11th 69..#373262 Unsatisfactory
360 ppm. Chloride

Well, I hope I have not bored you too much, but this covers to the best of my ability the beginings of the run-around we have been subjected to for the last five years.

Enclosed is a copy of I guess one of the major reasons why... insurance companies not willing to cover a claim....

P.S. I BELIEVE IT WAS LATE IN JULY 1969 WHEN CALLAHAN HOOKED THE BARTHELMAN'S ONTO THE PRESENT "TEMPORARY SYSTEM"
ONE OTHER POINT: ACCORDING TO A SCALE MAP I HAVE OF THE WATER SYSTEM PROPOSAL THE BARTHELMANS PROPERTY (WELL) IS WITHIN THE 1000' CUT OFF LINES.

Sincerely,

Albert E. Sandecki

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

April 17th, 1973

Dear Albert:

Thank you for your letter of April 14th, 1973. As I told you, I expect to go over the general situation with Arnold Veague this week and shall let you know of any suggestions we work out.

The dates you give me are helpful in determining when we should proceed and also as to the record of the various wells involved.

Please keep me informed of any action by the Reclamation Committee or the Town.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

April 18th, 1973

Dear Albert:

Arnold Veague and I conferred yesterday in Bangor and he plans to call on Charles Snead in New York City later this month. At that time he will discuss the various alternatives you and I have mentioned before as to disposing of the water problem at Harborside.

Briefly these are

1. Establishment of a water company with sufficient funds supplied by Callahan to take care of the present system and new wells.

2. Payment of outright damages to the interested parties, or

3. The institution of litigation seeking damages for all parties.

Of course, there are numerous questions in connection with our position, but at least we can put Callahan on notice that a final solution must be worked out, which of course serves to confirm the position we reported to Callahan the last few months several times.

If you hear anything from the Selectmen or other parties as to the property and the Town accepting the offer, please let me know immediately.

I shall keep you informed of any reports I receive here.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

Maine Sea Farms

Harborside, Maine 04642 Tel. 207 / 326-4339

April 4, 1973

Mr. Albert Sandecki
50 Tanner Road
Haddonfield, New Jersey

Dear Mr. Sandecki:

Enclosed please find a copy of a pit sample taken this February. F-1 is the well supplying the Farnum's. The other numbers represent depths in the center of the pit. All salinities below 10 feet were above 18 ppt.

Any comparisons of these values should be against measurements taken elsewhere in Penobscot Bay or other esuarine areas in Maine. The idealized levels found in textbooks are not realistic.

I am sorry for the delay in forwarding these to you. We presently have several more samples being run by the Sewall Company and will send them to you as we receive them.

Sincerely,

Bob

JAMES W. SEWALL COMPANY

Results of analyses on water samples submitted by Callahan Mining Corporation.

Sample #	Cu (ppm)	Zn (ppm)	Pb (ppm)	Chloride (ppm)
F - 1	0.04	0.30	<0.05	10
5	<0.02	1.00	<0.05	9000
10	<0.02	0.80	<0.05	9650
20	<0.02	0.85	<0.05	9200
50	<0.02	0.65	<0.05	9600

MG/KG? PH ?

F-1 is a fresh water well

Sewell Millett
Mineral Resources Department

Samples 5, 10, 20 & 50 represent their respective depths in the pit

50 Tanner Street
Haddonfield,
New Jersey 08033
May 8, 1973

Maine Sea Farms
Harborside,
Maine 04642

Mr. Bob Mant
Director

Dear Bob:

Thank you for sending the water test results from the Sewall Company.

The figures seem to be within the standards set by the U.S. Dept. of Health & Welfare with the exception of the lead. These standards indicate a"Physiologically"... safe in water for a lifetime at 0.05mg/1

Not being very good at understanding metric conversions I would appreciate your telling me the difference (if any) between .05ppm and .05mg/1. ?

Did you get a Ph reading on the well water ?

Thank you again for sending the results and I hope you don't mind claaring me up on the above.

Hope all the Salmon and Oysters are content and growing, would like to get some from you this summer for smoking.

Sincerely,

Albert Sandecki

50 Tanner Street
Haddonfield,
New Jersey 08033
May 8, 1973

Mr. William Sherman Greene, Jr.
Attorney & Counsellor at Law
Sunset, Maine 04683

Dear Sherman:

Thought I would send you a copy of Mr. Mant's note and the test results from the Sewall Company.

As I understand it F-1 is the well our present system is operating on. I checked his figures with the Public Health Service's drinking water standards and they check out as within the tolerable standards, with the exception of lead, this in any amount is undesireable.

I'm not very good at metric conversions so I have written to Bob Mant asking for the equivalents of parts per million in terms of milligrams per kilograms (the U.S. Dept. of Health & Welfares scale of measurments.) Also asked him for the PH level.

In your letter of the 18th you mentioned that Arnold Veague might have a meeting with Charlee Snead, (now president of Callahan Mg.) in N.Y.C. at the end of April.... any news ?

On this consulting with Arnold Veague, and reflecting on your letter, I sincerely hope there will be an effort to resolve this matter soon... BUT, on the otherhand I hope his involvement does not upset you or the painful progress we have made to date. I am thinking of Fred Beck's expressed intention to check the old wells again this spring and if they are found unsatisfactory to drill a NEW WELL within a more practical distance to our affected houses.

He definately stated that the present cumbersome "temporary system" would be ridiculous and impractical to try to perpetuate.

Hopefully it doesn't but if litigation proves necessary is there a way to enjoin Callahan from cutting off the temporary water system as it now exists ?

In the meantime I will just stew here in N.J. and anxiously wait for the Memorial holiday to get over with so I can head for Harborside.

Best to you and your wife.

Sincerely,

June 7th, 1973

Arnold L. Veague, Esquire,
Six State Street
Bangor, Maine 04401

Dear Arnold:

Fred Beck of Callahan told me yesterday that water tests bottles had been sent to Sewall & Company for testing last Friday. The water was taken from two former wells, which were closed because of high chloride content a few years ago, after which the present two satisfactory wells now being used were dug by Callahan on its property about two years ago.

These two wells were recently tested and found satisfactory.

Fred Beck confirmed what Snead and he had said to us before that Callahan hopes these two old wells may become usable and satisfactory as time goes on. In such case, Callahan will recommend that they be used as well as the two new wells now being used.

Beck also said that he had contracted with a well digger to dig another well on the Cushing and Sandecki property, but that Callahan would not proceed with this well until they were confident the two old wells could not be used. Of course, no one can be certain that such a new well would test as satisfactory, nor that it could supply, especially in the summer, the numerous neighbors involved in this matter.

I told Beck that you and I were insisting on an immediate report as to Callahan's intentions, requesting that he let me know what the latest tests showed and that in any event, we were under instructions to proceed with litigation unless a satisfactory arrangement could be made to assure a good water supply. I told him that in my opinion, at least, this meant a binding agreement with Callahan to pay the expense of either maintaining or digging satisfactory wells for a stated period of time.

Please let me know what you hear from Charles Snead, and I shall keep you informed of any reports sent to me.

Sincerely yours,

WSG:RL

Wm. Sherman Greene, Jr.

bc: Albert E. Sandecki

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

June 6th, 1973

Dear Albert:

Sewall & Co. tells me they are reporting to Fred Beck as to the recent tests. As soon as I hear from Fred Beck or Sewall, I shall send a copy to you.

I talked with Arnold Veague and Charles Snead is going to call him again within a week or so concerning their position as to fresh water for the various parties involved. Arnold Veague made it clear that he and I were demanding an immediate statement, so that we may institute necessary proceedings if a satisfactory agreement was not reached at once.

I have heard nothing further as to the Brooksville matter, but shall let you know if I do.

I shall also write if there are any other developments about Sewall or Callahan, after Arnold Veague hears from them.

Sincerely,

WSG:RL

Mr. Albert E. Sandecki
50 Tanner St.
Haddonfield, N J 08033

JAMES W. SEWALL COMPANY

RESULTS OF WATER SAMPLES (P.4)

SAMPLE NO.	COPPER (ppm)	CADMIUM (ppm)	ZINC (ppm)	CHROMIUM (ppm)	LEAD (ppm)	SALINITY %
33 (surface) 5/25/73	.01	<.01	.08	<.01	<.01	0.71
33 @ 5' 5/25/73	<.01	<.01	0.1	<.01	<.01	9.0
33 @ 10' 5/25/73	<.01	.02	2.0	<.01	<.01	10.0
33 @ 40' 5/25/73	<.01	.02	1.5	<.01	<.01	9.5
Dam outflow 5/25/73	<.01	<.01	.09	<.01	<.01	1.7

RESULTS OF WATER SAMPLES

SAMPLE NO.	CHLORIDES (ppm)
Farnum 6/1 5 min.	340
Farnum 6/1 15 min.	35
Farnum 6/9	32
Farnum 6/9 15 min.	50
Uncle Tom 6/1 5 min.	120
Uncle Tom 6/1 15 min.	380
Uncle Tom 6/9	160
Uncle Tom 6/9 15 min.	180

Sewell Millett

August 24th, 1973

Charles D. Snead, Jr., Esquire
Callahan Mining Corporation
277 Park Avenue
New York, N Y 10017

Dear Charles:

Earlier this week Arnold Veague and I reviewed the situation as to the wells in Harborside and Arnold approved my suggestion that I write you requesting a conference, so that a definite agreement could be worked out with Callahan for the continuing protection of our clients as well as taking care of their damages and expenses at Harborside.

Before I completed my letter to you, I received Fred Beck's letter dated August 21st, 1973, giving a report on the wells and various suggestions concerning "settling the water problems permanently." As to Fred's suggestion that he and you meet with me next week, I would be glad to do so, which I am sure Arnold would approve, but of course we shall be more busy than usual taking care of summer clients before Labor Day and the week after Labor Day would be more practical, if you plan to be here then. If not, I am sure we could get together next week.

As I have frequently said, any solution must be of a permanent nature to assure satisfactory water on a continuing basis with Callahan making a positive agreement therefor. In addition, we must work out the problem of loss, damage and expenses to our various clients.

I have every expectation that these matters may be disposed of satisfactorily without resort to other proceedings.

Please let me know about a conference.

Sincerely yours,

WSGjmL

Wm. Sherman Greene, Jr.

cc: Arnold L. Veague, Esq.
Fred M. Beck
Mr. and Mrs. Brainard Farnham
Albert E. Sandecki

November 6th, 1973

Charles D. Snead, Jr., Esquire
Callahan Mining Corporation
277 Park Avenue
New York, N Y 10017

Dear Charles Snead:

Since our meeting on September 7th, 1973, I have not received any direct reports from you nor Fred Beck as to the current water tests, but this week I talked with Marian Farnham, who has recently returned from the hospital, following a serious operation. She said that Fred had told her last week that the latest tests on the Farnham new well showed no bacteria, but 190 chloride. You will recall that some time ago it was agreed that 150 chloride was the maximum we could accept.

I understood from Marian's report that Fred was going to take another test immediately, and I hope he will let us all know shortly what it shows for this well.

I should like to confirm our agreement of September 7th, 1973 that regardless of current State tests of the Farnham well to be made everytwo weeks by Callahan, you have agreed that Callahan will make the two Callahan wells which have been used for some time ready for instant winter use. The pipes, of course, should be cleaned and the reservoir cleaned and the pipes winterized insofar as possible.

Even if the well on the Farnham premises is found satisfactory, we must have the two wells available at any time.

I was expressly authorized to talk with your plumber in Brooksville at any time to take care of servicing the wells, pipes and all equipment.

In connection with these two Callahan wells, I request that a State test be made in November by Callahan to determine what shape they are now in.

I shall look forward to hearing from Fred Beck soon as to the latest tests of the Farnham well, which I understand is now being used.

Charles B. Snead, Jr., Esquire November 6th, 1973

As soon as I receive it, I shall talk with you and him as to the situation at that time, so that proper water is made available to the Farnhams at all times.

Please keep me immediately advised.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:ML

bc: Fred Beck
Albert E. Sandecki
Mr. and Mrs. Brainard Farnham

November 10th 1973

Mr. William Sherman Greene, Jr.
Attorney & Counsellor at Law
Sunset, Maine 04683

Dear Sherman:

Thank you for the copy of the letter of Nov.6th to Charlie Snead.

I ran into a curious situation while at Harborside in Late October. I had a plumber from Babson & Duffy come to drain the pipes at the Tom Gray house for the winter. I asked him to show me how to disconnect the old original well from the pump that Fred Beck had been taking water samples from. He informed me that the pump was "not" connected and in no way could one draw water from this old well through the pump and tank as it now exists in the cellar.

I have since been wondering if these tests on the Tom Well ever have been reliable ? Then again perhaps Fred had a different way of drawing water from this well for the Sewall tests. I think he ought to be asked about it. Another point concerning this original well, I cannot make head or tail out of Fred Beck's plumbing charges and as I am having new plumbing put into the house I feel that this well and its fittings should be returned to a usable condition in the event it should be needed in the future.

On October 22nd Brainard and I discussed with Fred Beck the problems with the difficulty in opening and closing all three of the underground control valves. All three valves are "extremely" difficult to operate and are absolutly necessary to the winterizing of the water system. He intends to make a new key for the valve stem and we agreed that the valves should be loosened which will require digging them up (again) We also made him aware of the need for a shut-off valve at the "T" junction of the waterline now coming from the reservoir on Dyers Hill, if this is not done and a leak occurs on this line back to the reservoir the well could go out before we were aware of the leak.
Also this line is not securely winterized on the hill.

I intended to call you before I left Harborside to make you aware of these points but you seemed upset when I first called concerning your wife's post accident problems and I did not want to burden you with our situation. I sincerely hope she is feeling better and all is working out well with her recovery and tests.

Please keep us informed of ANY developments on your letter to Charlie Snead.

Sincerely,

cc: Albert Sandecki
Brainard & Marian Farnham

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

November 15th, 1973

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

Dear Albert:

Thank you for your letter of November 10th, 1973. I have written Fred Beck, advising that he telephone me, so that we may discuss not only my letter to Charles Snead last week, but also the points you mentioned in your letter.

I am somewhat uncertain as to the old Farnham well being considered for current use as the tests reported to me and the others on it seem to be too high for consideration, 190 chloride being the last test July 17th, 1973. I shall talk with Fred about getting the water from this well and who is making the test at this time.

I shall also request that he arrange to have a convenient and easy system to use the old well, if it tests satisfactory and is to be used later.

As to the valves and shut-off valve, I shall talk with Fred to see when this can be done.

Please call me at any time, and I shall keep you informed.

I am glad to say that both Betty and I are much better and things are in good shape.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

MAINE DEPARTMENT OF HEALTH AND WELFARE COMPLETION OF THIS AREA IS MANDATORY FOR US TO INTERPRET THE RESULTS

MAY 2 1974
Date reported

Serial No. 446683

Start Analysis

Bottle No. 295

Sequence No. 22

Truck No. 10

Date Shipped

SOURCE
- ☐ dug well
- ☑ drilled well
- ☐ spring
- ☐ well point
- ☐ lake or other

IF A WELL OR SPRING HOW IS IT LINED?
- ☐ concrete
- ☐ clay tile
- ☑ steel casing
- ☐ rock ☐ other

AGE OF WATER SOURCE 2 months

IF A WELL OR SPRING HOW DEEP IS IT? 160 ft.

IS THE TOP ELEVATED ABOVE THE GROUND? ☑ Yes ☐ No

WATER USE
- ☑ drinking
- ☐ swimming

HOW IS IT COVERED?
- ☐ boards
- ☐ wellhouse
- ☐ concrete ☑ other

BOTTLE NO. 02295 **SUPPLY LOCATED IN TOWN OF** Brooksville
DATE OF COLLECTION April 16, 74 **ON THE PROPERTY OF** Albert Jardine

IS THE SOIL?
- ☐ sand ☐ gravel
- ☐ clay ☑ ledge

DISTANCE FROM SOURCE OF POLLUTION

privy .... ft.		sink drain .... ft.	
septic system ... ft.		garden .... ft.	
stable .... ft.		highway .... ft.	
barnyard .... ft.		oil tank .... ft.	
cesspool .... ft.		other .... ft.	

WATER COLLECTED FROM
- ☑ faucet ☐ pail
- ☐ handpump ☐ other

DOES THE WATER HAVE ODOR? TASTE?
☐ yes ☑ no ☐ yes ☑ no

CONSTRUCTED BY
- ☑ contractor ☐ other
- ☐ owner/occup.
- ☐ unknown

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

Name Brainard Jardine
Street or RFD ....
Post Office Harborside, Maine Zip Code 04642
Telephone No. 326-4434

WATER IS USED BY
- ☐ school
- ☐ boarding home
- ☐ nursing home
- ☑ eating place
- ☐ motel
- ☑ lodging place
- ☐ private home
- ☐ public water
- ☐ bottling plant
- ☐ rec. camp (adult)
- ☐ rec. camp (B&G)
- ☐ FHA Loan pending
- ☐ VA Loan pending
- ☐ several families
- ☐ served to public

NAME OF ESTAB. Jardine House

KIND OF PIPING USED
- ☐ copper
- ☐ galvanized
- ☐ plastic
- ☐ lead
- ☐ other

approx. length ....ft.

TYPE OF TREATMENT
- ☐ chlorinator
- ☐ softener
- ☐ pH control
- ☐ iron removal
- ☐ ultra-violet
- ☐ other

USE SERIAL NUMBER WHEN MAKING INQUIRY ABOUT THIS REPORT

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT ☑ SATISFACTORY ☐ SATISFACTORY WITH NOTATION ☐ UNSATISFACTORY

An X in the respective squares furnishes an interpretation of this analysis on reverse side.
1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐ 11. ☐

LABORATORY ANALYSIS ROUTINE SANITARY ANALYSES DO NOT NECESSARILY INCLUDE ALL THE TESTS SHOWN BELOW

Bacteriological Quality
COLIFORM GROUP BACTERIA
The number of positives | Colonies Per 100 ML: 0

mg/L | Color units | Turbidity units | pH | Zinc .08 mg/L

DETERGENTS
☐ Positive
☐ Negative

Hardness — A (√) in this box means the results are less than 50 mg/L ✓ mg/L

Nitrite Nitrogen — A (√) in this box means the results are less than 0.02 mg/L ✓ mg/L

Nitrate Nitrogen — A (√) in this box means the results are less than 1.0 mg/L ✓ mg/L

Chloride — A (√) in this box means the results are less than 10.0 mg/L 13 mg/L

Ammonia Nitrogen mg/L | Albuminoid Nitrogen mg/L

Copper mg/L — A (√) in this box means the results are less than 1.0 mg/L

Iron mg/L — A (√) in this box means the results are less than .2 mg/L

Manganese mg/L

1. COLIFORM GROUP BACTERIA

SIGNIFICANCE

The coliform group of organisms includes E. Coli organisms which inhabit human and animal intestinal tracts and Ent. aerogenes and intermediate type organisms commonly present in the top soils and on various types of vegetation.

The presence of coliform organisms in a drinking water suggests that other fecal organisms may also be present. They also suggest the existence of defects in the protection of the source and/or its distribution system.

Coliform bacteria laboratory results can be reported as (1) number of positive tubes (BGLB method) or (2) number of colonies per 100 milliliter of sample (membrane filter method).

Water containing Coliform organisms should not be used for drinking or cooking purposes unless disinfected or boiled for 5 minutes.

The following guide lines are presently in use:

0 to 1 positive tubes—Satisfactory

2 to 5 positive tubes—Unsatisfactory

0 to 1 col/100ml Satisfactory

2 - up col/100 ml Unsatisfactory

POSSIBLE CORRECTIVE MEASURES

If 2 to 4 colonies per 100 milliliter are or if one positive tube is found in the sample, and the supply is protected with a tight metal or concrete cover and walled so that surface water, light and dust can not enter, and there have been no alterations in the pump or plumbing system, we suggest that another sample be submitted for analysis, carefully following the collection directions to prevent contamination during the sampling process.

Five (5) or more colonies per 100 milliliter or two or more positive tubes, suggest a needed evaluation and possibly the improvement of the protection of the supply. The supply should be sterilized to eliminate any bacteria which may have been introduced prior to or during construction and/or reconstruction.

This sterilization may be accomplished by thoroughly mixing about one gallon of bleach water, Clorox, Dazzle, or similar product, obtained at grocery or hardware stores, in a pail of water, pour this solution into the well, spring, reservoir, or cistern and then stir the water, if possible, so as to thoroughly mix the disinfectant in the water supply. Open all the various faucets, sill-cocks and similar outlets until the odor of chlorine is noted, then allow the mixture to stand in the system a few hours. Before submitting a sample of water for analysis, test by smelling to see that there is no odor of chlorine present.

NOTE: All lake, stream or pond waters used for drinking or cooking purposes need to be continuously and efficiently filtered and sterilized.

2. TURBIDITY, COLOR AND ODOR

SIGNIFICANCE

Although these tests do not directly measure the safety of the water, they do relate to an individual's acceptance of a water. The levels of 5 units of turbidity, 15 units or color, and odor number of 3 are levels which are objectionable to a number of people.

POSSIBLE CORRECTIVE MEASURES

Turbidity and color may be removed by entanglement with a chemical floc, setting, and filtration. Activated carbon cartridges will remove tastes and odors by adsorption.

If a supply suddenly develops an offensive odor, discontinue using the water for drinking and cooking purposes until another analysis shows the water is satisfactory for such purposes.

3. CHLORIDES

SIGNIFICANCE

Chlorides in normal ground waters fall in the 1 to 2 milligram per liter (mg/L) range, and in reasonable concentrations, are not harmful to humans. Concentrations of 250 mg per liter of Chloride and above give a salty taste to water which is objectionable to many people, and are judged unsatisfactory.

POSSIBLE CORRECTIVE MEASURES

Chlorides may enter ground water from a variety of sources, such as natural mineral deposits, sea water infiltration of subterranean water supplies, highways, kitchen and other household waste-water. Concentrations over 20 mg/L suggest the presence of one of the above sources of salt.

One should attempt to locate and eliminate the sources of chlorides and hope that in time the water will return to its natural state. Chloride removal equipment capable of treating 5 to 10 gallons per day is available for home use, and we suggest you check with a water treatment specialist.

4. NITROGEN COMPOUNDS

SIGNIFICANCE

The compounds of nitrogen are of great interest because of the importance of nitrogen in the life processes of all plants and animals. The nitrate, nitrite and ammonia determinations are pf particular interest in identifying possible sources and age of pollution.

NITRATE Nitrates, in high concentrations, can and do cause methemoglobinemia or so-called nitrate poisoning in infants. Supplies with 10 or more mg of N/L are judged unsatisfactory and are not considered safe for drinking or cooking. It is especially dangerous to children and should never be used in infants formulas.

NITRITE Nitrite in water poses a greater health hazard, but fortunately it seldom occurs in high concentrations. Waters with nitrite-nitrogen concentrations over 1 mg/L should not be used for infant feeding.

POSSIBLE CORRECTIVE MEASURES

Nitrogen compounds result from drainage from privies, private sewage disposal systems, manure piles, gardens, heavily fertilized land or similar sources of pollution. Once the source of pollution is located and removed, the waters may take a number of years to return to normal.

Nitrate removal equipment is available for home use, and we suggest you check with a water treatment specialist.

5. HARDNESS

SIGNIFICANCE

Hard waters are as satisfactory for human consumption as soft waters. But because of their adverse action with soap, and their tendency to produce scale in hot-water pipes, heaters, etc., it may be desirable, from the economics standpoint, to install a domestic water softener.

Waters nationwide are classified as follows:

0-75 mg/L of calcium carbonate	Soft
75-150 mg/L of calcium carbonate	Moderately hard
150-300 mg/L of calcium carbonate	Hard
300-up mg/L of calcium carbonate	Very hard

POSSIBLE CORRECTIVE MEASURES

The hardness in water is derived largely from calcium and magnesium dissolved from the soil and rock formations and may be removed by one of several methods—precipitation, ion exchange or a combination.

6. COPPER

SIGNIFICANCE

In-as-much as copper is an essential and beneficial element in human metabolism and does not constitute a health hazard but does impart an undesirable taste to water when present in concentrations of 1 to 5 milligrams per liter (mg/L, waters are judged undesireable at 1.0 mg/L.

POSSIBLE CORRECTIVE MEASURES

Since copper is not naturally found in Maine's ground waters, but is introduced when acid waters come in contact with copper pipes, this is best eliminated with pH control equipment or changing to plastic pipe.

7. IRON AND MANGANESE

SIGNIFICANCE

Both iron and manganese are highly objectionable constituents in domestic water supplies. Iron and manganese impart a brownish color to laundered goods and can appreciably effect the taste of beverages, including coffee or tea.

Waters with a combined concentration of iron and manganese greater than 0.3 milligrams per liter are considered undesirable.

POSSIBLE CORRECTIVE MEASURES

There are a number of domestic iron and manganese removal units commercially available from water treatment specialists.

8. DETERGENTS

SIGNIFICANCE

A positive detergent test suggests a poorly constructed and/or located private sewage disposal unit which if not corrected may result in a grossly contaminated water supply.

9. SWIMMING ANALYSIS

The sample submitted is satisfactory for swimming purposes as long as conditions remain the same.

10. OLD SAMPLES

Water samples arriving at the laboratory 72 hours or more after the sampling time will not give a true representation of the bacterial quality of the water and will be reported without bacteriological analysis unless unsatisfactory.

11. MISC.

Water bottles which are received without the information portion of the form completed, cannot be properly interpreted and will not be interpreted.

#07864
Cushing well
#07867
Tom well.
TEST TAKEN
July 17 & 19 DATA SHEET:
4:30 PM.

STATE DEPARTMENT OF HEALTH AND WELFARE
PUBLIC HEALTH LABORATORY

DIRECTIONS FOR COLLECTION OF WATER SAMPLES

DATA SHEET: FILL IN ALL REQUESTED DATA. Type or use a ball point pen or a heavy soft black pencil. Be sure to note special problems such as metalic taste, odors, colored water, or staining of laundry or fixtures. **BE SURE TO INCLUDE DATE SAMPLE WAS COLLECTED!**

SAMPLE CONTAINERS: Water test kits consist of 2 eight ounce sample containers for chemical and bacteriological examinations. **THE 8 OUNCE BOTTLES ARE STERILE. DO NOT OPEN UNTIL READY TO COLLECT SAMPLE. TAKE CARE NOT TO TOUCH LIP OF BOTTLE OR INSIDE OF CAP.**

COLLECTION PROCEDURE: **WHENEVER POSSIBLE, COLLECT THE SAMPLE FROM A FAUCET** since collection directly from the well or spring is difficult and almost invariably results in accidental contamination of the sample. It is also difficult to obtain a satisfactory sample from a hand pump. **BOTH BOTTLES NEED TO BE FILLED FROM THE SAME SAMPLING POINT.**

FAUCET SAMPLES: If the faucet is equipped with a strainer or aerator, remove before collecting sample. **FLAME THE FAUCET THOROUGHLY WITH CANDLE FLAME OR OTHER LONG BURNING FLAME. THE METAL MUST BECOME HOT.** Allow water to run 5 to 10 minutes to clear pipes.

PONDS OR STREAMS: In collecting from a pond or stream for bacteriological examination, remove cap carefully, push bottle through water rapidly with a sweeping motion.

TIME OF COLLECTION OR MAILING: **TAKE SAMPLE JUST BEFORE MAILING.** Since the age of a water sample has a direct bearing on the accuracy of the laboratory results, water samples should be collected just before the samples are mailed or brought to the laboratory.

Samples should be mailed on Monday, Tuesday, or Wednesday so that they will not be delayed in the post office over the weekend. However, samples may be brought to the laboratory at the Health and Welfare Building, State House Complex, State Street, Augusta, any time Monday through Friday during these hours:

8 A. M. to 3 P. M.

WHEN TO EXPECT THE LABORATORY RESULTS: Because the demands on the laboratory are extremely heavy, it takes a **MINIMUM OF 7 TO 10 DAYS** between receipt of the sample and the mailing of the report. In the summer, it often takes a **MINIMUM OF 10 TO 15 DAYS.** Containers should be returned within two weeks. Delays mean other applicants are kept waiting.

RESAMPLING: If you find it necessary to request additional test kits because of unsatisfactory bacteriological results, please specify that you wish a bacteriological test kit only. Also indicate previous serial #. These results are usually mailed out 3 to 5 days after the receipt of the sample. **NOTE:** The usual service charge should be submitted with your request for a test kit for resampling.

CAUTION: Water samples arriving at the laboratory 72 hours or more after the sampling time will not give a true representation of the bacterial quality of the water and **WILL BE REPORTED WITHOUT BACTERIOLOGICAL ANALYSIS** unless unsatisfactory. Samples which are received without the information portion of the form completed, **CANNOT BE PROPERLY INTERPRETED AND WILL NOT BE INTERPRETED.**

INTERPRETATION & INFORMATION: Correspondence and telephone calls relative to a water analysis should refer to the report serial number.

September 4, 1974

Callahan Mining Corporation
41 Union Wharf
Portland, Maine 04111

Mr. Frederick Beck
Exploration Mgr.

Dear Fred:

Missed you at Harborside last week, your secretary said you were on the Cape and Brainard and I have been wanting to talk with you concerning the water.

Mr. Snow never made it to try the second step in trying to clear the well by dumping the washed gravel to form a filter bed. Possibly he has been there since we left on August 29th.

As you know the raising of the pump 20' seemed to ease the dark gray water for about three days but the water came in as gray as ever shortly there after.

Possibly the water has cleared some by now as two of the households are off the well.

There will be three houses using the water continuously now as the Tom House is rented starting this October. I hope to return in October and January with the family and perhaps you can get Mr. Snow to work on a permanent winterizing of the tanks in the Cushing house and freeing up those damn valves (which I could not turn off again) before cold weather sets in and the ground freezes.

We all would be dissapointed if the well fails and your alternatives on using washed gravel or driving a deeper casinghave us hopeful that this well will hold.

I am sending a copy of this letter to Brainard as he was very anxious to talk with you last week. You might consider calling on him the next time you are up to the mine-site.

Sincerely,

Albert Sandecki

cc: Brainard Farnham
CMP

50 Tanner Street
Haddonfield,
New Jersey 08033
June 6, 1974

Callahan Mining Corporation
41 Union Wharf
Portland, Maine 04111

Mr. Fred Beck
Dist. Expl. Mgr.

Dear Fred:

Ref: Landscape clean-up of Sandecki property at new well head area, Harborside, Maine.

LABOR: Two men 6 hrs. @$ 2.50/hr. .....$ 30.00

MATERIALS: 5 lb. Grass seed..... 3.79

Broken rake (replacement)..... 4.59

Total $ 38.38

At your direction for Mr. Snead's consideration, I would like to suggest the following:

The exposed well-head and electrical conduit seems to represent a physical hazard to persons using the property. In lieu of cutting the well-head casing and electrical connections to below or ground level and to avoid another landscaping problem, I would like to request that we match funds to purchase a round picnic table to be placed over the exposed well casing, for its protection and those making use of the yard area.

A barrel was considered but rejected as I believe the well head is vented and this type of enclosure may create a haven for verminous creatures that might enter the system causing a future problem of contamination of the water supply.

Table prices as quoted by SEARS & ROEBUCK COMPANY of Moorestown, New Jersey are as follows:

60" round... $ 70.00 to 89.99 Redwood (w/o Benches)

48" round... $ 40.00 to 59.99 Stained Pine (w/o Benches)

I hope there will be a meeting this July towards resolving the water situation with all parties involved.

Sincerely,

Albert E. Sandecki

cc: Mr. Charles D. Snead, Jr.

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE

2 Water sample container(s) (2 bottles each) is/are being sent to you on 7-15-74 by United States Mail.

As we use hundreds of these each month, in order to supply the requests from other persons without delay it is requested that each container be returned to us promptly when received.

MAIL Mon.-Thurs. Avoid Week-end delay
PLEASE RETURN TO MAINE DEPARTMENT OF HEALTH AND WELFARE
PUBLIC HEALTH LABORATORY
AUGUSTA, MAINE 04330

HPHL-10 Rev. 572

TAKEN JULY 17 74

200/SAMPLES
1.60 POSTAGE
+
TOTAL → 5.60

DEPARTMENT OF HEALTH AND WELFARE

Public Health Laboratory

State House, Augusta, Maine

We have your request for a test of your drinking water.

It has become necessary to make a service charge of $2.00 for each test of a private water supply in order to meet the increasing cost of providing this service.

TO EXPEDITE YOUR ANALYSIS WE ARE SHIPPING THE CONTAINER WITH THE SERVICE CHARGE UNPAID.

The service charge may be remitted in the questionnaire envelope when you return your sample. Please make your check or money order for $2.00 payable to "Treasurer of State."

2 CHECKS

Form Letter PHL #6

Herbert T. Silsby, II · William S. Silsby, Jr. · Frank B. Walker · James A. Silsby

LAW OFFICES OF

SILSBY & SILSBY

ELLSWORTH, MAINE 04605

Albert E. Sandecki

50 Tanner Street

Haddonfield, New Jersey 08033

July 16, 19 71

DATE	STATEMENT	DEBIT	CREDIT	BALANCE
	To Professional Services			
	To statement rendered November 24, 1967			$100.00

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

September 20th, 1973

Mr. Albert E. Sandecki,
50 Tanner Street
Haddonfield, N.J. 08033

Dear Albert:

Thank you for your letter of September 17th, 1973. I have been so busy since the meeting on September 7th, 1973 that I have not been able to send a full report to you.

When you are here in October, I should like to go over the entire conference with you and the Farnhams.

Callahan stated that the chloride content was being reduced in all wells and that they hope the Farnham's new well could be used for all purposes soon. They also state that tests at their expense for all purposes would be continued throughout the winter. Another test was to be made after our meeting, but I have not received a report about it.

We discussed the disposition of claims by my clients of every nature, including expenses, cost of equipment and loss of water use and Callahan's obligation to maintain or install additional wells in the future.

Callahan would not agree at this time to any disposition of these claims and Mr. Veague and I made it clear that while we would await further water tests, all matters involved would have to be resolved to our satisfaction before May 30th, 1974, otherwise proceedings might become necessary to determine the rights and damages of our clients.

I shall go over these specific questions with you in more detail when I see you.

Callahan agreed to maintain the two new wells on its property, from which water is now being received, for use this fall and winter, whatever wells are used. They will clean the reservoir and the system, so that it may be used at any time. Callahan did not agree to winterize the water pipes, but authorized me to request a Harborside plumber to take care of things at their expense, if necessary.

I am sure Callahan realizes that Arnold Veague and I both plan to proceed as necessary to protect our clients in every way, unless

a voluntary and satisfactory solution is agreed to by Callahan next spring.

I shall look forward to seeing you next month and shall discuss our conference in detail.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

Gardiner—Norman P. Whitzell D.
12 Spruce Street 04345
Winslow—Donald V. Carter D. 7 Baker St. 04901
Benton—Guy I. Hunter R. R 1, Clinton 04927
China—Carroll W. Farrington R. So. China 04358
Chelsea—Stanley F. Shaw R.
RFD 2, Gardiner 04345
West Gardiner—Charles G. Dow D.
R 3, Gardiner 04345
Wayne—David R. Ault R. 04284
Oakland—Francis B. B. Brawn R.
230 Summer Street 04963

Knox County

Rockland—David F. Emery R.
192 No. Main Street 04841
Vinalhaven—Edwin F. Maddox R. Box 126 04863
Camden—Albert W. Hoffses R.
Washington Street 04843
Union—Dorothy McCormick R. Box 422 04862

Lincoln County

Nobleboro—Linwood E. Palmer, Jr. R. 04555
Southport—Ransom P. Kelley R.
P.O. Box 128, West Southport 04576
Bristol—Edward B. Lewis R. Pemaquid 04558

Oxford County

Rumford—Albert Theriault D.
132 Penobscot Street 04276
Mexico—Emile J. Fraser D. 47 Osgood Ave. 04257
Dixfield—John H. Rollins R. East Dixfield 04227
West Paris—Jacob J. Immonen R. 04289
Norway—Lowell D. Henley R. Box 28 04268
Fryeburg—C. Allan Trumbull R. 04037
Bethel—J. Jay Willard R. 04217

Penobscot County

Bangor—Raymond J. Curran D.
188 Maple Street 04401
Bangor—Edward C. Kelleher D. 29 Vine St. 04401
Bangor—John R. McKernan, Jr. R.
256 Kenduskeag Avenue 04401
Bangor—Frank John Murray D.
215 Maple Street 04401
Bangor—Robert N. Soulas R. 55 Palm St. 04401
Brewer—John M. Norris II R. 9 North Road 04412
Old Town—Joseph E. Binnette D.
128 South Brunswick Street 04468
Millinocket—Leon J. Crommett D.
413 Penobscot Avenue 04462
Exeter—Stewart Smith D. East Corinth 04427
Hampden—Roderick E. Farnham R.
M.R.C., Box 17, Bangor 04401
Hermon—Lloyd R. Littlefield R.
M.R.C., Box 161, Bangor 04401
Dexter—Harold J. Keyte D. 34 Pleasant St. 04930
Alton—Harold E. Barnes, Sr. R.
R 1, Old Town 04468
Orrington—Ethel B. Baker R. 04474
Orono—Theodore S. Curtis, Jr. R.
Woodhaven Road 04473
Enfield—James T. Dudley D. West Enfield 04493
Lincoln—Walter W. Cameron R.
101 Main Street 04457
Mattawamkeag—Edna M. Murchison R. 04459
East Millinocket—Walter A. Birt R.
33 Pine Street 04430

Piscataquis County

Guilford—Charlotte H. White R. 04443
Milo—Claude N. Trask R. 3 Main St. 04463
Dover-Foxcroft—Douglas M. Smith D.
Box 162 04426

Sagadahoc County

Bath—Kathleen Watson Goodwin D.
409 High Street 04530
Bath—Rodney E. Ross, Jr. R.
1024 Washington Street 04530
Bowdoinham—Bert D. Merrill R. Box 65 04008
Topsham—Lorraine N. Chonko D.
New Lewiston Road, Pejepscot 04067

Somerset County

Skowhegan—C. Everett Dam D.
102 Beech Street 04976
Fairfield—William R. Lawry D.
4 Osborne Street 04937
Pittsfield—Roosevelt T. Susi R. Box 236 04967
Harmony—Fredrick C. Herrick R. 04942
Madison—Glenys W. Berry R.
RFD 1, Box 447 04950
Solon—Raymond N. Faucher D. Solon Hotel 04979

Waldo County

Belfast—Donald J. Webber D.
44 Union Street 04915
Freedom—Lee E. Evans R. 04941
Brooks—Myron E. Wood R. 04921
Stockton Springs—Melvin A. Shute R.
School Street 04981

Washington County

Addison—Bertram E. Davis R. 04606
Machias—Dorothy B. Kelley R. 04654
Lubec—John A. Donaghy R. 04652
Eastport—Kenneth A. Mills D. 56 High St. 04631
Calais—Harold L. Silverman R. Box 336 04619

York County

Biddeford—Robert M. Farley D.
45 Myrtle Street 04005
Biddeford—Armand Fecteau D. 131 Pool St. 04005
Biddeford—Carl F. Sheltra D.
249 Granite Street 04005
Sanford—Howard A. Chick R. Maurice Ave. 04073
Sanford—Roland A. Gauthier D.
67 North Avenue 04073
Saco—Barry J. Hobbins D.
14 Promenade Avenue 04072
Kittery—Henry W. Hodgdon R.
11 Sterling Road 03904
Kennebunk—James K. McMahon R.
41 Grove Street 04043
Old Orchard Beach—Leatrice M. Morin D.
27 Adelaide Road 04064
York—Neil Rolde D. P.O. Box 304, 03909
South Berwick—Harland C. Goodwin, Jr. D.
10 Parent Street 03908
North Berwick—Ralph C. Cressey R.
Market Street 03906
Berwick—Richard W. Stillings R. 03901
Kennebunkport—Elmont S. Tyndale R. RFD 2 04046
Buxton—Philip P. Berry D. RFD 1, Saco 04072
Parsonsfield—Norman G. Pratt R.
Kezar Falls 04047

Republicans	79
Democrats	72
Total	151

The One Hundred and Sixth Maine Legislature

ADVANCE LIST OF

State Senators

AND

Representatives to the

Legislature

OF THE

State of Maine

Apparently elected November 7, 1972

Courtesy of

NATURAL RESOURCES COUNCIL OF MAINE

106th Legislature

Advance List of State Senators and Representatives to the Legislature of the State of Maine Apparently Elected—November 7, 1972.

STATE SENATORS

District 1
Eliot—Walter W. Hichens R. Box 211 03903
District 2
Biddeford—Guy A. Marcotte D. 66 May St. 04005
District 3
Sanford—John B. Roberts R.
6 Washington Street 04073
District 4
Saco—Peter W. Danton D. 7 Beach St. 04072
District 5
Norway—David F. Aldrich D. Pleasant St. 04268
District 6
Cumberland—Harrison L. Richardson R.
250 Blanchard Road 04021
District 7
Gorham—Linwood E. Graffam R. 6 Park Lane 04038
District 8
Cape Elizabeth—Richard N. Berry R.
Ocean House Road 04107
District 9
Portland—Gerard P. Conley D. 29 Taylor St. 04102
District 10
Portland—Joseph E. Brennan D.
92 Craigie Street 04102
District 11
Brunswick—Richard A. Morrell R.
2 Brecken Road 04011
District 12
Auburn—Richard B. Olfene R.
Beech Hill Road, Rte. 4, Box 191A 04210
District 13
Lewiston—Robert W. Clifford D.
14 Nelke Place 04240
District 14
Lewiston—Carroll E. Minkowsky D.
1 South Avenue 04240
District 15
Winthrop—Jerrold B. Speers R. RFD 1 04364
District 16
Hanover—Norman K. Ferguson R. Box 38 04237
District 17
Farmington—Elden H. Shute, Jr. R.
7 Knowlton Avenue 04938
District 18
Waterville—Cyril M. Joly, Jr. R.
63 Mayflower Hill Drive 04901
District 19
Augusta—Bennett D. Katz R.
27 Westwood Road 04330
District 20
Woolwich—T. Tarpy Schulten R.
Old Stage Road 04579
District 21
Rockland—Paul R. Huber R.
22 Samoset Road 04841
District 22
Morrill—Edwin H. Greeley R. 04952
District 23
Pittsfield—Alton E. Cianchette D.
9 Libby Street 04967
District 24
Newport—Minnette H. Cummings R.
24 High Street 04953
District 25
Bangor—John H. Cox R. 239 Essex St. 04401
District 26
Brewer—Kenneth P. MacLeod R.
203 Parkway North 04412
District 27
Old Town—Joseph Sewall R. P.O. Box 433 04468
District 28
Ellsworth—Frank Whitehouse Anderson R.
8 Laurel Street 04605
District 29
Milbridge—J. Hollis Wyman R. 04658
District 30
East Millinocket—Wakine G. Tanous R.
29 Main Street 04430
District 31
Caribou—Peter S. Kelley D. 16 Teague St. 04736
District 32
Madawaska—Edward P. Cyr D. Box 249 04756
District 33
Houlton—Arnold S. Peabody R.
73 Bangor Street 04730

Republicans	23
Democrats	10
Total	33

REPRESENTATIVES

Androscoggin County
Lewiston—Georgette B. Berube D.
195 Webster Street 04240
Lewiston—Albert E. Cote D. 138 Bartlett St. 04240
Lewiston—Emile Jacques D. 31 Pleasant St. 04240
Lewiston—Louis Jalbert D. 39 Orestis Way 04240
Lewiston—George F. Ricker D.
65 Cumberland Avenue 04240
Lewiston—Roland D. Tanguay D.
13 Wilson Street 04240
Auburn—Frank M. Drigotas D. 402 Court St. 04210
Auburn—Joyce E. Lewis R. R R 3 Maple Hill 04210
Auburn—Bertrand L. Pontbriand D.
374 Main Street 04210
Auburn—Peter T. Snowe R.
114 Nottingham Road 04210
Durham—James E. Tierney D.
RD 2, Lisbon Falls 04252
Livermore Falls—Arthur P. Lynch D.
41 High Street 04254
Poland—Philip E. Dunn R.
RFD 1, Box 280, Mechanic Falls 04256
Sabattus—Leighton Cooney D. Box 246 04280
Aroostook County
Caribou—Ezra James Briggs R.
40 Pioneer Avenue 04736
Caribou—Hayes E. Gahagan R.
27 Hammond Street 04736
Houlton—Roy A. Bither R. 13 Elm St. 04730
Houlton—Floyd M. Haskell R.
21 Highland Avenue 04730
Presque Isle—James P. Dunleavy D. Box 33 04769
Presque Isle—Harry K. Parks R.
16 Hillside Street 04769
Limestone—Thomas P. Albert D. 04750
Easton—Luman P. Mahany D. 04740
Island Falls—Vaughan A. Walker R. 04747
Bridgewater—Louis F. Finemore R.
Box C, Main Street 04735
Westfield—Herschel L. Good R. RFD 04787
Perham—Harold Bragdon R. R 1, Washburn 04786
Eagle Lake—John L. Martin D. P.O. Box 276 04739
Fort Kent—Valier E. Morin D. 04743
Madawaska—Edward A. McHenry D.
9 North 13th Avenue 04756
Van Buren—Allen J. Ouellette D.
5 St. John Avenue 04785
Cumberland County
Portland—Anne M. Boudreau D.
81 Lincoln Street 04101
Portland—Laurence E. Connolly, Jr. D.
91 State Street 04101
Portland—John B. Cottrell, Jr. D 36 June St. 04102
Portland—Jane Callan Kilroy D.
60 Brighton Avenue 04102
Portland—Thomas R. LaPointe D.
317 Deering Avenue 04103
Portland—Thomas J. Mulkern D.
28 Munjoy South 04101
Portland—Mary Najarian D.
173 Pleasant Avenue 04103
Portland—John B. O'Brien D.
194 Pleasant Avenue 04103
Portland—Domenico A. Santoro D.
43 Deering Street 04101
Portland—Gerald E. Talbot D.
132 Glenwood Avenue 04103
Portland—Mildred F. Wheeler D. 29 Pya Rd. 04103
South Portland—James J. Conley D.
624 Broadway 04106
South Portland—E. Lyle Flynn R.
341 Sawyer Street 04106
South Portland—Stephen L. Perkins R.
805 Main Street 04106
Westbrook—J. Robert Carrier D.
315 Bridge Street 04092
Westbrook—Maurice Aime Deshaies D.
215 Pierce Street 04092
Brunswick—Bertrand M. LaCharite D.
P.O. Box 462 04011
Brunswick—Patrick N. McTeague D.
39 Columbia Avenue 04011
Scarborough—Patricia S. Knight R.
Kirkwood Road 04074
Falmouth—David G. Huber R.
430 Blackstrap Road 04105
Cape Elizabeth—Richard D. Hewes R.
38 Ocean View Road 04107
Gorham—Calvin H. Hamblen R. Hamblen Rd. 04038
Windham—Thomas J. Peterson D.
RFD 1, Lantern Lane, South Windham 04082
Casco—Owen L. Hancock D. 04015
Standish—Larry E. Simpson R. Sebago Lake 04075
Cumberland—William J. Garsoe R.
Blanchard Road 04021
Yarmouth—Patrick T. Jackson, Jr. R.
40 Main Street 04096
Freeport—Nancy R. Clark D.
RFD 2, Lambert Road 04032
Franklin County
Jay—Sidney D. Maxwell D. Box 511, Wilton 04294
Farmington—Richard G. Morton R. Box 224 04938
Strong—Roswell E. Dyar R. 04983
Hancock County
Stonington—Lawrence P. Greenlaw, Jr. D. 04681
Orland—Eugene L. Churchill R. 04472
Ellsworth—Cecil H. McNally R.
152 West Main Street 04605
Bar Harbor—James C. MacLeod R.
54 Kebo Street 04609
Gouldsboro—Walter L. Bunker R. Ashville 04607
Kennebec County
Augusta—Brooks Brown, Jr. R. Alton Road 04330
Augusta—David Bustin D. 6 Colony Road 04330
Augusta—Stanley E. Sproul R.
9 Mayfair Circle 04330
Waterville—Richard J. Carey D.
27 Sterling Street 04901
Waterville—Robert C. Ferris R.
11 First Rangeway 04901
Waterville—Arthur E. Genest D.
23 Pleasantdale Avenue 04901

September 17, 1973

Dear Sherman:

I can no longer resist writing you concerning the September 7th meeting at the JedProuty Tavern.

Not hearing from you leads me to wonder if the meeting was postponed (or) it brought up many complicated factors necessitating drafts and re-drafts of proposals a la Callahan Mining.

I hope to return to Harborsdde in October but no positive date yet.

Sincerely,

Albert Sandecki

August 29th, 1973

Arnold L. Veague, Esquire,
Six State Street
Bangor, Maine 04401

Dear Arnold:

After we arranged for your meeting with Charles Snead and Fred Beck on August 30th, 1973, Jed Prouty Tavern twelve noon, Snead telephoned me to say that he hoped we could work out a later date, so that all of us could go over the possible solution. It was my understanding that he had discussed such a time with you and we agreed that I would attend a conference on September 7th, 1973, same place and time.

Unless I hear otherwise, I shall attend.

My suggestions are the same as to what we should discuss.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Albert E. Sandecki

CALLAHAN MINING CORPORATION

277 PARK AVENUE · NEW YORK, N.Y. 10017
TELEPHONE: (212) 826-2950

PLEASE ADDRESS REPLY TO
41 UNION WHARF
PORTLAND, MAINE 04111
TEL: (207) 772-3789

August 21, 1973

Mr. Sherman Greene
Sunset, Maine 04683

re: Harborside water wells

Dear Sherm:

Water testing of the wells at Harborside has provided encouraging results and it would appear that the wells have recovered sufficiently so that the users can again begin using potable water from them. As time goes on, these wells should improve even more.

The results are as follows:

Farnham ("Uncle Tom's")

Pumping Time	Chlorides
June 1, 1973---5 min.	120 ppm (Sewall)
June 1, 1973---15 min.	380 ppm (Sewall)
June 9, 1973---5 min.	160 ppm (Sewall)
June 9, 1973---15 min.	180 ppm (Sewall)
July 17, 1973---10 min.	220 ppm (State)
July 17, 1973---20 min.	190 ppm (State)

Farnham deep well

Pumping Time	Chlorides
June 1, 1973---5 min.	340 ppm (Sewall)
June 1, 1973---15 min.	35 ppm (Sewall)
June 9, 1973---5 min.	32 ppm (Sewall)
June 9, 1973--- 15 min.	50 ppm (Sewall)
June 26, 1973---5 min.	130 ppm (Sewall)
June 26, 1973---20 min.	180 ppm (Sewall)
June 26, 1973---21 min.	190 ppm (Sewall)
July 5, 1973---? min.	62 ppm (State)
July 17, 1973---30 min.	68 ppm (State)
July 31, 1973---5 min.	133 ppm (State)
July 31, 1973---6 min.	124 ppm (State)

Mr. Sherman Greene
Sunset, Me.

re: Harborside water wells

We have some reason to be skeptical of the Sewall Company chloride analyses. However, the State analyses are of course probably accurate.

The bacteria analyses for some samples from both Uncle Tom's and the deep well have shown no bacteria. Other samples from the same wells, including the July 31st samples, show a bacteria content. This is, in all probability, due to a dirty faucet or other similar contamination. We will be taking samples again next week and will take extra care in getting the samples.

We would like to discuss with you the possibility of settling the water problems permanently by 1) returning users to their own systems, 2) paying for periodic water analysis for the next year, and 3) granting to the property owners affected by the water problems the right to use water from Callahan's wells for a period of time--say up to 3 years. We would agree to leave the present water system intact for this purpose. Would sometime next week be convenient for Charlie Snead and I to meet with you? Please let me know.

Very truly yours,

Fred

Frederick M. Beck
Director of Exploration

cc: C. D. Snead, Jr.

FMB/ebw

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

December 6, 1971

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

Dear Albert:

Thank you for your letter of December 1, 1971.

The November 1, 1971 Augusta water test of the Smith well, a copy of which I enclose, indicates no lead and low chloride. However, I have asked that Callahan have Augusta check the next sample thoroughly.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:KL

encl.

PENOBSCOT UNIT
CALLAHAN MINING CORPORATION
HARBORSIDE, MAINE 04642

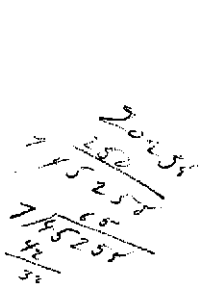
July 21 - #1 - 200 PPM
#2 - PUMP FAILURE
July 28 - #1 - 200
#2 - 217

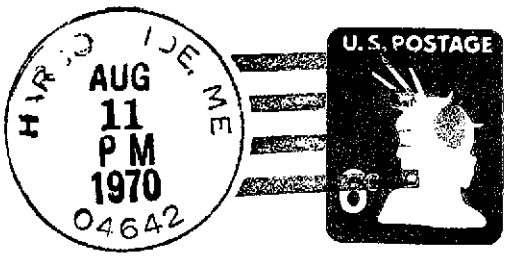
Aug 5 - #1 - 197
#2 - 340

Aug 11 - #1 - 200
#2 - 325

Aug 18 #1 - 200
#2 - 342

July 14 - #1 125
#2 97
" 15 - #1 165
#2 145





Mr. Albert Sandecki
Harborside
Maine 04642

GREENE CALL
13 AUG 70 1:50

SHERMAN GREENE . 348-2881
SECRETARY 367-2230

AUGUSTA TESTS.

388527 JULY 21/70

P.H 6.4 BOT # 359

CHLOR 75.

CU. .16

LEAD T T = 2.1 PPM.

ZINC 9.6

389810 AUG 20/70

P.H. 6. BOT # 214.

CHLOR. 225.

CU. .16

LEAD .1

ZN. .75.

BOTH TESTS. DID NOT INDICATE FINAL RESULTS. SAT. QEST. UNSAT.

FEB 19 1971

347278

CHL - 189

PH - 7.9

MAR 18

347354

CHL - 197

PH 7.1

ZN. 56

HARDNESS 246

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

SE-1 1. 8-68

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number 121 Date of Collection MARCH 9 1970 Time of Collection 3:30 P.M.

Source of Water ☑ Well, ☐ Spring, ☐ Other _____ Located on Property of [illegible]

Well or spring, how lined? ☐ rock, ☐ concrete, ☐ tile, ☐ other _____ How covered? ☐ boards, ☒ concrete, ☐ other _____ Is top elevated above ground? ☒ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name CROCKHAM MINING CO.

Street or RFD _____

Post Office [illegible] 04462

Zip Code

Kind of pipe used ☐ plastic ☑ galvanized ☐ copper ☐ other _____

Length 22 ft.

If a well, was it ☐ dug, ☐ driven, ☐ drilled?

How long ago? JAN. 1967

Depth? 265'

Distance from nearest privy [illegible] ft.; stable _____ ft.; barnyard _____ ft.; sinkdrain _____ ft.; public or private sewer [illegible] ft.; septic tank and laterals 110 ft.; garden _____ ft.; manure pile _____ ft.; cesspool _____ ft.; other _____ ft. Nature of soil ☐ clay ☐ sand ☐ gravel ☐ other _____ Does the water have an unpleasant odor or taste? ☐ Yes ☒ No How is water drawn ☐ pail ☒ faucet ☐ other _____

Method of purification ☐ boiling ☐ chlorination ☐ other _____ Is water used by city or town? ☐ Yes ☒ No

If yes, give name of water company _____ Any change to supply since last analysis? ☐ Yes ☐ No If Yes, what? _____ Is water used by a ☐ School ☑ Private Home ☐ VA ☐ FHA ☐ Other _____ or by a licensed establishment such as: ☐ Swimming Area ☒ Boarding Home ☑ Eating Place ☒ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls') ☐ Nursing Home ☐ Other _____ Located in city or town of BROOKSVILLE, ME.

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 284735 Date MAR 16 1970

☒ SATISFACTORY ☐ QUESTIONABLE (Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) ☐ UNSATISFACTORY (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☑ large number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☒ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☐ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☐ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. ☒ The lead report on this sample will be sent at a later date.

Division of Sanitary Engineering

BACTERIA COLIFORM GROUP

Bottle #	10	BGLB
1		
2		
3		
4		
5		

DO NOT WRITE ON THIS SIDE

Serial No. 284735

Start of Analysis MAR 5 [illegible]

LABORATORY ANALYSES

Results in parts per million.
To change into grains per U.S. gallon, multiply by 0.058.

Bottle No. 191

Sequence No. 6

Truck No. 3

TURBIDITY

RESULTS 0

COLOR

RESULTS 0

NITRITES

.15 5

RESULTS .0015

FREE AMMONIA

RESULTS 0

ALBUM. AMMONIA

RESULTS

NITRATES

9.

RESULTS .01

pH

RESULTS 2.5

CHLORIDES

29.5
29.0
1.5
1.3

RESULTS 130.

HARDNESS

20.2
10.6
4.6

RESULTS 192.

SEDIMENT AND ODOR

RESULTS

COPPER

Bottle # 14

Result .04

IRON

RESULTS

MANGANESE.

RESULTS

RESULTS

RESULTS

RESULTS

T. L. Howard
Harborside, Me.
04642

Mr Albert E Sandecki
50 James Dr
Haddonfield,
New Jersey 08033

Dear Mr Sandecki

In regard to our drinking water
I had a check on it last Oct 21 1969
And the salt content was a little higher
than the one previous to this one.
of Aug 20 1964 - after checking the 64
one the check was ☒ Satisfactory + we have
been drinking it up until now
also the analysis of Oct 21 1969
was marked ☒ Satisfactory. I believe
Mr + Mrs Farnham have been drinking the water
from our well for some time + may our Lord
Bless them. Truly yours

Tracy L Howard Sr

Albert Sundelin

MAY 28 1970

SE-1 Rev. 8-68

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

CALLAHAN #2 WELL

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number P-61 Date of Collection May 29 -70 Time of Collection 3:00 P.M

Source of Water ☒ Well, ☐ Spring, ☐ Other ____ Located on Property of CALLAHAN MINING CORP

Well or spring, how lined? ☐ rock, ☐ concrete, ☐ tile, ☐ other ____ How covered? ☐ boards, ☐ concrete, ☐ other ____ Is top elevated above ground? ☑ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name CALLAHAN MINING CORP.

Street or RFD ____

Post Office BROOKSVILLE, Maine 04642 Zip Code

Kind of pipe used ☐ plastic ☐ galvanized ☐ copper ☐ other ____

Length ____ ft.

If a well, was it ☐ dug, ☐ driven, ☒ drilled?

How long ago? 2 WEEKS (May 15-70

Depth? 200'

Distance from nearest privy 200' ft.; stable ____ ft.; barnyard ____ ft.; sinkdrain ____ ft.; public or private sewer ____ ft.; septic tank and laterals 1500' ft.; garden ____ ft.; manure pile ____ ft.; cesspool ____ ft.; other ____ ft. Nature of soil ☐ clay ☐ sand ☐ gravel ☐ other ____ Does the water have an unpleasant odor or taste? ☐ Yes ☒ No How is water drawn ☒ pail ☐ faucet ☐ other ____

Method of purification ☐ boiling ☐ chlorination ☐ other ____ Is water used by city or town? ☐ Yes ☒ No

If yes, give name of water company ____ Any change to supply since last analysis? ☐ Yes ☐ No If Yes, what? ____ Is water used by a ☐ School ☒ Private Home ☐ VA ☐ FHA ☐ Other ____ or by a licensed establishment such as: ☐ Swimming Area ☒ Boarding Home ☒ Eating Place ☒ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls') ☐ Nursing Home ☐ Other ____ Located in city or town of BROOKSVILLE

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 387268 Date JUN 11 1970

☒ **SATISFACTORY** ☐ **QUESTIONABLE** (Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) ☐ **UNSATISFACTORY** (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☐ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☐ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☐ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. ☐ ____

Division of Sanitary Engineering

DO NOT WRITE ON THIS SIDE

BACTERIA COLIFORM GROUP

Bottle # PG1 V

	10ml	BGLB
1		
2		
3		
4		
5		

RECEIVED JUN 1970 CALLAHAN MINING CORP. HARBORSIDE, ME.

LABORATORY ANALYSES

Results in parts per million.
To change into grains per U.S. gallon, multiply by 0.058.

Serial No. 387268

Start of Analysis JUN 2 1970

Bottle No. PG1

Sequence No. 16

Truck No. 4

TURBIDITY — a — RESULTS 0

COLOR — a — RESULTS 0

NITRITES — a — RESULTS 0

FREE AMMONIA — a — 1, 0, 0, 1K.02 — RESULTS .002

ALBUM. AMMONIA — a — 1K.9, .2, 0, 0, 0, 1.1K.02 — RESULTS .022

NITRATES — Bottle # 16 — Result .3

pH — Bottle # PG1 16 — Result 5.4

CHLORIDES — S — 2.1, 1.7, 1.4, 1.2 — RESULTS 12.

HARDNESS — S — 14.2, 13.1, 1.1, 2.2 — RESULTS 22.

SEDIMENT AND ODOR — RESULTS — Mod. Veg. OV

COPPER — RESULTS

IRON — RESULTS

MANGANESE — RESULTS

RESULTS

RESULTS

RESULTS

Albert Sandelin
Farnhams Faucet

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number X 29 Date of Collection 4/9/70 Time of Collection 7:45 AM
Source of Water X Well, ☐ Spring, ☐ Other ____ Located on Property of CALLAHAN MINING CORP.
Well or spring, how lined? ☐ rock, ☐ concrete, ☐ tile, ☐ other STEEL CASING How covered? ☐ boards, X concrete, ☐ other ____ Is top elevated above ground? X Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name CALLAHAN MINING CORP.
Street or RFD ____
Post Office HARBORSIDE, ME. 04642 Zip Code

Kind of pipe used ☐ plastic X galvanized ☐ copper ☐ other ____
Length 90 ft.
If a well, was it ☐ dug, ☐ driven, X drilled?
How long ago? JAN. 1967
Depth? 365'

Distance from nearest privy 2000 ft.; stable ____ ft.; barnyard ____ ft.; sinkdrain ____ ft.; public or private sewer 110 ft.; septic tank and laterals ____ ft.; garden ____ ft.; manure pile ____ ft.; cesspool ____ ft.; other ____ ft. Nature of soil ☒ clay ☐ sand ☐ gravel ☐ other ____ Does the water have an unpleasant odor or taste? ☐ Yes ☒ No How is water drawn ☐ pail ☒ faucet ☐ other ____
Method of purification ☐ boiling ☐ chlorination ☐ other ____ Is water used by city or town? ☐ Yes ☒ No
If yes, give name of water company ____ Any change to supply since last analysis? ☐ Yes ☒ No If Yes, what? ____ Is water used by a ☐ School ☒ Private Home ☐ VA ☐ FHA ☐ Other ____ or by a licensed establishment such as: ☐ Swimming Area ☒ Boarding Home ☒ Eating Place ☒ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls') ☐ Nursing Home ☐ Other ____ Located in city or town of BROOKSVILLE, ME

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 385683 Date APR 24 1970

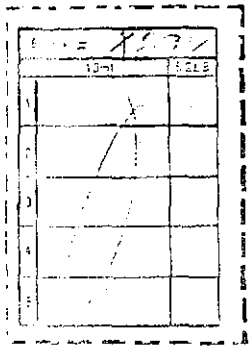
☒ SATISFACTORY ☐ QUESTIONABLE (Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) ☐ UNSATISFACTORY (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☒ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☐ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☐ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. ☐ ____

Division of Sanitary Engineering

BACTERIA COLIFORM GROUP



DO NOT WRITE ON THIS SIDE

LABORATORY ANALYSES

Results in parts per million.
To change into grains per U. S. gallon, multiply by 0.058.

Serial No. 385683

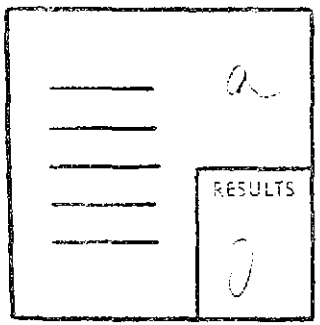
Start of Analysis APR 10 1970

Bottle No. 129

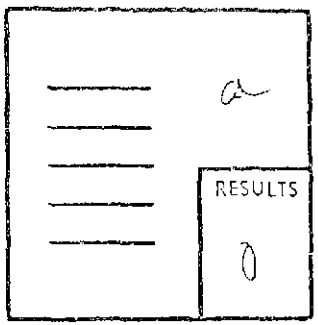
Sequence No. 3

Truck No. 1

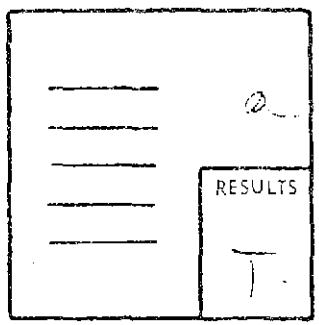
TURBIDITY



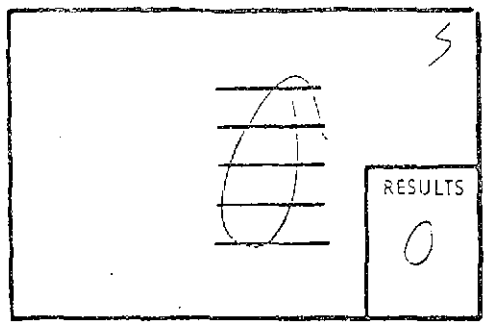
COLOR



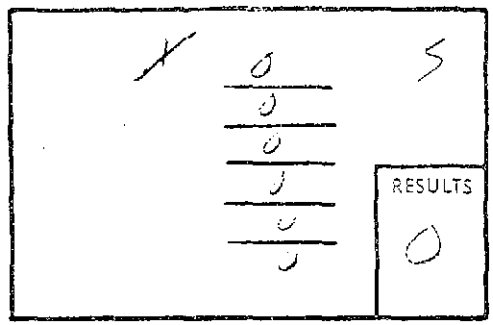
NITRITES



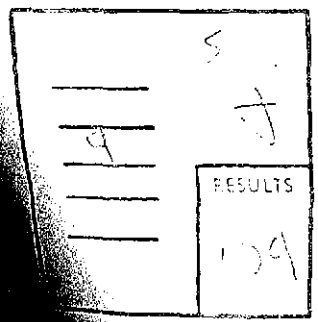
FREE AMMONIA



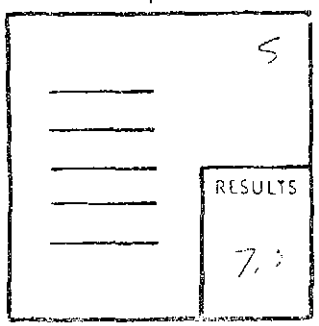
ALBUM. AMMONIA



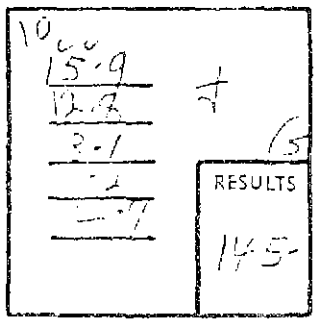
NITRATES



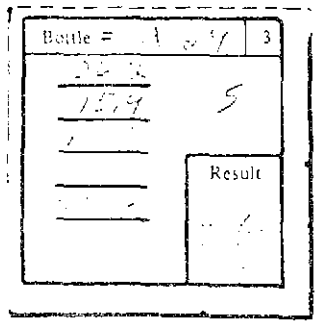
pH



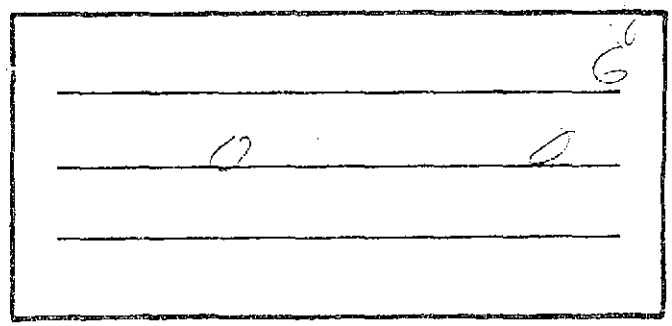
CHLORIDES



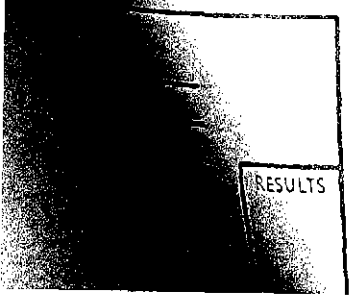
HARDNESS



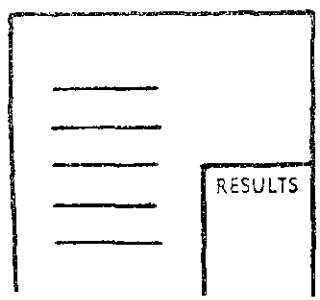
SEDIMENT AND ODOR RESULTS



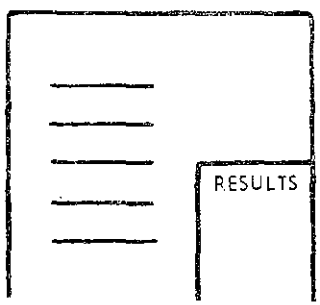
COPPER

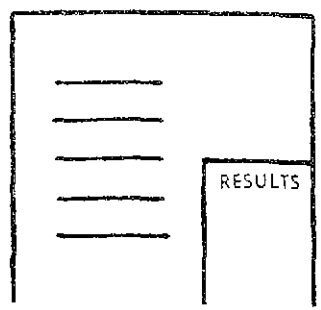


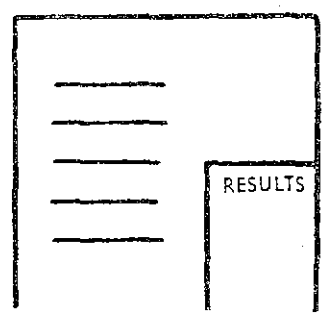
IRON

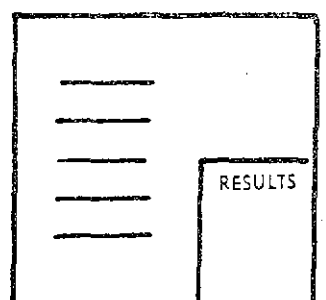


MANGANESE









December 20,1972

Mrs. Brainard Farnham
Harborside, Maine 04642

Dear Marian:

As I told you, we hope to be in New Jersey and Massachusettw until January 1st. At the moment I think Callahan is under general control.

I suggest that if any problem at all arises with reference to the water, you call Frank Snow. Fred Beck told me that he was in charge of the wells, the reservoir, the pumps and all matters in connection with the water. Keep after him and if necessary, you can call Mrs. Luning at 367-2230 and she can reach me.

Hope you have a Good Holiday.

Sincerely yours,

Wm. Sherman Greene, Jr.

WSG:RL

cc: Albert E. Sandecki

Sept.29th

Dear

Just an update on the deteriorating water situation.

Sherman Greene met with Snead & Beck a few days ago the points covered were as follows:

1. The two wells drilled this past summer near the tailings area are continuing to supply water to the reservoir on the hill. The electrical supply for these pumps is a desiel generator and will remain so because Callahan does not wish to take on the cost of a powerline installed by Bangor Hydro... Estimate for this line is placed at $ 1,500.00 per year (instalation & maintanance).

2. There has never been a metal analysis of these two wells, nobody seems to know why... This will however be done shortly by the Dept. of Health & Welfare in Augusta.

3.The existing water pipes from well heads to reservoir will NOT be buried below frost for winterized supply the cost would be too high. The winterizing of these lines will consist of covering them with 2 feet of earth as they are now placed on the surface of the ground. BUT this decision will not be made until OCTOBER 15TH, pending outcome on tests on Callahan's well at the mine office and the wells originally drilled on the Farnham and Veague property on the chance that they may regain useability. The wells have come up somewhat since the pit has flooded. Brainard's I understand has tested as salt though.

4. Callahan's main water supply has dropped from 250ppm to 230ppm chloride and this supply (if it improves) can be reconnected to the reservoir and is supposedly already winterized, or can be connected in a manner to avoid freeze up by permitting a small flow of water to trickel through the line.

5. Callahan says a survey was made of the piping and appliances and the deterioration of pipes, faucets, h/w heaters etc. was not due to salt content of the water but rather old age. Callahan does not feel responsible for the condition of household plumbing.

6. The amount of money Callahan is willing to put up for maintanance of present existing system is subject to developments on old wells and future negotiations if the old wells do not come back.

This is a brief summary of Greene's telephone call to me this morning. I for one am too disgusted to comment, the Farnham's are willing to wait until October 15th to see how the old wells test, then meet with Sherman Greene to decide on legal action.

If as it seems to be that Callahan will do no more than perpetuate a shoddy temporary water arrangement we have until October the 15th to decide on starting an action.

I think it would be worthwhile to give Sherman Greene your thoughts in a letter sometime between now and the 15th so he can prepare the necessary papers.

Sincerely,

Albert

SHERMAN GREENE - 3PM. AUGUST 15TH

PENDING OUTCOME OF RESTORATION OF WATERTABLE.
OF THREE WEEKLY MEASURMENTS MADE BY JOHN GRAY.
ON JULY 31ST, AUG 7, AND 14TH WELLS SHOWED RISE OF
APPROX 5' BETWEEN FIRST 2 WKS. AND + OR 1 ONE FOOT
ON AUG 14TH. I ASKED JOHN TO INCLUDE THE TIME
AT TESTING WELL LEVELS FOR POSSIBLE TIDAL AFFECTS ON
WELL LEVELS. HE AGREED TO DO SO.

PIPING - TYPE, DEPTH (4'), SHUTOFF VALVES, CONNECTORS.

RESERVOIR - PUMP, ELECTRICITY, MAINTANANCE

TIME PERIOD FOR GUARANTEED MAINTANANCE ——

AMOUNT OF MONEY FOR GUARANTEED MAINTANANCE —

WATER COOPERATIVE.

BARTHELMAN'S WATER SUPPLY WAS ORIGINALLY WINTERIZED.
AS WELL AS. FARNHAM'S & MAC GRAY'S (LEAGUE'S?)

December 13, 1971

Mr. Frederick M. Beck,
Callahan Mining Corporation
41 Union Wharf,
Portland, Maine 04111

Dear Fred:

Thank you for your letter of December 10, 1971. As to continuing the present water supply system, I am glad to note that the tests have been acceptable, but it is most important that lead tests and other mineral tests be made before a decision is reached as to the use of this water for all parties. Incidentally, I note that you are evaluating the costs of the program.

As to Leach, I shall be glad to see the test when received from the Sewall Company.

Finally and most important, please let me know what you hear from Mr. Boring in answer to your letter of November 30th.

I hope that no further blasts at the mine will be permitted at night. I have already talked to Mr. Snead about this.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:RL

bc: Mr. and Mrs. Brainard Farnham
Mr. Albert E. Sandecki

12:10 PM CALL FROM DOW.

ROBT DOW
HURST
UTTAMO
MR SPENCER

1:30 PM

J. WIGGINS

OPEN MTG TO PRESS
HARD TIME GAINING PUBLIC
SUPORT FOR DECISIONS
ARRIVED AT SECRETLY.
INTENTION TO HOLD PUBLIC
MTG WITHIN A WEEK OR TWO
TO DISCUSS VARIOUS PROPOSALS
CORRELATED BY THE COMMITTEE.

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

PHL 20 Rev. 8-70

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number ____ Date of Collection July 19, 1971 Time of Collection ____

☐ Source of Water ☐ Well, ☐ Spring, ☐ Other ____, Located on Property of ____

Well or spring, how lined? ☐ rock, ☐ concrete, ☐ tile, ☐ other ____ How covered? ☐ boards, ☐ concrete, ☐ other ____ Is top elevated above ground? ☐ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name Mrs Bernard Farnham

Street or RFD ____

Post Office ____ Zip Code

Kind of pipe used ☐ plastic ☐ galvanized ☐ copper ☐ other ____

Length 50 ft.

If a well, was it ☐ dug, ☐ driven, ☐ drilled?

How long ago? ____

Depth? ____

Distance from nearest privy ____ ft.; stable ____ ft.; barnyard ____ ft.; sinkdrain ____ ft.; public or private sewer ____ ft.; septic tank and laterals ____ ft.; garden ____ ft.; manure pile ____ ft.; cesspool ____ ft.; other ____ ft. Nature of soil ☐ clay ☐ sand ☐ gravel ☐ other ____ Does the water have an unpleasant odor or taste? ☐ Yes ☐ No How is water drawn ☐ pail ☐ faucet ☐ other ____

Method of purification ☐ boiling ☐ chlorination ☐ other ____ Is water used by city or town? ☐ Yes ☐ No

If yes, give name of water company ____ Any change to supply since last analysis? ☐ Yes ☐ No If Yes, what? ____ Is water used by a ☐ School ☐ Private Home ☐ VA ☐ FHA ☐ Other ____ or by a licensed establishment such as: ☐ Swimming Area ☐ Boarding Home ☐ Eating Place ☐ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls') ☐ Nursing Home ☐ Other ____ Located in city or town of Brooks

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT

Serial Number 40591 Date 7-29-71

☐ SATISFACTORY ☐ QUESTIONABLE (Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.) ☒ UNSATISFACTORY (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. X The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☐ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. X This water is not satisfactory for use in a ☐ School, a X Boarding Home, or a X Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. X Unsatisfactory due to high chloride content. (265. ppm.)

Division of Sanitary Engineering

...IA COLIFORM GROUP

Bottle # 172

0

Colonies Per 100 ML

M.F.

DO NOT WRITE ON THIS SIDE

403531

Start of Analysis JUL 20 1971

Bottle No. A72

Sequence No. 16

Truck No. 6

LABORATORY ANALYSES

Results in parts per million.
To change into grains per U.S. gallon, multiply by 0.058.

TURBIDITY

RESULTS 0

COLOR

RESULTS 0

NITRITES

RESULTS < .05

FREE AMMONIA

RESULTS

ALBUM. AMMONIA

RESULTS

NITRATES

RESULTS < 1.

pH

RESULTS 7.3

CHLORIDES

RESULTS 265.

HARDNESS

33.1
16.0
17.1

RESULTS 340.

SEDIMENT AND ODOR

RESULTS 0

COPPER

IRON

Bottle # 12

Result

MANGANESE

RESULTS

Bottle # 18

Result

Lead

Bottle # 24

Result

RESULTS

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA

[illegible] M. D.
COMMISSIONER

Aug. 31, 1971

MRS. BRAINARD FARNHAM
HARBORSIDE, Maine 04642

Dear MADAM:

The examination for lead in the sample of water submitted on 7-20-71 in bottle No. A72, the sanitary quality of which was reported on 7-29-71, showed the presence of 0 parts per million of lead.

Any water used for drinking or culinary purposes which is conducted through a lead pipe, or a pipe containing lead, is dangerous to use, irrespective of whether or not the sample tested shows the presence of lead. One sample may not show any lead, but another sample submitted from the same source at another time may show it to be present in a sufficient quantity to be considered dangerous to health.

Because of the grave danger of lead poisoning, we do not approve nor recommend the use of water for drinking or culinary purposes which is conducted through a lead pipe or pipe containing lead. All such pipe should be removed at once, and replaced by stainless steel, Duriron or other corrosion resistant alloy pipe, cement-lined pipe, galvanized wrought iron, galvanized steel, or similar type pipes.

The amount of lead found in the sample reported above may be compared with the following table for quantity evaluation purposes:

0 to .05 parts per million represents a trace amount of lead.
.05 to .1 parts per million represents a small amount of lead.
Over .1 parts per million represents a large amount of lead.

Very truly yours,

Earle W. Tibbetts

Earle W. Tibbetts, Director
Division of Sanitary Engineering

PL-12

ORIGINAL WELL CHLORIDES.
MAY 20 1964. 9.

JUNE 9 -1969 NEW WELL.
PH 7.8 CHLOR. 24. ✓

AUG 27/69
PH. 7.5 CHL 45. ✓

OCT 29/69 CHL. 75-75 ✓
PH. 7.7 - 7.8

~~DEC~~ 29/69 CH. 95 ✓
PH. 7.7

JAN 14/1970 CH 95 ✓
PH 7.5

FEB 17/1970 CH 125 ✓
PH. 7.5

MAR 16/70 CH 130 ✓
PH 7.5

APR. 24/70 CH. 145 ✓
PH. 7.5

~~MAY 28/70~~

MAY } NO TESTS.
JUNE }

JULY. 21/70 75 CH ✓
6.4 PH

AUGUST 20/70 225 CH ✓
6. PH

SEPT }
OCT } ?
NOV }

250 MAX U.S.P. STANDARDS.

NEW WELL BY FARNHAMS

AUG. 1ST 1968 - CHLORIDES ?
DEC 5th " " 750 PPM
PH. 7.8

DEC 20/68 CHLORIDES 80
PH. 6.9

APRIL 2 68 CHL 360
PH. 7.6

NOV 19/70 236 CHL ✓
7.3 PH

DEC. 17/70 206 CHL ✓
7.8 PH

JAN 15/71 197 CHL. ✓
8.2 PH

FEB 19/71 189 CHL
7.9 PH

MARCH 18/71 197 CHL.
PH 7.1

APR
MAY
JUNE
JULY
AUG
SEPT
OCT
~~NOV 1971~~

150 PPM
DR. FULLER

JAN 15/71 CHL. 197
PH 8.2

DEC

12/2 23/1 3

50 12/2 6

SERVICE CHARGE UNPAID
$2.00

JAN 25 1972

STATE OF MAINE
DEPARTMENT OF HEALTH AND WELFARE
AUGUSTA, MAINE 04330

SE-1 Rev. 8-68

PLEASE CAREFULLY FILL OUT THIS INFORMATION FORM, AS IT WILL BE USED AS PART OF YOUR REPORT.

Bottle Number 437 Date of Collection Jan 24 1972 Time of Collection 7:00 AM
Source of Water ☒ Well, ☐ Spring, ☐ Other ____ Located on Property of [illegible]
Well or spring, how lined? ☐ rock, ☐ concrete, ☐ tile, ☐ other ____ How covered? ☐ board, ☐ concrete, ☐ other ____ Is top elevated above ground? ☒ Yes, ☐ No

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

PLEASE PRINT

Name Mrs. EDWARD FARNHAM
Street or RFD ____
Post Office HARRISIDE, MAINE 04464
Zip Code

Kind of pipe used ☐ plastic ☐ galvanized ☐ copper ☐ other ____
Length 90 ft.
If a well, was it ☐ dug, ☐ driven, ☐ drilled?
How long ago? Jan 1947
Depth? [illegible]

Distance from nearest privy 200 ft.; stable ____ ft.; barnyard ____ ft.; sinkdrain ____ ft.; public or private sewer 1000 ft.; septic tank and laterals 110 ft.; garden ____ ft.; manure pile ____ ft.; cesspool ____ ft.; other ____ ft. Nature of soil ☒ clay ☐ sand ☐ gravel ☐ other ____ Does the water have an unpleasant odor or taste? ☒ Yes ☐ No How is water drawn ☐ pail ☒ faucet ☐ other ____
Method of purification ☐ boiling ☐ chlorination ☐ other ____ Is water used by city or town? ☐ Yes ☐ No
If yes, give name of water company ____ Any change to supply since last analysis?
☐ Yes ☐ No If Yes, what? ____ Is water used by a ☐ School ☐ Private Home
☐ VA ☐ FHA ☐ Other ____ or by a licensed establishment such as: ☐ Swimming Area
☐ Boarding Home ☐ Eating Place ☐ Lodging Place ☐ Motel ☐ Rec. Camp (Adults) ☐ Rec. Camp (Boys' and Girls')
☐ Nursing Home ☒ Other ____ Located in city or town of TOPSFIELD

DO NOT WRITE BELOW THIS LINE

411148
Serial Number

WATER ANALYSIS REPORT

MAR 17 1972
Date

☐ SATISFACTORY

☐ QUESTIONABLE (Indicates sample unsafe at time of collection. The supply is considered capable of being made safe with proper corrections.)

☑ UNSATISFACTORY (Indicates continuing unsafe conditions.)

An X in the respective squares furnishes an interpretation of this analysis.

1. ☐ The bacteriological examination showed the presence of a ☐ small, ☐ large, number of dangerous bacteria (Coliform Group).
2. ☐ This is apparently a naturally good water, but the supply needs proper protection and sterilization. (See diagram and paragraph No. 2 on reverse side). After the supply is protected, another sample may be submitted for analysis.
3. ☐ The supply needs proper protection (See diagrams on reverse side).
4. ☐ If the supply is protected with a tight metal or concrete cover and wall so that water, light or dust may not enter, as shown on the reverse side, we suggest that another sample be submitted for analysis, carefully following collection directions to prevent contamination of the sample.
5. ☐ The chemical examination showed a higher salt content than normal for the section of the State in which the supply is located.
6. ☐ The chemical examination indicates a ☐ small, a ☒ large amount of decomposing organic matter, which may be caused by contact with drainage from a sewer, cesspool, privy, septic tank system or similar type, stable, garden, heavily fertilized land, or similar source of pollution.
7. ☐ Location and removal of the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. The amount of the above pollution although abnormal and therefore somewhat detrimental does not appear at this time to be in sufficient amounts to completely prohibit the use of this water. There is a possibility, however, as long as the sources of pollution remain, that this pollution may increase sufficiently to make the water unsafe for use. For this reason, if the water is to be used for domestic purposes, samples should be submitted at intervals of not more than six months to determine whether or not the water is deteriorating or improving in quality.
8. ☐ Locating and removing the sources of pollution, listed in 5 and/or 6, and adequate protection of the supply may correct the unfavorable condition. After the sources of pollution are eliminated a considerable period of time, estimated from 2-5 years, will elapse before the ground surrounding this water supply may be expected to return to normal and the water become safe for domestic consumption.
9. ☐ This water is not satisfactory for use in a ☐ School, a ☐ Boarding Home, or a ☐ Licensed Establishment until necessary corrections have been made and additional tests indicate that it is safe.
10. ☐ Lake, pond or stream water used for drinking or cooking purposes needs to be constantly and efficiently sterilized at all times.
11. ☐ The examination for lead (use of lead pipe having been declared) showed the presence of a ☐ trace, ☐ small, ☐ large amount. (See lead paragraph on reverse side.)
12. ☐ ____

BACTERIA COLIFORM GROUP

3	Bottle # 1.32
0	
Colonies Per 100 ML	
M.F.	

DO NOT WRITE ON THIS SIDE

LABORATORY ANALYSES

Results in parts per million.
To change into grains per U.S. gallon, multiply by 0.058.

411148 Serial No.

Start of Analysis JAN 25 1972

Bottle No. 137

Sequence No. 1C

Truck No. 3

TURBIDITY	COLOR	NITRITES	FREE AMMONIA	ALBUM. AMMONIA
5	5			
RESULTS 1.	RESULTS 0	RESULTS .05	RESULTS	RESULTS

NITRATES	pH	CHLORIDES	HARDNESS	SEDIMENT AND ODOR
	B		26.0 6.6 19.4 B	C
RESULTS 4	RESULTS 6.6	RESULTS 300.	RESULTS 388.	RESULTS 0 0

COPPER	IRON	MANGANESE	Lead	Zinc	
.17	.13		3.1 E	40.9	
RESULTS .05	RESULTS .05	RESULTS	RESULTS .0572	RESULTS .5	RESULTS

MAINE DEPARTMENT OF HEALTH AND WELFARE

PLEASE FILL IN NAME AND ADDRESS AND SAMPLE DATA ONLY.

SOURCE
☐ dug well
☑ drilled well
☐ spring
☐ well point
☐ lake or other

IF A WELL OR SPRING HOW IS IT LINED?
☐ concrete
☐ clay tile
☑ steel casing
☐ rock ☐ other

HOW IS IT COVERED?
☐ boards
☐ wellhouse
☑ concrete ☐ other

HOW LONG HAS SUPPLY BEEN IN USE? Jan 1967

IF A WELL OR SPRING HOW DEEP IS IT? 265

IS THE TOP ELEVATED ABOVE THE GROUND?
☐ Yes ☐ No

BOTTLE NO. K 35 SUPPLY LOCATED IN TOWN OF Brooksville
DATE Feb 22 72 ON THE PROPERTY OF Calhoun Mining Co

DISTANCE FROM SOURCE OF POLLUTION

privy	2000 ft.	sink drain	ft.
septic system	100 ft.	garden	ft.
stable	ft.	highway	ft.
barnyard	ft.	oil tank	ft.
cesspool	ft.	other	ft.

WATER COLLECTED FROM
☑ faucet ☐ pail
☐ handpump ☐ other

DOES THE WATER HAVE ODOR? TASTE?
☐ yes ☐ no ☑ yes ☐ no

WATER USED FOR
☐ drinking
☐ swimming

IS THE SOIL?
☐ sand ☐ gravel
☑ clay ☐ ledge

CONSTRUCTED BY
☐ contractor ☐ other
☐ owner/occup.
☐ unknown

Date Shipped

Serial No. 411765

Start of Analysis

Bottle No. K 35

Sequence No. 8

Truck No. 8

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

Name

Street or RFD

Post Office Zip Code

KIND OF PIPING USED
☐ copper
☐ galvanized
☐ plastic
☐ lead
☐ other
approx. length ft.

TYPE OF TREATMENT
☐ chlorinator
☐ softener
☐ pH control
☐ iron removal
☐ ultra-violet
☐ other

WATER IS USED BY
☐ school
☐ boarding home
☐ nursing home
☐ eating place
☐ motel
☐ lodging place
☐ rec. camp (adult)
☐ rec. camp (B&G)
☐ FHA
☐ VA
NAME OF ESTAB.

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT ☐ SATISFACTORY ☐ UNSATISFACTORY

An X in the respective squares furnishes an interpretation of this analysis on reverse side.
1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐

MAR 16 1972

LABORATORY ANALYSIS Do Not Write Below This Line

Bacteriological Quality - COLIFORM GROUP BACTERIA

The number of positives: [ ] Colonies Per 100 ML: 0

Color 5 units	Turbidity 1 units	Ammonia Nitrogen mg/l	Albuminoid Nitrogen mg/l	
Hardness 422 mg/l	Copper .06 mg/l	Iron .12 mg/l	Manganese mg/l	Fluoride mg/l
DETERGENTS ☐ Positive ☐ Negative	Nitrite Nitrogen ✓ mg/l	LEAD T mg/l	Zinc 1.08 mg/l	mg/l / mg/l
SEDIMENT 0	Odor Number 1V	Nitrate Nitrogen ✓ mg/l		
		Chloride 300 mg/l		
		pH 6.6 8		

1. COLIFORM GROUP BACTERIA

SIGNIFICANCE

The coliform group of organisms includes E. Coli organisms which inhabit human and animal intestinal tracts and Ent. aerogenes and intermediate type organisms commonly present in the top soils and on various types of vegetation.

The presence of coliform organisms in a drinking water suggests that other fecal organisms may also be present. They also suggest the existence of defects in the protection of the source and/or its distribution system.

Coliform bacteria laboratory results can be reported as (1) number of positive tubes (BGLB method) or (2) number of colonies per 100 milliliter of sample (membrane filter method).

The following guide lines are presently in use:

0 to 1 positive tubes—Satisfactory	**0 to 1 col/100ml Satisfactory**
2 to 5 positive tubes—Unsatisfactory	**2 - up col/100ml Unsatisfactory**

POSSIBLE CORRECTIVE MEASURES

If 2 to 4 colonies per 100 milliliter are or if one positive tube is found in the sample, and the supply is protected with a tight metal or concrete cover and walled so that surface water, light and dust can not enter, and there have been no alterations in the pump or plumbing system, we suggest that another sample be submitted for analysis, carefully following the collection directions to prevent contamination during the sampling process.

Five (5) or more colonies per 100 milliliter or two or more positive tubes, suggest a needed evaluation and possibly the improvement of the protection of the supply. The supply should be sterilized to eliminate any bacteria which may have been introduced prior to or during construction and/or reconstruction.

This sterilization may be accomplished by thoroughly mixing about two quarts of bleach water, Clorox, Dazzle, or similar product, obtained at grocery or hardware stores, in a pail of water, pour this solution into the well, spring, reservoir, or cistern and then stir the water, if possible, so as to thoroughly mix the disinfectant in the water supply. Open all the various faucets, sill-cocks and similar outlets until the odor of chlorine is noted, then allow the mixture to stand in the system a few hours. Before submitting a sample of water for analysis, test by smelling to see that there is no odor of chlorine present.

NOTE: All lake, stream or pond waters used for drinking or cooking purposes need to be continuously and efficiently filtered and sterilized.

2. TURBIDITY, COLOR AND ODOR

SIGNIFICANCE

Although these tests do not directly measure the safety of the water, they do relate to an individual's acceptance of a water. The levels of 5 units of turbidity, 15 units of color, and odor number of 3 are levels which are objectionable to a number of people.

POSSIBLE CORRECTIVE MEASURES

Turbidity and color may be removed by entanglement with a chemical floc, settling, and filtration. Activated carbon cartridges will remove tastes and odors by adsorption.

If a supply suddenly develops an offensive odor, discontinue using the water for drinking and cooking purposes until another analysis shows the water is satisfactory for such purposes.

3. CHLORIDES

SIGNIFICANCE

Chlorides in normal ground waters fall in the 1 to 2 milligram per liter (mg/l) range, and in reasonable concentrations, are not harmful to humans. **Concentrations of 250 mg per liter of Chloride and above** give a salty taste to water which is objectionable to many people, and are **judged unsatisfactory.**

POSSIBLE CORRECTIVE MEASURES

Chlorides may enter ground water from a variety of sources, such as natural mineral deposits, sea water infiltration of subterranean water supplies, highways, kitchen and other household waste-water. Concentrations over 20 mg/l suggest the presence of one of the above sources of salt.

Chloride removal presently is not economically feasible for the private home owner. All one can do is to attempt to locate and eliminate the sources of chlorides and hope that in time the water will return to its natural state.

4. NITROGEN COMPOUNDS

SIGNIFICANCE

The compounds of nitrogen are of great interest because of the importance of nitrogen in the life processes of all plants and animals.

The nitrate, nitrite and ammonia determinations are of particular interest in identifying possible sources and age of pollution. Nitrates, in high concentrations, can and do cause methemoglobinemia or so-called nitrate poisoning in infants. **Supplies with 10 or more mg of N/l are judged unsatisfactory and are not considered safe for drinking or cooking. It is especially dangerous to children and should never be used in infants formulas.**

POSSIBLE CORRECTIVE MEASURES

Nitrogen compounds result from drainage from privies, private sewage disposal systems, manure piles, gardens, heavily fertilized land or similar sources of pollution. Once the source of pollution is located and removed, the waters may take a number of years to return to normal.

Experimental nitrate removal equipment is becoming available for home use, and we suggest you check with a water treatment specialist.

5. HARDNESS

SIGNIFICANCE

Hard waters are as satisfactory for human consumption as soft waters. But because of their adverse action with soap, and their tendency to produce scale in hot-water pipes, heaters, etc., it may be desirable, from the economics standpoint, to install a domestic water softener.

Waters nationwide are classified as follows:

0-75 mg/l of calcium carbonate	Soft
75-150 mg/l of calcium carbonate	Moderately hard
150-300 mg/l of calcium carbonate	Hard
300-up mg/l of calcium carbonate	Very hard

POSSIBLE CORRECTIVE MEASURES

The hardness in water is derived largely from calcium and magnesium dissolved from the soil and rock formations and may be removed by one of several methods — precipitation, ion exchange or a combination.

6. COPPER

SIGNIFICANCE

In-as-much as copper is an essential and beneficial element in human metabolism and does not constitute a health hazard but does impart an undesirable taste to water when presence in concentrations of 1 to 5 milligrams per liter (mg/l), **waters are judged unsatisfactory at 1.0 mg/l.**

POSSIBLE CORRECTIVE MEASURES

Since copper is not naturally found in Maine's ground waters, but is introduced when acid waters come in contact with copper pipes, this is best eliminated with pH control equipment or changing to plastic pipe.

7. IRON AND MANGANESE

SIGNIFICANCE

Both iron and manganese are highly objectionable constituents in domestic water supplies. Iron and manganese impart a brownish color to laundered goods and can appreciably effect the taste of beverages, including coffee and tea.

Waters with a combined concentration of iron and manganese greater than 0.3 milligrams per liter are considered unsatisfactory.

POSSIBLE CORRECTIVE MEASURES

There are a number of domestic iron and manganese removal units commercially available from water treatment specialists.

8. DETERGENTS

SIGNIFICANCE

A positive detergent test suggests a poorly constructed and/or located private sewage disposal unit which if not corrected may result in a grossly contaminated water supply.

9. SWIMMING ANALYSIS

The sample submitted is satisfactory for swimming purposes as long as conditions remain the same.

A CHECK √ IN THE NITRITE, NITRATE CHLORIDE AND HARDNESS RESULTS BOXES MEANS THE LEVELS FOUND ARE NOT SIGNIFICANT.

SECTION I. SAMPLE DATA — BACTERIOLOGICAL WATER REPORT

PLEASE COMPLETE THIS BOX ONLY

			Chlorine Residual	RESULTS	
Date Collected		SOURCE OF SAMPLE		Presump.	Confirm.
Hour	1	4171 [illegible]			
Water Temp. °F.	2	4171 [illegible]			
By Whom	3				
	4				

SECTION II. LABORATORY ANALYSIS — Do Not Write Below This Line

TESTED BY [illegible] EXAM. STARTED [illegible] 1972 Hour Water Temp. °F.

SAMPLE No. 1									SAMPLE No. 2									SAMPLE No. 3									SAMPLE No. 4								
10. ml	EC	BG LB	1.0 ml	EC	BG LB	0.1 ml	EC	BG LB	10. ml	EC	BG LB	1.0 ml	EC	BG LB	0.1 ml	EC	BG LB	10. ml	EC	BG LB	1.0 ml	EC	BG LB	0.1 ml	EC	BG LB	10. ml	EC	BG LB	1.0 ml	EC	BG LB	0.1 ml	EC	BG LB

Membrane Filter Results Are Reported As The Number Of Coliform Colonies Per 100 ml of Sample.

M. F. 1.	M. F. 2.	M. F. 3.	M. F. 4.
0	0		

☒ SATISFACTORY ☐ UNSATISFACTORY — Please submit sample(s)

ANALYSIS	RESULTS	Chemist
Fluoride		

ANALYSIS	RESULTS	Chemist
Fluoride		

ANALYSIS	RESULTS	Chemist
Fluoride		

ANALYSIS	RESULTS	Chemist
Fluoride		

See Over

MAINE DEPARTMENT OF HEALTH AND WELFARE

PLEASE FILL IN NAME AND ADDRESS AND SAMPLE DATA ONLY.

SOURCE
- ☐ dug well
- ☑ drilled well
- ☐ spring
- ☐ well point
- ☐ lake or other

IF A WELL OR SPRING HOW IS IT LINED?
- ☐ concrete
- ☐ clay tile
- ☑ steel casing
- ☐ rock ☐ other

HOW IS IT COVERED?
- ☐ boards
- ☐ wellhouse
- ☐ concrete ☑ other

HOW LONG HAS SUPPLY BEEN IN USE? New

IF A WELL OR SPRING HOW DEEP IS IT? 205

IS THE TOP ELEVATED ABOVE THE GROUND? ☑ Yes ☐ No

BOTTLE NO. C98
DATE 6/26/72
SUPPLY LOCATED IN TOWN OF Brooksville
ON THE PROPERTY OF Callahan Mining Corp.

DISTANCE FROM SOURCE OF POLLUTION

privy — ft.	sink drain — ft.
septic system 500 ft.	garden 300 ft.
stable — ft.	highway 1000 ft.
barnyard — ft.	oil tank 800 ft.
cesspool — ft.	other — ft.

WATER COLLECTED FROM
- ☑ faucet ☐ pail
- ☐ handpump ☐ other

DOES THE WATER HAVE ODOR? ☐ yes ☑ no
TASTE? ☐ yes ☑ no

WATER USED FOR
- ☑ drinking
- ☐ swimming

IS THE SOIL?
- ☐ sand ☑ gravel
- ☐ clay ☐ ledge

CONSTRUCTED BY
- ☑ contractor ☐ other
- ☐ owner/occup.
- ☐ unknown

Date Shipped
Serial No. 417127
Start of Analysis
Bottle No. C98
Sequence No. 9
Truck No. 18

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

Name Callahan Mining Corp.
Street or RFD Penobscot Unit
Post Office Harborside, Maine Zip Code 04642

KIND OF PIPING USED
- ☐ copper
- ☐ galvanized
- ☑ plastic
- ☐ lead
- ☐ other

approx. length ft.

TYPE OF TREATMENT
- ☐ chlorinator
- ☐ softener
- ☐ pH control
- ☐ iron removal
- ☐ ultra-violet
- ☐ other

WATER IS USED BY
- ☐ school
- ☑ boarding home
- ☐ nursing home
- ☐ eating place
- ☐ motel
- ☐ lodging place
- ☐ rec. camp (adult)
- ☐ rec. camp (B&G)
- ☐ FHA
- ☐ VA

NAME OF ESTAB.

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT ☐ SATISFACTORY ☑ UNSATISFACTORY

An X in the respective squares furnishes an interpretation of this analysis on reverse side.
1. ☒ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐

JUL 5 1972

USE SERIAL NUMBER WHEN MAKING INQUIRY ABOUT THIS REPORT.

LABORATORY ANALYSIS Do Not Write Below This Line

Bacteriological Quality
COLIFORM GROUP BACTERIA

The number of positives	Colonies Per 100 ML
	3

Color 5 units
Turbidity 4 units
Ammonia Nitrogen mg/l
Albuminoid Nitrogen mg/l

[illegible] 38 mg/l Copper [illegible]

DETERGENTS ☐ Positive ☐ Negative

Nitrite Nitrogen ✓ mg/l
Nitrate Nitrogen ✓ mg/l
Chloride ✓ mg/l

SEDIMENT

Odor Number

MAINE DEPARTMENT OF HEALTH AND WELFARE

PLEASE FILL IN NAME AND ADDRESS AND SAMPLE DATA ONLY.

SOURCE
- ☐ dug well
- ☑ drilled well
- ☐ spring
- ☐ well point
- ☐ lake or other

IF A WELL OR SPRING HOW IS IT LINED?
- ☐ concrete
- ☐ clay tile
- ☑ steel casing
- ☐ rock ☐ other

HOW IS IT COVERED?
- ☐ boards
- ☐ wellhouse
- ☐ concrete ☑ other

HOW LONG HAS SUPPLY BEEN IN USE? New

IF A WELL OR SPRING HOW DEEP IS IT? 205

IS THE TOP ELEVATED ABOVE THE GROUND?
- ☑ Yes ☐ No

BOTTLE NO. 510
DATE 6/26/72

SUPPLY LOCATED IN TOWN OF .....
ON THE PROPERTY OF .....

DISTANCE FROM SOURCE OF POLLUTION

privy	— ft.	sink drain	— ft.
septic system	500 ft.	garden	300 ft.
stable	— ft.	highway	1000 ft.
barnyard	— ft.	oil tank	800 ft.
cesspool	— ft.	other	— ft.

WATER COLLECTED FROM
- ☑ faucet ☐ pail
- ☐ handpump ☐ other

DOES THE WATER HAVE ODOR? ☐ yes ☑ no **TASTE?** ☐ yes ☑ no

WATER USED FOR
- ☑ drinking
- ☐ swimming

IS THE SOIL?
- ☐ sand ☑ gravel
- ☐ clay ☐ ledge

CONSTRUCTED BY
- ☑ contractor ☐ other
- ☐ owner/occup.
- ☐ unknown

Date Shipped .....
Serial No. 417130
Start of Analysis .....
Bottle No. 510
Sequence No. 12
Truck No. 18

NAME AND ADDRESS TO WHOM REPORT IS TO BE SENT

Name Callahan Mining Corp.
Street or RFD Penobscot Unit
Post Office Harborside, Maine Zip Code 04642

KIND OF PIPING USED
- ☐ copper
- ☐ galvanized
- ☑ plastic
- ☐ lead
- ☐ other

approx. length ..... ft.

TYPE OF TREATMENT
- ☐ chlorinator
- ☐ softener
- ☐ pH control
- ☐ iron removal
- ☐ ultra-violet
- ☐ other

WATER IS USED BY
- ☐ school
- ☑ boarding home
- ☐ nursing home
- ☐ eating place
- ☐ motel
- ☐ lodging place
- ☐ rec. camp (adult)
- ☐ rec. camp (B&G)
- ☐ FHA
- ☐ VA

NAME OF ESTAB. .....

DO NOT WRITE BELOW THIS LINE

WATER ANALYSIS REPORT ☐ SATISFACTORY ☑ UNSATISFACTORY

An X in the respective squares furnishes an interpretation of this analysis on reverse side.

1. X 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐

JUL 5 1972

LABORATORY ANALYSIS Do Not Write Below This Line

Bacteriological Quality
COLIFORM GROUP BACTERIA

The number of positives ..... Colonies Per 100 ML 7

Color 5 units	Turbidity 2 units	Ammonia Nitrogen mg/l	Albuminoid Nitrogen	
Hardness 56 mg/l	Copper mg/l	Iron mg/l	Manganese mg/l	
DETERGENTS ☐ Positive ☐ Negative	Nitrite Nitrogen ✓ mg/l	mg/l	mg/l	mg/l
SEDIMENT	Odor Number	Nitrate Nitrogen ✓ mg/l		
		Chloride ✓ mg/l		

SERIAL NUMBER WHEN MAKING INQUIRY ABOUT THIS REPORT.

Date Oct 7 1972

MEMO TO: Mr. & Mrs. Brainard Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C. D. Snead, Jr.

FROM: R. C. Flow

SUBJECT: Chloride Content of Water from Callahan well.

Date	SAMPLE TAKEN FROM	Chlorides p.p.m.
10/7	Callahan New Well	5
10/7	Farnham Tap	5

Date Oct 14 72

MEMO TO: Mr. & Mrs. Brainard Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C. D. Snead, Jr.

FROM: R. C. Flow

SUBJECT: Chloride Content of Water from Callahan well.

Date	SAMPLE TAKEN FROM	Chlorides p.p.m.
10/14	Callahan New well	[redacted] 5
10/14	Farnham Tap	25

Date Oct 22, 72

MEMO TO: Mr. & Mrs. Brainard Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C . D. Snead, Jr.

FROM: R. C. Flow

SUBJECT: Chloride Content of Water from Callahan well.

Date	SAMPLE TAKEN FROM	Chlorides p.p.m.
10/2	Callahan New Well	5
10/2	Farnham Tap	5

Date 10/29/72

MEMO TO: Mr. & Mrs. Brainard Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C . D. Snead, Jr.

FROM: R. C. Flow

SUBJECT: Chloride Content of Water from Callahan well.

Date	SAMPLE TAKEN FROM	Chlorides p.p.m.
10/29	Callahan New Well	5
10/29	Farnham, Tap	5

Date November 5 1952

MEMO TO: Mr. & Mrs. Brainard Farnham
Mr. & Mrs. Albert Sandecki

Copies to: Mr. Wm. Sherman Greene, Jr.
Mr. C. D. Snead, Jr.

FROM: R. C. Flow

SUBJECT: Chloride Content of Water from Callahan well.

Date	SAMPLE TAKEN FROM	Chlorides p.p.m.
11/5	Callahan New Well	5
11/5	Farnham Tap	5

Wm. Sherman Greene, Jr.
Attorney and Counsellor at Law
Sunset, Maine 04683
207-348-2881

March 21, 1972

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N J 08033

Dear Albert:

Thank you for your letter of March 17, 1972 and enclosures. I hope that Mr. Hall will be able to help in the water matter. However, our experience has been with Callahan and the other parties involved, especially the Borings, that it is difficult to reach any decision. Moreover, we do not know what new wells might offer, especially prior to the closing of the mine and refilling the pit.

Although, of course, it is in order to pursue these suggestions and if possible seek and obtain new wells, our major efforts this spring will have to be either a settlement by Callhan of possible claims by setting up an adequate fund to take care of new wells or litigation to determine the actual damages involved.

This latter course may be the only solution to forcing the issue and we must decide this during the early summer.

I understand you expect to be in Maine next month and suggest we explore all possibilities when you are here.

As I have said many times, you and anyone else involved may take any proper steps with Callahan or anyone else without considering my position. Other than the publicity, I have never insisted that my efforts be carried out and I fully understand why you and the others involved suggest that you participate directly with Callahan.

Very truly yours,

Wm. Sherman Greene, Jr.

WSG:RL

50 Tanner Street
Haddonfield,
New Jersey 08033
March 23, 1972

Callahan Mining Corporation
277 Park Avenue
New York, New York 10017

Mr. Joseph T. Hall
President

Dear Mr. Hall:

Thank you for your letter of March 15th, and considering my suggestion that Fred Beck or Charlie Snead contact Mr. Boring at his home.

I have written to Fred asking to let me know of any developments.

As to the possibility of approaching others in the vicinity for permission to drill a well, I really do not know who to suggest. The people I know on the Cape are in the immediate vicinity and most have had their wells affected to some degree. I believe Mr. Greenhall and Mr. Butler had talked to the Howards at one time and although they are no longer in your employ there might be some record of their responce with Fred.

I think there might be a better possibility of a positive responce if Fred were to contact those in the vicinity if negotiations with Mr. Boring end.

With Fred's knowldege of geology he would I'm suree have a better eye for location of a suitable well site, plus the advantage of being a Maine resident.

Thank you again for your help and I hope it will lead to resolving the problem.

Sincerely,

Albert E. Sandecki

50 Tanner Street
Haddonfield,
New Jersey 08033
March 17,1972

Mr. William Sherman Greene
Sunset, Maine 04683

Dear Mr. Greene:

Enclosed are copies of some correspondence I have had with Mr. Hall.

I have been intending to write to him for a while as I knew he was about to retire and had hopes that he might like to leave the company with a clean slate.

Bill Veague and his wife stopped by earlier this m month and we got to talking about a personall approach to Mr. Hall in hopew of his prodding Charlie Snead or Fred Beck to resolve the water problem.

Well, for what it's worth (and it's not much) I thought I would let you know of these letters.

Sincerely,

Albert E. Bandecki

CALLAHAN MINING CORPORATION

277 PARK AVENUE · NEW YORK, N.Y. 10017
TELEPHONE: (212) 826-2950

OFFICE OF THE PRESIDENT

March 15, 1972

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N. J. 08033

Dear Albert:

I have talked with Charlie Snead about your suggestions of March 8th, and he in turn has talked with Fred Beck who is presently on the West Coast. They both are in agreement with your suggestion that the Borings be pursued at home base, and will move along this line as soon as possible.

They are also entirely agreeable to approaching others in the vicinity and would welcome your suggestions. A problem, of course, will be obtaining rights for a pipe line across intervening properties if a well is found. This would have to be ascertained in advance, for it would be a shame to find a non-transportable oasis.

I shall certainly advise you of my whereabouts if I go West, but still am hoping that you will find your way to the great city to visit with your friends here. I continue to be extremely interested in every aspect of our withdrawal from Harborside, and we are planning to increase our efforts in all areas so that Callahan will be a pleasant remembrance, and hopefully a constructive one, for the area in years ahead.

With all best wishes.

Sincerely,

Joseph T. Hall

JTH:aim

50 Tanner Street
Haddonfield,
New Jersey 08033
March 8,1972

Callahan Mining Corporation
277 Park Avenue
New York, New York10017

Mr. Joseph T. Hall
President

Dear Mr. Hall:

Thank you for your letters of March 6th. As far as my painting is concerned I have been experiencing an attitude that seems to have affected my work to the extent that little is being produced. When I am able to settle down and resume doing some decent work I will be sure to let you know. Hopefully by the end of next year I may have enough work for a show.

Please let me know your address when you move out West, not too near a mining activity I trust.

In the last paragraph of your letter concerning the water problem you mentioned possible suggestions I might have. There is one that I wish you would consider; that of Charlie Snead and Fred Beck arranging a meeting with the Boring family at their residence in Massachusetts with the objective of reaching a final agreement, or at least the decision that further negotiation is or is not worthwhile concerning permission to drill on their property.

If such an agreement is found not to be possible would Charlie and Fred consider approaching again others in the vicinity for permission to drill a well. There may be the possibility of an unaffected aquifer on the westerly side of the town road which could also mean less of an expense to trench the water line below frost.I'm sure however Fred is more knowledgeable than I on this.

In no way do I mean to impune Charlie's of Fred's efforts in my earlier letter to you. I think I understand what they have been through with the Borings. It seems to me that a face to face meeting with the Borings might shorten the negotiations and prevent any misunderstandings that can develop through long delayed correspondence.

This is my only suggestion and I would appreciate your condideration and decision.

Sincerely,

Albert E. Sandecki

CALLAHAN MINING CORPORATION

277 PARK AVENUE · NEW YORK, N.Y. 10017
TELEPHONE: (212) 826-2950

OFFICE OF THE PRESIDENT

March 6, 1972

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N. J. 08033

Dear Albert:

As I respond to your letter of March 1st, I am sympathetic to your request and to such inconveniences as the Farnhams and others have experienced. I have kept in touch with the developments in this difficult situation and the problems of getting action in a reasonable period.

I am sure, however, that you are in much more intimate touch than I. Frankly, I have had the impression that Charlie Snead, Fred Beck, Ralph Flow and the others were pursuing every avenue as closely as they could, and that as one solution after another proved unsatisfactory, they initiated another - and sometimes more than one.

If there is any way for me to expedite the answer, I should be more than glad to try to do so. My problem is that I really don't know what to do beyond our present efforts. Perhaps you have suggestions for steps we have overlooked - I should welcome word from you if you have thoughts on what we should be doing and are not.

With best wishes.

Sincerely,

Joseph T. Hall

JTH:aim
CC: G. J. Beattie
F. M. Beck
C. D. Snead, Jr.

CALLAHAN MINING CORPORATION

277 PARK AVENUE · NEW YORK, N.Y. 10017
TELEPHONE: (212) 826-2950

OFFICE OF THE PRESIDENT

March 6, 1972

Mr. Albert E. Sandecki
50 Tanner Street
Haddonfield, N. J. 08033

Dear Albert:

I have missed you on my very infrequent visits to Harborside - and I'm sorry for it. I am still hoping that you can find time when next you are in the City to drop by for a visit or a meal, and to look at the Sandeckis in our office.

I am planning to move to the West later this year, and would like to take with me more of your work than the "January" and "Sunning" which I now own.

Are you having another show soon? Or might you find time to do one for me?

Cordially,

Joseph T. Hall

50 Tanner Street
Haddonfield,
New Jersey 08033
March 1, 1972

Callahan Mining Corporation
277 Park Avenue
New York, New York 10017

Mr. Joseph T. Hall
President

Dear Mr. Hall:

I am writing to you concerning the water problem we have lived with since July 13th 1968, in hopes that you would consider initiating priority to resolve this problem.

Understanding that it is difficult to be aware of all of your company's situations all of the time, this is an effort to be sure you know of our predicament.

The water situation has deteriorated in the eyes of the mine's neighbors who have lost their wells due to the lowering of the watertable. Correspondence and discussions with the Farnhams and other neighbors has been increasingly depressing. Aside from the inconvenience of having to haul drinking water the plumbing in the houses is being ruined by the salt content of the water (310 ppm) now in the system.

I am aware and appreciative of Fred Peck's situation in the drawn out negotiations with the Borings.

This is a personal appeal to you and your conscience mainly for the sake of the elderly Farnhams and Grays as year-round residents who bear the brunt of the problem.

I am sure in your efforts to be a successful mining company nothing would be spared to obtain the necessary rights to achieve that end.

Would you please consider helping to finally resolve this water problem.

Thank you.

Sincerely,

Albert E. Sandecki

18 Mar 72

Dear Albert

We were glad to learn via the telephone last evening that your father is "out of the woods" and making good progress. Please give him our best wishes —

As promised in my 14 March letter to you — I am including here — with our "water doctor" report.

Also included is copy of my 17 Mar letter to him as well as my 1/24/69 letter to Brainerd.

We must be NIP on Mr. Staley's listing — as he usually requires 90 days to render an opinion.

Ruth is a "bit" more comfortable with double dosage of pills plus hot, hot, wet towels every 20 minutes.

Don't work too hard!!

Bob Bill

11 March '72

Dear Harold

Please note inclosed letter, 3/8/72 especially the marked paragraphs and let us have benefit of your advices. Can we relate ppm to pH.? I have sent Albert some NITRAZENE, papers to determine pH. Also note marked paragraphs in copy of my 1/24/69 letter to Raimund

Please return both with your reply.

Ruth is having again a painful bout with arthritis in her back. We are doing all possible for relief — sun lamp, medication, cervical traction, rest.

How are you both? In good health and spirits? Sincerely Bill

3/16/72

Dear Bill.

I sat down this evening and read your letter and started in on the "technical discussion" given ~~th~~ in the next 4 pages, without wanting an adequate "opener".

It was nice to hear from you again, but we are sorry to hear that Ruth is having so much trouble with arthritis. Hope she improves and is more comfortable.

Eddie + I have been "fair". She had a spell of "flu" or bad cold, which still bothers her I have just recovered from a session with "Diverticulitis" which laid me up for a week. I feel better than ever now — but will have to watch my diet.

I'm not sure whether I said before but I "retired" on Dec 1 (1971), but have continued at the same job in exactly the same way as a "Consultant" Hope to keep it up for at least 2 years but I'm vulnerable. Motor is still very active, and a good place to work — and I'm enjoying it more than ever.

Now I proceed to the next pages

Give our regards to Ruth.

I'm returning the letters, with this.

Sincerely
Harold.

3/18/72 (1)

Dear Bill

Your letter arrived today, so I will proceed to give my "thoughts" on the Questions raised.

I do ~~not~~ have information at hand on how much salt there is in sea water but your statement that ^it is^ 1100 (PPM) of chloride sounds about right. (PPM = Parts per million parts of water) Likewise, I suspect your figure of 140 PPM is near the taste threshold. When discussing salt content and laboratory tests, care should be taken to state how it is expressed. Salt is sodium chloride (Na Cl) ~~and~~ but the chemical test determines only the chloride (Cl) part of the molecule, so some people express the salt content as so many PPM of salt (expressed as Na Cl); others express it as so many PPM (expressed as chloride Cl^-) It would appear that your quotation expressed it 140 PPM of chloride. To express it as PPM of sodium chloride (NaCl), you can multiply 140 by 58.45/35.46 = 1.65, that is 140 X 1.65 = 231 PPM expressed as NaCl.

It is not clear whether the 315 PPM figure or the 115 PPM figure are expressed as NaCl or as chloride but regardless of the absolute numbers, I would

[Left margin note:] [illegible] — I have a handbook that says chloride (Cl) should not exceed 250 PPM in drinking water, so maybe 140 PPM is too low to taste ??

expect that 315 PPM of Nacl or 315 PPM as Cl would be quite corrosive to copper pipe.

When considering corrosion problems, the effect of high salt content should be considered seperately from the effect due to acids, that is, high acid content will give low pH. pH is a measure of the hydrogen ion concentration. For example Hydrochloric acid (HCl) ionizes (decomposes?) when placed in water to give:

$$HCl \longrightarrow H^+ + Cl^-$$

Hydrochloric acid — Hydrogen ion — Chloride ion

Since pH is a negative logarithmic function of the hydrogen ion concentration, that is (Numerically between 0 and 14)

$$pH = -\log [H]^- \quad \text{(approximately)}$$

then the lower the pH, the higher the hydrogen ion concentration. Pure water should have a pH of 7.0 so that if the pH is 4.5, the hydrogen ion (acidity) is higher. Generally speaking acids cause corrosion.

Corrosion due to salt can go on almost at any pH, anywhere from 1 to 14. On the other hand water containing no salts, if made acid so that it had a pH of 4. or lower, would be corrosive

water can be made to have a pH of 4.5 (or lower) with Carbon dioxide (which is "carbonic acid" when dissolved in water) and can be quite corrosive, if there is no calcium or other salts in the water. That is hard water containing calcium & magnesium salts would be less corrosive at pH 4.5 than soft water. The above may explain to some extent your statement that your water has a pH of 4.5 but is not corrosive. It is not corrosive, for some reason other than the pH of 4.5.

By the way the above chemistry was what kept Cochrane in business, as you no doubt are aware.

To answer your specific question "Can we relate PPM to pH ?", the PPM that you are talking about is "PPM of chloride" or PPM of NaCl", and it cannot be related to pH. That is there is no relation between the chloride content and the Hydrogen ion content (Ratio pH or acidity)

Actually the hydrogen ion content at pH 7.0 could be expressed in PPM of Hydrogen ion (but rarely if ever is expressed in PPM). The Hydrogen ion at pH is a very small number. In this sense PPM could be related to pH, but it would be concerned with PPM of Hydrogen ion at a particular pH value.

Is the above very confusing?

To review the overall problem, I would expect corrosion of copper to take place with water having either (a) 315 PPM chloride or (b) a pH of 4.5. That is either (a) or (b) seperately would probably corrode — Both together would almost certainly corrode.

I get the general impression from the three letters, that you are making some progress in resolving the problems in Maine.

COMMUNITY WATER SUPPLY STUDY

Significance of National Findings

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Environmental Health Service
Bureau of Water Hygiene

COMMUNITY WATER SUPPLY STUDY

Significance of National Findings

Bureau of Water Hygiene
Environmental Health Service
U.S. Public Health Service
Department of Health, Education and Welfare
July, 1970
Washington, D. C.

FOREWORD

The ecological crisis with which our Nation, and the world, are today confronted has been building for many years. Yet, for many, the magnitude of the damage which we have inflicted on our environment, in ignorance and carelessness, has come as a recent, stunning surprise. However, the urgency of our environmental problems can no longer be ignored or denied. President Nixon expressed the National mood about these sobering realities when he declared that "the nineteen seventies absolutely must be the years when America pays its debt to the past by reclaiming the purity of its air, its waters and our living environment."

Of special concern is the fact that the waste products of our highly urbanized and technological society --- many of them not even identified --- which pollute our land, air, and water, persist in the environment, and react, one with another, in complex and little understood ways, to affect the life cycles of plant, animal, and human organisms.

Our water resources, more perhaps than any other, illustrate the interaction of all parts of the environment, and also the recycling process that characterizes every resource of the biosphere. Everything that man injects into his environment --- chemical, biological, or physical --- can ultimately find its way into the earth's water and these contaminants must be removed, by nature or by man, before the water is again potable.

Concern for our water quality until quite recently has centered principally on the danger of bacteriological contamination from inadequately treated sewage discharged into our rivers and streams. Today we are confronted with the fact that chemical pollution of source waters poses additional, and possibly even more difficult, problems. Moreover, we deceive ourselves if we assume that even the most complete and effective treatment of municipal and industrial wastes can ever remove all threats of water contamination.

In a world subjected to growing burden of interacting pollutants, many other sources of contamination exist, so that the quality and safety of our drinking water must finally depend upon constant vigilance and application of the best techniques of water treatment and distribution.

That only recently has attention been focused on the problems of maintaining safe drinking water is illustrative of the dangerous complacency with which we have viewed the whole spectrum of environmental ills. This report by the Bureau of Water Hygiene, Environmental Health Service, represents the first real attempt to determine, on a nationwide basis, the efficacy of current practices in water treatment and to assess future prospects for maintaining safe, high quality drinking water.

It may be concluded, on the basis of the survey findings, that, while the overwhelming majority of the people of the United States can be assured that the water they drink today is safe, several million drink water containing potentially hazardous amounts of chemical or bacteriological contamination. Clearly there is an immediate need, in many localities, for upgrading present water treatment and distribution practices.

Moreover, as in so many other aspects of our environmental situation, the findings are not reassuring with regard to the future. It seems abundantly clear that we will need, in the years ahead, to give increasing attention to the broad problems of water supply in order to assure the public of an adequate supply of safe drinking water on a continuing basis.

Charles C. Johnson, Jr.
Assistant Surgeon General
Administrator

SIGNIFICANCE OF THE NATIONAL COMMUNITY WATER SUPPLY STUDY

A Statement by the
Director of the Bureau of Water Hygiene

PREFACE

Contemporary American society recognizes a host of interrelated factors that determine the quality of urban life. In addition to the basic needs -- food, clothing and shelter -- we have recently begun to recognize two other daily necessities that were heretofore thought to be of unquestionable quality and available in unlimited quantities; ample quantities of clean air, from moment to moment, and safe drinking water, from hour to hour.

The Community Water Supply Study concerns the current and future healthfulness and dependability of the drinking water supplied to over 150 million Americans by community water supply systems. The remaining population drinks from private supplies. The purpose of the study was to determine the quality of drinking water being delivered to the over 18 million people in the study areas and the health risk factors that enabled scientists and engineers to evaluate the ability of these systems to continue to provide adequate supplies of safe water now and in the future. The Analysis of National Survey Findings of the National Community Water Supply Study (July 1970) is based on a survey of 969 representative public water supply systems located in nine areas of the Nation. This statement attempts to place the technical findings into a national perspective. It seeks to answer two questions about the nation's water supplies: (1) Are well established standards of good practice being applied to assure the quality and dependability of water being delivered to consumers' faucets today? and, (2) What needs to be done to assure adequate quantities of safe drinking water in the future on a National scale? While our study has helped provide answers to these important questions, not all the discussion that follows in this statement is derived solely from the results of this single investigation.

BACKGROUND

Americans generally assume that the water from their faucets is healthful, and free of bacterial or chemical contaminants that can bring disease. Usually, the assumption is correct. The drinking water supplies in cities and towns of the United States rank in quality, on the average, among the best in the world. Nevertheless, there is cause for serious concern about our drinking water. There are two good reasons for this paradox.

To begin with, it cannot be maintained that all of our drinking water is safe. It is true that the classical communicable waterborne diseases of years past -- typhoid fever, amoebic dysentery and bacillary dysentery -- were brought under control by the 1930's. However, we still have outbreaks of communicable disease from sewage contamination of water supply systems in the United States. Recent outbreaks are discussed later in this report. As we shall see in this report, we found evidence of bacterially contaminanted water being served to consumers in communities ranging in size from less than 500 to 100,000 persons.

Disturbing as it is to find such evidence, there is a second, more far reaching problem of considerable importance to the country. That problem is the ability of all our present municipal water supply systems to continue to deliver water of good quality and adequate quantity in the decades ahead to a rapidly rising population. This is made all the more difficult by the growing amount of chemical pollutants entering our lakes, streams and aquifers.

Current forecasts provide an indication of how much water we will be needing in the future. According to one calculation, we used 270 billion gallons of water per day in 1965 in support of industry, agriculture, and for domestic drinking purposes. By the year 2020, our water requirements. are expected to exceed 1300 billion gallons each day. But hydrologists estimate that the total usable surface water supply from rainfall is only 700 billion gallons per day.

Even today, when we return our used waters to streams or lakes we find ourselves using them over and over again. The need for multiple reuse of water will become greatly amplified in major sections of the country in years ahead. If the future population growth rate is only half of current projections, and even where desalinization of salt and brackish waters is a practical and economically feasible alternative, major sections of the country will find it increasingly necessary to practice multiple reuse in the years ahead. Much of the future problem relates to the need for having this water available when and where it is needed. For this reason, ground water has emerged as a significant source now accounting for more than 20 percent of the Nation's water supply requirements.

Where both surface and ground sources are insufficient, it will become necessary to directly recycle our wastewaters. This means taking wastewaters and using them over again in a closed system without first discharging them into our streams and lakes. With our present technology we cannot use water in this fashion for drinking, recreation or other intimate uses. It is true that during the past decade, much has been learned about the treatment of wastewaters for removal of some organic substances and bacteria, and processes for renovating wastewaters for direct reuse have even proceeded to the pilot plant stage. But the reuse of wastewaters over and over again presents us with new problems; with present treatment processes, chemicals would be concentrated, and therefore, new treatment processes must be developed; fail-safe warning systems must be found; and new methods must be developed to detect and remove such impurities as the pesticides and viruses which currently are present in almost undetectable concentrations. Little is known about the concentrations of carcinogens, antibiotics or hormones present in wastewaters.

Even though wastewater control efforts will be expanded in the future and are sorely needed to minimize future pollution of our drinking water sources, it is clear that water pollution control efforts alone cannot assure a safe drinking water quality. It is highly unlikely that even the best conventional waste treatment will produce a discharge of drinking water quality. As such, treatment does not remove all of todays known potential toxicants or biological agents prior to discharge. In addition, there are pollutants which have an effect on source of drinking water which are not subject to waste treatment. Such pollutants are found in uncontrolled runoff from our fields and forests, and from chemicals spilled in transportation accidents. Both of these examples adversely affect quality at the community water treatment plant intake. Both today and in the future, delivery of adequate supplies of safe water at the consumer's tap will be dependent upon properly designed, constructed and operated municipal water treatment plants and distribution systems.

SCOPE OF THE STUDY

The National Community Water Supply Study was designed to cover a variety of natural and demographic situations across the country. It surveyed 969 public water systems -- in the State of Vermont and in eight standard metropolitan statistical areas -- New York, New York; Charleston, West Virginia; Charleston, South Carolina; Cincinnati, Ohio; Kansas City, Missouri-Kansas; New Orleans, Louisiana; Pueblo, Colorado; and San Bernardino-Riverside-Ontario, California. The survey investigated every public water system in each of the designated areas. Twenty-two big city systems in the study areas served over 13 million people. The remaining 947 systems served 5 million people in communities of less than 100,000 people and 760 of those 947 systems each served populations of less than 5,000 people.

The survey was not expected to provide a perfect random sample of water supply systems throughout the country, but the results are reasonably representative of the status of

the water supply industry in the United States. As detailed in the Analysis of National Survey Findings, and in the nine supportive reports presenting findings for the specific study areas, the Public Health Service Drinking Water Standards of 1962 were used to evaluate both the current quality of drinking water and the health risks associated with the systems delivering that water.

Each water supply system was investigated to determine the quality of water being delivered to the consumer's tap, the adequacy of physical facilities and operating procedures, and the status of surveillance programs so necessary to the delivery of adequate quantities of safe water on a continuing basis consistent with the U.S. Public Health Service Drinking Water Standards. Two or more water samples, depending on the size of the community population, were analyzed for chemical, bacteriological and other constituents. Each sample indicated the quality of water at a particular point in time, and when all samples from a given system were evaluated together, the average quality of water being served during the study was determined.

The evaluation of each system was designed to identify deficiencies which could lead to a system failure in the future that, in turn, could lead to the delivery of potentially hazardous water quality to the consumer. Past records were studied to determine operational practices, including the frequency of past failures of equipment. The current condition of physical facilities was examined for such deficiencies as inadequate disinfection equipment in the event of an emergency, or finished water reservoirs poorly protected from contamination. The surveillance programs were reviewed with an eye on such problems as collection of bacteriological samples on a regular basis and the regular inspection of the distribution systems to prevent recontamination of the drinking water between the treatment plant and the consumer's tap.

FINDINGS IN THE STUDY AREAS

Drinking water quality defects and health risk problems involving poor operating procedures, inadequate physical facilities, and poor surveillance activities were found in both large cities and small towns irrespective of geographical location. In general, the larger systems, those serving in

excess of 100,000 persons including the 10.4 million people in the cities of New York, Cincinnati, Kansas City, and New Orleans, were delivering an "average" acceptable water quality consistent with the Drinking Water Standards. On this average basis, 86 percent of the approximately 18 million people covered by this study, or about 15.5 million served by 59 percent of the 969 systems investigated, were receiving good water during the study. The larger systems also evidenced better operation of treatment and distribution facilities. While sanitary defects were found in larger systems, the overall health risk was generally judged to be low, even though improvements in operational procedures and physical facilities are believed warranted in many instances.

Conversely, 41 percent of the 969 systems were delivering waters of inferior quality to 2.5 million people. In fact, 360,000 persons in the study population were being served waters of a potentially dangerous quality. This was particularly true of community systems serving less than 100,000 persons. Even where average quality was good, occasional samples were found to contain fecal bacteria, lead, copper, iron, manganese and nitrate and a few even exceeded the arsenic, chormium, and selenium limits. After all, people do not drink "average" water. They drink "samples" of water from their kitchen faucets or a drinking fountain at work or play. It is particularly important to note that communities of less than 100,000 people evidenced a prevalence of the water quality deficiencies and health risk potential. Some of the very small communities were even drinking water on a day-to-day basis that exceeded one or more of the dangerous chemical limits, such as selenium, arsenic or lead.

The major findings from the study, in the light of today's water treatment technology are as follows:

QUALITY OF WATER BEING DELIVERED

* 36 percent of 2,600 individual tap water samples contained one or more bacteriological or chemical constituents exceeding the limits in the Public Health Service Drinking Water Standards.

...9 percent of these samples contained bacterial contamination at the consumer's tap evidencing potentially dangerous quality.

..30 percent of these samples exceeded at least one of the chemical limits indicating waters of inferior quality.

..11 percent of the samples drawn from 94 systems using surface waters as a source of supply exceeded the recommended organic chemical limit of 200 parts per billion.

STATUS OF PHYSICAL FACILITIES

* 56 percent of the systems evidenced physical deficiencies including poorly protected groundwater sources, inadequate disinfection capacity, inadequate clarification capacity, and/or inadequate system pressure.
* In the eight metropolitan areas studied, the arrangements for providing water service were archaic and inefficient. While a majority of the population was served by one or a few large systems, each metropolitan area also contained small inefficient systems.

OPERATORS' QUALIFICATIONS

* 77 percent of the plant operators were inadequately trained in fundamental water microbiology; and 46 percent were deficient in chemistry relating to their plant operation.

STATUS OF COMMUNITY PROGRAMS

* The vast majority of systems were unprotected by cross-connection control programs, plumbing inspection programs on new construction, or continuing surveillance programs.

STATUS OF STATE INSPECTION AND TECHNICAL ASSISTANCE PROGRAMS

* 79 percent of the systems were not inspected by State or County authorities in 1968, the last full calendar year prior to the study. In 50 percent of the cases, plant officials did not remember when, if ever, a state or local health department had last surveyed the supply.

* An insufficient number of bacteriological samples were analyzed for 85 percent of the water systems -- and 69 percent of the systems did not even analyze half of the numbers required by the PHS Drinking Water Standards.

NATIONAL SIGNIFICANCE OF THE STUDY FINDINGS

Well established standards of good practice, in terms of the full application of existing technology, are not being uniformly practiced today to assure good quality drinking water. While most professionals hold the USPHS Drinking Water Standards in high esteem, the study shows that an unexpectedly high number of supplies, particularly those serving fewer than 100,000 people, exceeded either the mandatory or recommended constituent levels of bacterial or chemical content, and a surprisingly larger number of systems evidence deficiencies in facilities, operation and surveillance.

The National significance can be placed in perspective by considering the size-distribution of municipal water supply systems that were the subject of comprehensive facilities census conducted during 1963. At that time, 150 million Americans were being served by 19,236 public water supply systems including 73 million people dependent upon 18,837 small systems, each serving communities of less than 100,000 people. When these statistics are compared with the fact that over 40 percent of the small systems investigated during the current study evidenced current quality deficiencies on the average and both large and small communities were judged to be giving inadequate attention to quality control factors, there can be little doubt that this situation warrants major National concern.

Most of our municipal water supply systems were constructed over 20 years ago. Since they were built, the populations that many of them serve have increased rapidly -- thus placing a greater and greater strain on plant and distribution system capacity. Many systems are already plagued by an insufficient supply, inadequate transmission or pumping capacity, and other known deficiencies that become most evident during peak water demand periods. Moreover, when these systems were built, not enough was known to design a facility for the removal of toxic chemical or virus contaminants. They were designed solely to treat raw water of high quality for the removal of coliform bacteria. Such facilities are rapidly becoming obsolete as demands rise for water. The task in the future for our water treatment plants can be visualized by examining our population trend. By the year 2000 -- only 30 years from now -- our present population of about 205 million is expected to spurt to 300 million. By that time, it is expected that 187 million people (the total U.S. population just eight years ago) will be concentrated in four urban agglomerations -- on the Atlantic Coast, the Pacific Coast, on the coast of the Gulf of Mexico and on the shores of the Great Lakes. Most of the remaining population will be living in cities of 100,000 or more.

In the past, communities and industries were in the favorable position of being able to select the best source of supply consistent with their quantity and quality requirements. The demand for more water to quench the thirst of a growing population and meet the needs of expanding industry have led many people to ask how future quantity requirements will be satisfied. Concurrently, expanding water use comes at a time of greatly increased pollution of ground water aquifers, as well as streams, lakes and rivers. Historically and traditionally, ground water coming from its natural environment has been considered of good sanitary quality -- safe to drink,

if palatable. Nevertheless, 9 percent of the wells sampled during this survey showed coliform bacterial contamination. It seems fair to say that a similar situation prevails nationwide.

Chemical contaminants in our environment have been on the increase for about 25 years, due to the dramatic expansion in the use of chemical compounds for agricultural, industrial, institutional and domestic purposes. There are about 12,000 different toxic chemical compounds in industrial use today, and more than 500 new chemicals are developed each year. Wastes from these chemicals -- synthetics, adhesives, surface coatings, solvents and pesticides -- already are entering our ground and surface waters, and this trend will increase. We know very little about the environmental and health impacts of these chemicals. For example, we know very little about possible genetic effects. We have difficulty in sampling and analyzing them -- we have much greater difficulties in determining their contribution to the total permissible body burden from all environmental insults.

Consideration of the findings of this study leaves no doubt that many systems are delivering drinking water of marginal quality on the average, and many are delivering poor quality in one or more areas of their water distribution systems today. To add to this quality problem, the deficiencies identified with most water systems justifies real concern over the ability of most systems to deliver adequate quantities of safe water in the future.

RECOMMENDATIONS

Modern facilities operated by qualified personnel under adequate surveillance will provide high quality water with the lowest possible risk that current technology can offer. The following recommendations are made to those state and municipal officials concerned with the responsibility for safe, adequate water supply:

* Apply available water treatment and distribution technology, more intensively.
* Determine manpower needs of the state and county programs now in order to develop a program to provide technical assistance, training, and adequate surveillance to the Nation's numerous community water supply systems.
* Upgrade the skills of personnel responsible for the operations and maintenance of the water supply systems themselves, particularly in the case of those systems serving fewer than 100,000 people, through short courses, seminars, and correspondence courses to employees presently employed in the field as well as those wishing to enter it.
* Expand state laboratory resources to add the capability of routinely analyzing water samples for biological and chemical agents of health significance.
* Provide educational opportunities in water hygiene at the university level to assure the availability of qualified personnel to meet existing and future needs.

In addition to defining the need for improvements at the state and community level, this study's findings also show a need for research, development and planning to improve current practices and to provide adequate supplies of safe water in the future. The study clearly evidences the need to develop:

* Improved systems including surveillance procedures, to assure continuous and effective disinfection programs, particularly in smaller communities.
* Additional engineering research to simplify and lower the cost of removing excess nitrates and fluorides.
* Improved systems to control aesthetically undesirable concentrations of iron, manganese, hydrogen sulfide, and color, as well as taste and odor-causing organic constituents.

* Analytical surveillance techniques and control procedures to eliminate the deterioration that is occurring in water quality between the time the water leaves the treatment plant and the time it reaches the consumer.
* Improved planning to provide adequate quantities of safe water to the majority of our people who live in urban areas, and to assure optimum resource development and utilization to meet the needs of major population complexes.

History gives ample evidence of the inescapable penalties paid by past civilizations which failed to provide for the safety of their drinking water systems. Modern history shows that such waterborne diseases as typhoid, dysentery, and cholera are controllable and, in fact, were all but eliminated in the United States by the 1930's by applying the principles identified in the Drinking Water Standards. This study demonstrates that we have begun to backslide, which in turn, explains why it is that waterborne disease persists as evidenced by the epidemic at Riverside, California in 1965 which affected 18,000 people, the 30 percent gastroenteritis attack rate in Angola, New York in 1968 due to a failure in the disinfection system, and the 60 percent infectious hepatitis attack rate which afflicted the Holy Cross football team in 1969 as a result of the ineffective cross-connection control procedures. These recent episodes, reinforced by the findings of the current study, provide ample evidence of the increasing potential for similar episodes unless we improve water system operations consistent with currently accepted standards of practice.

We must also recognize numerous voids in existing technology which do not allow measurement of the current effectiveness of existing procedures. The current Drinking Water Standards do little more than mention viruses, neglect

numerous inorganic chemicals which are known to be toxic to man, and identify only one index that is supposed to cover the entire family of organic chemical compounds. These standards must be updated.

The need for knowledge about the health effects of waterborne contaminants is acute. Research is required, for example, to develop improved treatment control and surveillance procedures for viruses. The chronic long-term effects of chemical contaminants requires thorough investigation. For instance, we must determine the concentration levels at which numerous contaminants, such as mercury, molybdenium or selenium,cause adverse health effects. Similarly, we must mount a major attack on a host of synthetic organic chemicals which are growing at a rate of 500 new compounds per year. In addition to the threats posed by such well-publicized materials as pesticides, we now have to face a multitude of new organic chemical compounds. Recognizing our relatively fixed amount of ground and surface water supply, the increasing water needs of the general population and industry, and the need to reuse our available supplies to satisfy future demands, we can no longer afford to "wait and see what happens." We must begin to investigate before we introduce new compounds into the environment.

All this research is essential if we are to maintain at least the status quo for the current generation. These are issues confronting scientists and engineers today at all levels of government. But the overall water hygiene effort is this generation's responsibility to future generations. Indeed, answers to many of the currently identifiable research problems of today must be gained quickly if the current and future planners of our environment are to begin to formulate rational, economic and effective plans for the continued growth and development of our society.

James H. McDermott, P.E.
Director
Bureau of Water Hygiene

Rural Water NEWS

published for: COMMISSION ON RURAL WATER / Demonstration Water Project

published by: Ground Water Council
221 North LaSalle Street, Chicago, Illinois 60601
Telephone: 312/346-1862

Reports on what's happening on water and waste disposal for rural America.

Number 4 - December, 1972

DWP Holds Annual Meeting

Richard (Dick) Goodling, State Director of the Farmers Home Administration in Virginia, was the principal speaker at the annual stockholders meeting of Demonstration Water Project, held in Roanoke on November 30.

Elizabeth Spencer of the Office of Economic Opportunity, Virginia FmHA State Director Richard Goodling and DWP President C. M. Reynolds III, at the DWP Annual Meeting.

He expressed his appreciation for DWP's excellent cooperation in making FmHA's program more effective. He called particular attention to the fact that 16 FmHA financed homes are currently under construction in DWP project areas -- which he visited during the day -- and he expected this trend to continue. Virginia FmHA expects to be number one in the nation this year in rural housing and home improvement loans.

DWP President C.M. Reynolds III -- who was re-elected to serve another term -- reported on the past years accomplishments and future plans and presided over the election of the new DWP Board of Directors. The DWP board is made up of representatives from the five Roanoke area counties where DWP operates. Each company member is a stockholder and participates in the annual election.

Report Progress on Local Projects

DWP Roanoke reports loan closings with FmHA on two of its companies. Loans and grants totaled $75,000 for Glen-Wilton Water, Inc. and $65,000 for the Hollins Community Water Co. Both companies should be in operation shortly after the 1st of the year...The Franklin Water Development Co., which includes single family and cluster wells, is now awaiting funding from Virginia FmHA: It should be available on February 1...A new company is being formed in the small community of Eagle Rock, whose previous water system was condemned by the state health department. All 90 families in Eagle Rock are working with DWP to form a non-profit company...Project Director Joe Van Deventer also reports that 16 new homes -- mostly financed by FmHA -- are now under construction in the Southern Rural and Delaney Court Water Co. areas as a direct result of new water systems there.

Guyandotte Water and Sewer Development Corp. in Logan County, W.Va. has received a revised engineering report from its consultant for its initial project in the Big

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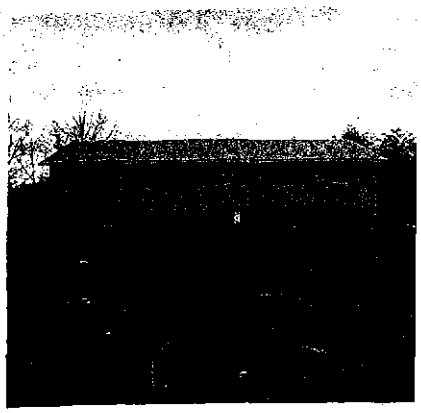
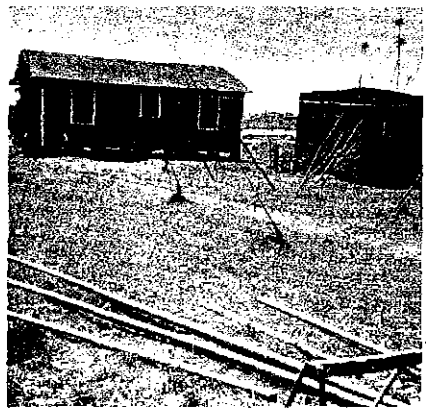


New housing follows new water in the Roanoke area.

Typical house in Big Creek area.



Laying pipe in Possum Hill area.

Creek area. Subject to the approval of FmHA and the state health department, the new plan includes six separate water and eight sewer systems to serve the 250 families involved. The final plan will be reviewed by FmHA in February.

The Beaufort-Jasper Special Water Project in South Carolina celebrated the "turning-on" of water for the 23 families involved in its project in the Possum Hill area of Beaufort County. Using Special Water Project and DWP funds, the families were hooked-up to the lines of the Beaufort Water Authority...Revised plans for central systems in the Bluffton and St. Helena Island communities have been received and are being studied...Congressman Mendel Davis (D. S.C.) recently visited the Beaufort-Jasper project to get first hand knowledge on their efforts to improve the local sanitation situation. Congressman Davis was a co-sponsor of the Rural Drinking Water Assistance Act, which is expected to be re-introduced in the next session of Congress.

Local Groups Can Get a Helping Hand

DWP and the Commission on Rural Water have recently received funding that will enable them to start two additional local model projects. Details on the projects chosen will appear in the next issue of Rural Water News.

A limited amount of funding will also be available to help the Commission respond to the needs of non-model local projects who can benefit from organizational and technical assistance in their efforts to help low-income rural people improve their water and sewer facilities. The assistance could include consultation by Commission members, use of materials and concepts developed by the Commission and DWP and a small cash grant, if necessary. Projects chosen will have to demonstrate that such assistance will result in a viable program that is likely to aid large numbers of rural people and will have good prospects of developing its own funding base.

If you feel your local group can benefit from such a program and also help us to learn more about ways to solve the problem nationally, please write, giving as many details about your current organization and programs as possible, to Mr. Stanley Zimmerman, Commission on Rural Water, 3400 Patterson St., N.W., Washington, D.C. 20015.

Rural Water-Sewer Guides Available Soon

Commission technical manuals on water and waste disposal systems design have been circulated in draft form to an expert group of reviewers and will soon go to the printer in their final form.

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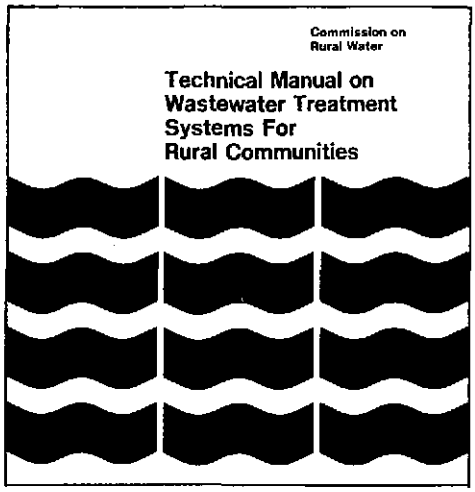
Written primarily for rural water-sewer companies and their engineering consultants, the manuals will also be valuable aids to government agencies, such as the Farmers Home Administration, who are active in providing loans and grants for these facilities. Several universities have also expressed interest in using the manuals in their courses in agricultural and civil engineering.



The Engineering Guide for Rural Water Systems Development was written jointly by Michael Campbell and Commission member Dr. Jay Lehr, both of the National Water Well Association. It includes chapters on water system development, construction, pumping and treatment facilities, and relative costs and maintenance. It stresses the complete evaluation of all available alternatives for both water source and distribution.

Commission member Steven Goldstein, assisted by Walter Moberg, Jr., is the author of the Technical Manual on Wastewater Treatment for Rural Communities. Similar in scope to the water systems manual, it is intended to be a guide to systems and componants which are available for treating wastewater in rural situations. It includes information on traditional systems, such as septic tanks, and on innovative systems that are now available commercially or in the advanced testing stage. Several of these are discussed in detail.

Both manuals, to be published as separate volumes around Feb. 1, will be completely illustrated. Readers who would like to receive pre-publication ordering information should fill out the enclosed reply card, or write to the Commission, 221 N. LaSalle St., Chicago, Ill. 60601.

Commission Spreads the Word

Representatives of the Commission on Rural Water have recently been "on the road" telling a variety of audiences the DWP rural water-waste story.

Patrick Cannon, Commission Public Information Director, attended the annual convention of the National Association of County Agricultural Agents in Atlanta on November 8, and participated in a professional improvement session on rural water and waste disposal problems. The two hour program included a showing of the Commission slide film, "Better Water for Rural America," and a discussion of forthcoming publications. County agents from all parts of the country attended the session and there was a lively interchange of ideas.

Commission member Durward Humes tells the DWP story to health officials.

Mr. Cannon gave a similar presentation on November 15-16, at the annual meeting of the American Public Health Association in Atlantic City. Members of the Conference of Local Environmental Health Administrators -- a group affiliated with APHA -- heard Commission member Durward Humes explain the DWP program during their annual luncheon meeting.

Regional and national groups whose memberships would also find such presentations of interest are urged to contact the Commission about the availability of speak-

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ers and programs. While the Commission can't promise to have a speaker available for your particular meeting or convention, it will do everything possible to meet your needs. If interested, please write with full details to Patrick Cannon, Commission on Rural Water, 221 N. La Salle St., Chicago, Ill. 60601.

We Get Letters

The Commission and DWP Information Clearinghouse has just sent out its 2000th Rural Water Information Kit. When we first offered the kit in Rural Water News, we were hoping for a large response, but the actual number of inquiries received has been far above what we had expected. We still have a backlog of unfilled requests, and are filling them as fast as possible.

Requests for more specific information about our program have also steadily increased since we began our Clearinghouse operations in April. These come not only from readers of Rural Water News, but from the thousands of people who have read about us in their local newspapers and in such publications as The Nation's Health, Clean Air & Water News, Ground Water Age, Water Well Journal and World Reporter, among others. As a result, we now receive as many as 30 letters a week that require individual replies. These are answered promptly, usually within a week.

The Clearinghouse is also responsible for distributing loan copies of the Commission slide film, "Better Water for Rural America." Beginning in September, the film has been seen by more than 30 local and national groups. All available loan copies are continuously in circulation, but we hope to eventually satisfy the requests of all those who want to see it.

We also arrange appearances by Commission speakers at regional and national meetings, and will continue to distribute Commission publications. (See stories this issue) All of our services are available to you and we urge you to take advantage of them by writing to the Clearinghouse c/o the Ground Water Council, 221 N. La Salle St., Chicago, Ill. 60601, or call us at 312/346-1862.

New Water Pollution Control Act Can Help

The $24 billion Water Pollution Control Act, recently passed into law by the Congress over the President's veto, contains provisions designed to improve the rural sewer situation.

Section 104 (q) directs the Administrator of the Environmental Protection Agency to "conduct a comprehensive program of research and investigation and pilot project implementation into new and improved methods of preventing, reducing, storing, collecting, treating, or otherwise eliminating pollution from sewage in rural and other areas where collection of sewage in conventional, community-wide sewage collection systems is impractical, uneconomical, or otherwise infeasible, or where soil condition or other factors preclude the use of septic tank and drainage field systems."

Section 105 authorizes the Administrator to follow-up on this research by making grants for demonstration projects using these "new and improved methods." These grants can be up to 75% of the total cost of the project. Authority for Section 104 is $100 million and for Section 105, $75 million, for the fiscal years ending June 30, 1973 and 1974.

Just what part of these funds will be spent for the rural research and demonstration provisions will await future decisions on priority by the Administration. And, of course, other general provisions of the Act will benefit rural communities whose need will be best met through the construction of conventional central sewage treatment facilities.

Commission on Rural Water

PUBLIC INFORMATION OFFICE:
Demonstration Water Project

Ground Water Council
221 North LaSalle Street
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312/346-1862

NATIONAL RURAL WATER

COMMISSION FORMED

April 28, 1972

FOR IMMEDIATE RELEASE

WASHINGTON, D.C. -- The national Commission on Rural Water, organized to work toward improved water and sewage facilities for America's rural families, has just been established.

The announcement was made by Stanley Zimmerman of Demonstration Water Project, Inc. (DWP), a Roanoke, Va.-based organization which has initiated new methods for setting up rural water districts in southwestern Virginia. Zimmerman will coordinate Commission activities.

The Commission will serve as national spokesman for DWP concepts and practices, seeking to make them effective throughout the country. Membership will initially be composed of representatives of the organizations involved in the DWP effort, together with related government agencies. These include the National Water Well Association (technical support on water systems), Mitre Corporation (waste disposal studies), Ground Water Council (national information clearinghouse), Office of Economic Opportunity, and the Environmental Protection Agency. Directors of local projects established by DWP will automatically become members. Additional members will be sought from interested national groups including farm, public health, rural consumer, and government.

The major breakthrough in the DWP program is agreement in principle from the Farmers Home Administration -- primary funding source for rural water systems -- to fund water companies that include so-called "cluster" and single family wells in their systems, instead of only central well-pipe line systems as formerly.

The Commission will seek to have this flexible approach implemented on a national basis to insure that rural people, regardless of income or location, will be provided with adequate water and sewage disposal facilities.

Further information on Commission activities and membership is available from the national clearinghouse -- Ground Water Council, 211 N. LaSalle St., Chicago, Illinois 60601. Phone (312) 346-8717.

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WS 21a, 31, 32, 33
GW 61, 62, 63

Commission on Rural Water

PUBLIC INFORMATION OFFICE:
Demonstration Water Project

Ground Water Council
221 North LaSalle Street
Chicago, Illinois 60601
312/346-1862

N E W S R E L E A S E

TECHNICAL HELP COMING FOR
RURAL WATER-WASTE PLANNERS

May 15, 1972

FOR IMMEDIATE RELEASE

CHICAGO, ILL. -- Rural people planning new community water and waste disposal systems will have an easier time of it later this year when the National Water Well Association (NWWA) and the Mitre Corporation publish a new manual, Engineering Guide for Rural Water and Waste System Development.

NWWA and Mitre are preparing the manual for the Commission on Rural Water, which is innovating new methods of providing water and waste disposal facilities for low-income rural residents.

The guide is meant to assist local project personnel in choosing the most appropriate and economical systems for their particular area. It will thoroughly cover development procedures, design, cost factors, operation and maintenance. It should prove valuable to local engineers, geologists, and Farmers Home Administration officials. Farmers Home is the primary funding agency for rural water and waste disposal systems.

In addition to the water and waste systems guide, the Commission has sponsored a series of training manuals in water company operations. When all of these are complete, rural residents will be able to take advantage of proven procedures in setting up and operating their local projects.

Further information on the Commission is available from the National Clearinghouse -- Ground Water Council, 221 N. LaSalle St. -- Chicago, Ill. 60601.

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Commission on Rural Water

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Ground Water Council
221 North LaSalle Street
Chicago, Illinois 60601
312/346-1862

20 MILLION IN RURAL AMERICA
STILL WITHOUT WATER

July 7, 1972

FOR IMMEDIATE RELEASE

WASHINGTON, D.C. - There are still more than 20 million rural Americans who lack running water in their homes, according to the Commission on Rural Water.

The Commission, organized to assist rural families in getting adequate water and waste disposal facilities, said this estimate is based on preliminary 1970 Census figures. The estimate is conservative, with the actual number likely to be closer to 25 million.

Aggravating this serious lack is an equally critical waste disposal problem. The Commission estimates that more than 30 million families are using systems that dump untreated effluent into our soil and surface waters. The "outhouse" is not a thing of the past in rural America, nor is the pipe that runs directly from a house to a nearby stream.

In commenting on these statistics, Stanley Zimmerman, coordinator of the Commission's activities, said, "The extremely high number of rural people still lacking these essential services is yet another indication of our inability to come to terms with the problem. The new rural development legislation, recently agreed upon by House-Senate conferees, will go a long way toward closing the gap, but only if the 300 million in yearly water and sewer grant money authorized by Congress is actually spent. With $58 million in already appropriated Farmers Home Administration water and sewer grant money being held up by the Office of Management and Budget, we are not optimistic that this will happen."

The Commission said that the FmHa water and sewer grant and loan program, while it has done much good, needs to be made more flexible and responsive, particularly to the low-income families who suffer most from a lack of pure drinking water and adequate waste disposal facilities.

Commission on Rural Water

PUBLIC INFORMATION OFFICE:
Demonstration Water Project

Ground Water Council
221 North LaSalle Street
Chicago, Illinois 60601
312/346-8717

RURAL WATER INFORMATION KIT NOW AVAILABLE

August 7, 1972

FOR IMMEDIATE RELEASE

Chicago, Illinois. - Rural residents seeking to improve their drinking water and waste disposal facilities can now get a helping hand from the recently formed national Commission on Rural Water.

A new Rural Water Information Kit explains how new approaches to rural water and sewage districts can benefit rural residents -- particularly those with low incomes. The kit explains how the federal government's assistance programs can be used and how they can be improved, using "cluster" wells and decentralized sewage disposal. It explains new approaches to systems design, and who to see if you have a local area water or sewage problem.

The kit was prepared jointly with Demonstration Water Project (DWP), which has organized local projects in several areas of the country to assist low-income people in organizing their own water companies. Much of the material in the kit is based on DWP's successful innovations and practices.

"Many rural residents, regardless of income, simply aren't aware of the programs available to help them," said Stanley Zimmerman, national coordinator for the Commission. "With 22 million rural people still without water in their homes, we think the kit will fill a real need. It suggests ways to get started, including where to find loan and grant money. But most important, it proves -- using the DWP experience -- that rural people can be successful in helping themselves get better water and waste disposal."

The kit is available from Box NR, Commission on Rural Water, 221 N. La Salle St., Chicago, Ill. 60601

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RURAL WATER COMMISSION

SUPPORTS NEW LEGISLATION

September 27, 1972

FOR IMMEDIATE RELEASE

Washington, D.C. - The national Commission on Rural Water has announced its support of two bills, now pending before the Congress, that will have far-reaching impact on the water and waste disposal situation in rural America.

The first, known as the "Rural Drinking Water Assistance Act," was recently introduced in the House by Rep. Howard Robison (R. N.Y.). It calls for the Secretary of Agriculture, in cooperation with the Environmental Protection Agency, to initiate a thorough survey of rural water needs and report these findings to a newly created Rural Water Council. The Council, whose membership would come from both government and private life, would then recommend a program of action at the federal level.

Other provisions would provide funding for research, and $100 million a year each for direct loans and grants to rural water and sewer associations, with highest priority given to low-income groups. Grants of $20 million a year would also be available to groups working to help poor people organize themselves.

Sen. Ernest Hollings (D. S.C.) has added similar survey provisions as an amendment to the Senate "Safe Drinking Water Act." This bill, given a good chance for passage this session, will set national standards for drinking water quality and Sen. Hollings' amendment would specifically recognize the special problems of rural people.

"We're hopeful that at least the Hollings' amendment will become law this year," said Stanley Zimmerman, national coordinator of the Commission. "The results of the survey will, we're sure, bear out the Commission's contention that millions of rural Americans are doing without these basic sanitary facilities. Although the Farmers Home Administration has done excellent work over the years in closing the gap and will be helped even further by the new "Rural Development Act," recently signed by the President, we feel that the Robison and Hollings' legislation will help to further focus national attention on the problem and will result in even higher priorities being given to solving it.

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Commission on Rural Water

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Demonstration Water Project

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221 North LaSalle Street
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312/346-8717

RURAL DRINKING AND WASTEWATER SYSTEM GUIDES AVAILABLE SOON

November 8, 1972

FOR IMMEDIATE RELEASE

Washington, D.C. -- Rural groups planning new or expanded water and waste disposal facilities will soon be able to refer to design manuals prepared especially for them by the Commission on Rural Water.

Written primarily for rural water-sewer companies and their engineering consultants, the manuals will also be valuable aids to government agencies, such as the Farmers Home Administration, who are active in providing loans and grants for these facilities. Several universities have also expressed interest in using the manuals as basic texts in their agricultural and civil engineering curriculum.

The Engineering Guide for Rural Water Systems Development was written for the Commission by Michael Campbell and Dr. Jay Lehr of the National Water Well Association (NWWA). It includes chapters on water system development, construction, pumping and treatment facilities, and relative costs and maintenance. It stresses the complete evaluation of all available alternatives for both water source and distribution.

Mr. Steven Goldstein and Walter Moberg, Jr., then of Mitre Corp., are authors of the Technical Manual on Wastewater Treatment Systems for Rural Communities. Similar in scope to the water systems manual, it is intended to be a guide to systems and components which are available for treating wastewater in rural situations. It includes information on traditional systems, such as septic tanks, and on innovative systems that are now available commercially, or in the advanced testing stage. Several of these are discussed in detail.

Both manuals, to be published as separate volumes around the 1st of the year, will be completely illustrated. Those who would like further information, or would like to receive pre-publication ordering information, should write to the Commission on Rural Water, 221 N. La Salle St. -- Chicago, Ill. 60601.

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Commission on Rural Water

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Demonstration Water Project

Ground Water Council
221 North LaSalle Street
Chicago, Illinois 60601
312/346-8717

RURAL WATER COMMISSION PUBLISHES

LOCAL DEVELOPMENT GUIDE

January 31, 1973

FOR IMMEDIATE RELEASE

Washington, D.C. -- Rural citizens seeking to improve their community's water and waste disposal facilities can now benefit from the experience of the Commission on Rural Water.

A new book, Guide for the Development of Local Water Projects, has just been published by the Commission and is available for ordering. Written by Stanley Zimmerman and Edwin Cobb, of Conset, Inc., the book draws upon the experience of Demonstration Water Project, Inc., in setting up model development projects in various parts of the country. It is the only publication available that covers the subject in a comprehensive manner.

Using a step-by-step approach, the guide covers assessment of local need ...organization of the development team...obtaining official approvals and project financing...establishment and training of the utility companies...and construction supervision and support company operation.

Written in easy to understand language, the guide takes the form of advice -- "do's and don't's" -- to the potential project developer. Problems faced in actual DWP project areas are used to illustrate many of the points made. In addition, appendixes at the end of each section include samples of the various forms and procedures required by the many agencies involved in the funding and approval process.

The cost of the guide is $5.00, which covers the expense of duplication. Postage will be prepaid if payment accompanies order. To order a copy -- and to request information on other Commission publications, including technical manuals on rural water-sewer system development -- write to the Commission on Rural Water, Box DM, 221 N. La Salle St., Chicago, Ill. 60601.

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Commission on Rural Water

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Demonstration Water Project

Ground Water Council
221 North LaSalle Street
Chicago, Illinois 60601
312/346-8717

RURAL DRINKING AND WASTEWATER
SYSTEM GUIDES NOW AVAILABLE

February 6, 1973

FOR IMMEDIATE RELEASE

Washington, D.C. -- Groups active in the development of new or improved water and waste disposal facilities for rural areas can now order design manuals prepared especially for them by the national Commission on Rural Water.

Written primarily for rural water-sewer companies and their engineering consultants, the manuals will also be valuable to government agencies, such as the Farmers Home Administration, who finance such facilities. Universities should also find them useful as basic texts in their agricultural and civil engineering curriculums.

The Engineering Guide for Rural Water Systems Development was written for the Commission by Michael Campbell and Dr. Jay Lehr, both of the National Water Well Association. It includes sections on system development, construction, pumping and treatment facilities, and relative costs and maintenance. It stresses complete evaluation of all alternatives for both water source and distribution.

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Both manuals are completely illustrated and are bound in hard covers. Cost is $12.50 each, or $22.50 if ordered together. Postage will be pre-paid if payment accompanies order. Volume prices are also available. To order -- or to request additional information on these and other Commission publications -- write to the Commission on Rural Water, Box TM, 221 N. La Salle Street, Chicago, Ill. 60601.

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(Reprinted from WORLD magazine, Vol.1 No. 4, August 15, 1972)

America's Drinking Water Trouble On Tap

by Rice Odell

Rice Odell is the Editor of CF LETTER, a monthly report on environmental issues published by the Conservation Foundation in Washington.

For years, the nation's experts on drinking water have been trying to tell the American public something urgent. The point they have been striving to make is that many citizens are being subtly debilitated by contaminated water and, more importantly, that the country is sliding toward a health crisis which is not likely to be at all subtle.

The administration and Congress finally seem to have got the message that the situation calls for decisive action. There is a fair prospect of new federal legislation this year. But will it be strong enough to set up an effective federal program? Will it sufficiently activate state and local governments, which have basic responsibility for drinking water supplies? Many of these administrative bodies take safe water for granted—a complacency shared by the general public.

The complacency is not warranted, even by present circumstances. In the decade from 1961-1970, according to figures compiled by Gunther Craun and Leland McCabe, water specialists with the Environmental Protection Agency, there were 128 *known* outbreaks of disease or poisoning attributable to drinking water, outbreaks in which twenty people died and an estimated 46,374 became ill, many seriously. The worst incident since 1970 is believed to have occurred last summer in Pico Rivera, California, during which some 3,500 persons suffered from gastroenteritis, a stomach and intestinal inflammation that is the most common of the waterborne illnesses.

But *reported* illnesses are probably only the tip of an iceberg. Officials believe that countless sufferers go unreported—those with subclinical symptoms, those who don't bother going to a doctor, and those whose ailments are not attributed to drinking water. Few doctors, faced with a case or two of diarrhea or, even more significant, with arthritic-type symptoms that have their origin in toxicity, are likely to launch the kind of investigation that can track down and pin the blame on an elusive water contaminant. Samples of the water involved usually are not even available.

A DOCTOR is likely to hesitate before he signs a report implicating a city's water system. State and local agencies themselves are suspected of sometimes failing to thoroughly investigate and report the causes of outbreaks, even large ones. In 1964, for example, some 16,000 residents of Gainesville, Florida—well over a third of the population—were struck with gastroenteritis. (The episode was not unlike one in Riverside, California, the following year, when salmonellosis from drinking water infected an estimated similar number of persons, three of whom died.)

Federal water-hygiene officials are convinced that contaminated drinking water was the cause in Gainesville—but they were not notified at the time of the outbreak, despite its magnitude, and learned about it only two years later almost by accident. Why? Perhaps the Floridians couldn't agree that water was the culprit; perhaps they were concerned about tarnishing the image of the university town; or perhaps they feared a host of damage suits. In any case, nonreporting of outbreaks obscures the extent of the problem. "A lot goes on that people don't hear about," says EPA's William Long. "Or if they do hear about it, they don't realize the significance of it."

Similarly, EPA figures for the same ten-year period blame drinking water for 903 cases of infectious hepatitis, which

can result in permanent liver damage. (The infection of the Holy Cross football team in 1969 is a well-known example.) But a person who gets infectious hepatitis from a virus in water can transmit it to others, even without contracting the disease himself. So water may be indirectly responsible for many of the estimated half-million cases of that disease each year, of which most go undetected.

"The disease is so widespread, but so ill-reported," says Daniel A. Okun, a professor at the University of North Carolina, "that its economic impact from work time lost and for medical care is virtually impossible to assess."

Also unquantified, of course, are the discomfort and suffering, and the semi-productive work caused by milder cases. The same can be said of other water-borne diseases. In addition to health and economic effects, tap water frequently brings with it objectionable tastes and odors.

UNACCEPTABLE as the present situation is, the prospect of future hazards is what most unnerves the water experts. Some of the problems behind their concern are:

- Most municipal water supply systems —of which there are over 30,000—were built more than twenty years ago; each year they become more obsolete. They were designed principally to remove coliform bacteria from sources of "raw" water that were relatively clean. The enemies then were typhoid, dysentery, and cholera. "The sanitary engineers built in a helluva safety factor," says Long. The major diseases were all but wiped out, thereby helping to induce the present complacency. But the safety factor, in Long's opinion, has pretty well disappeared under new pressures.
- Rising demands for water are straining facilities for treatment, distribution, and pumping. Cities are turning increasingly to polluted sources of raw water; more and more reuse of water is inevitable. Population and industrial growth are pouring a heavier load of contaminants into the surface and ground waters from which municipal supplies are drawn. Runoff from farms and forests is largely uncontrolled, and chemicals are often accidentally spilled.
- New families of pollutants are entering the nation's waters at a rapid rate. In many cases, techniques have not been devised to remove them or even find them. And their short-term or long-term effects on health remain undetermined. These pollutants include various trace metals and a bewildering array of exotic chemicals. "There are about twelve thousand different toxic chemical compounds in industrial use today," says James H. McDermott, director of EPA's Water Supply Programs Division, "and more than five hundred new chemicals are developed each year." More and more wastes from these chemicals are entering our water supplies, he notes.

"Rising demands for water are straining facilities for treatment, distribution, and pumping. Cities are turning to polluted sources of raw water . . . more reuse of water is inevitable."

Among the polluting materials are such metals, chemicals, and compounds as nickel, tin, vanadium, lithium, beryllium, cadmium, chromium, lead, mercury, arsenic, selenium, silver, zinc, sodium, nitrate, asbestos, solvents, nitriloacetic acid (the NTA in detergents), and polychlorinated biphenyls (the ubiquitous PCBs). Also of concern are hormones, antibiotics, pesticides, and radioactive materials.

Many of these agents have not been evaluated, or have been inadequately evaluated, in terms of their toxicity and their possible effects on allergies, chronic diseases, and other health conditions. Professor Okun points out that few of the new chemicals are assessed for their potential impact on health, "particularly for the synergistic effect they may have when acting together or in concert with other types of environmental stresses." He adds that some of these chemicals have been shown to cause cancer, genetic mutations, or birth deformities.

By and large, conventional treatment systems are incapable of filtering out chemicals and trace metals. As Ralph Nader has put it: "They are making our water heavy with silent violence."

- Still more ominous are the many types of virus lurking in the public's drinking water supplies. Scientists have long known of their presence and their association with hepatitis and other diseases. But viruses are difficult to locate; indeed, until a few months ago they had never been isolated in drinking water in the United States. To some extent, the experts have assumed that chlorination and other types of disinfection—the bread-and-butter water-treatment techniques—put most viruses to rest along with bacteria. But this faith was shaken by EPA's recent discovery of disease-producing viruses in the drinking water of two Massachusetts cities, Lawrence and Billerica, despite the fact that both cities have up-to-date purification systems that surpass most in the country.

Some reasonable conclusions: viruses are alive and well in much drinking water throughout the nation; conventional bacterial tests can no longer be considered sufficient evidence of their absence; viruses may be causing many unexplained outbreaks of disease; and they won't be eliminated from water supplies unless all elements of a modern treatment system are operating optimally, if then.

- State and local health and water agencies are seriously strapped for funds and manpower. Ironically, the great emphasis on water pollution control has siphoned off appropriations and expertise from such programs as drinking water treatment and hygiene. Budgeters don't consider these so critical, because they assume supplies are safe; at least, they identify no current crisis.

(Water pollution control efforts are of only indirect benefit to drinking water supplies. They are designed to improve the quality of the streams, lakes, and other sources of raw water. But conventional pollution control methods do not begin to remove most of the contaminants. Okun says, "They may reduce slightly the pressure on community water supplies, but if we wait for the water pollution control program to provide us with safe drinking water, I believe we will always be well behind.")

- The results of apathy and lack of funds were etched sharply in the 1969 Community Water Supply Study of 969 public systems. It indicated that 2 per cent of the study population was being served water of a potentially dangerous quality. Extrapolated to the total of 160 million persons served by public systems, there are 3.2 million consumers in that boat.

THE STUDY showed that 41 per cent of the systems investigated were delivering water that did not meet all of the Drinking Water Standards set by the Public Health Service in 1962—standards considered by many experts as inadequate anyway; and 56 per cent of the systems were judged deficient because of poor protection of water sources, inadequate disinfection controls, insufficient pressure in the distribution system, and the like. (EPA officals say some local treatment authorities even skimp on the amount of chlorine they apply.)

Almost 80 per cent of the systems had not been inspected by state or county authorities during the prior year, and in many cases the investigators could not determine how long it had been since the last check was made. The study also found generally inadequate training of

plant operators.

Another widespread problem is the absence or non-enforcement of ordinances against so-called "cross-connections." For example, a chemical plant might hook up to a municipal water pipe so it can flush out its tanks. No problem—except when someone turns a wrong valve, or when peak demand or a large fire reduces pressure in the municipal system enough to cause a back-flow that sucks chemicals into the drinking water supply.

In one instance of a cross-connection—hard to believe but true—a developer ran his water main underground, found a pipe with pressure down there, and hooked up to it. As a result, the first people to move into the development found toilet paper coming out of their faucets. Such occurrences, alas, are not uncommon.

Throughout municipal systems, as well as connected and nearby systems, there are ample opportunities for accidents, machinery malfunctions, and human errors. The proliferation of small systems only increases the chances and magnifies the problem of providing adequate monitoring and surveillance. "The state health men only go to them when they have trouble," says one official. It is also more difficult to staff many small plants with qualified technical personnel, and to disseminate to them much-needed research findings.

As A measure of state and local incapacities to deal with such an array of problems, consider the record on such a simple and inexpensive process as fluoridation. EPA officials assert that many public water authorities—mandated by their customers to provide fluoridation—do not put in as much fluoride as the dental profession recommends for maximum protection against tooth decay.

Legislation pending in both houses of Congress would attempt to alleviate the situation by having EPA set minimum national drinking water standards for states to follow. Such standards would deal with both contaminant levels and operating and testing techniques. (The 1962 standards, which are being revised, could serve the purpose. At present, they can be used only to prohibit interstate trains, buses, and airplanes from taking on water at stops if it doesn't meet standards. Many states have adopted these standards officially or unofficially.)

Key questions of interest to the drinking public are whether the legislation, when it has been through the Congressional mill, will:

1) provide for effective federal enforcement, administrative and legal, in cases of failure within a state to comply with standards;

2) set up a system of program grants to states, and provide adequate funding for them as well as for federal research and technical assistance activities. The bill before the House of Representatives, for example, would authorize for the first year a total of $35-million, the Senate bill $45-million. But some experts feel the states need double those amounts of money. And there is no assurance that authorized amounts will actually be appropriated;

3) require that the state, or the water authority involved, adequately publicize any situation involving substantial health hazards—and, in addition, that it notify all customers whenever water samples fail to meet a standard, or whenever prescribed monitoring is not being undertaken. Ralph Nader adds that local physicians should be given "particularly detailed information so that especially vulnerable citizens may be adequately protected."

A LITTLE community publicity about contaminated drinking water usually works wonders. Public indignation explodes, and remedial action is likely to be swift. Indeed, water officials proceed gingerly with adverse findings. They are afraid of causing a panic. And they balk at using scare tactics that could lead to accusations of crying wolf.

The public also has a stake in the revised Drinking Water Standards that will be issued soon, for stringent standards will be essential to effective regulation in the future. There are some soft spots in the recommendations an advisory committee has been preparing for EPA consideration.

Existing and proposed regulatory programs are aimed chiefly at "public" water systems—which include those operated by private companies as well as municipalities. But what about those Americans who drink from individual systems, such as wells and springs (some thirty-one million), and those who have no running water at all in their homes (an estimated twenty-one million) and must rely on unprotected surface or ground waters, rain barrels, and the like?

Dr. Jay H. Lehr, executive director of the National Water Well Association, notes that a large percentage of those without running water are poor and live in economically depressed areas throughout the nation. "The lack of running water in these households unquestionably contributes to the poor state of the family, like a vicious circle," he says. "The men, women, and children in these homes are frequently debilitated by incipient illness producing lethargy and reduced vigor stemming from intestinal disorders produced by bad drinking water. Such disorders cripple any potential incentive to become productive individuals.

"Children must stay home from school to haul water on laundry days and for bathing. Elderly and sick must haul water over long distances. Families pay excessive amounts for water. Water sources are muddy in some seasons. Embarrassment occurs at school caused by smells and dirty clothes."

DR. LEHR cited recent surveys in Virginia and South Carolina showing a large percentage of houses with no adequate water supply on the property, and a prevalence of health problems associated with poor water and other unsanitary conditions: kidney and intestinal disturbances, skin diseases, dental decay, amoebic dysentery, infectious hepatitis, increased susceptibility to respiratory diseases, and roundworms. "Usually," he says, "rural water supplies are not treated to remove bacterial pollutants from barnyards, outhouses, septic tanks, cesspools, and abandoned open wells."

Who is responsible for the development of safe water supplies in such areas? No one, really. The Farmers Home Administration's water program is usually limited to areas where centralized systems are considered practicable, which does not apply to many scattered rural families. However, Demonstration Water Project, Inc., a non-profit corporation controlled by low-income shareholders around Roanoke, Virginia, is using FHA financing and an Office of Economic Opportunity grant to demonstrate the feasibility of multiple wells arranged in a "cluster system." The project has set up ten small water companies to own and operate facilities serving an average of about sixty families each. It is using the same approach in West Virginia and South Carolina. Moreover, Demonstration Water Project, Inc., is looking for further opportunities elsewhere, according to Stanley Zimmerman, a consultant to the project.

Whether in urban or rural areas, it will be largely up to the public to insist that its drinking waters are safe. "The problem is how to get the public to notice," says McDermott.

In public health, the name of the game is prevention. The experts hope that drinking water contamination is one problem the nation can deal with effectively before it reaches crisis proportions. "It's our overall judgment," says James McDermott, "that the risk is getting excessively high."

Communities That Have Not Met U.S. Drinking Water Standards

The list below represents areas where the drinking water has failed to meet the Drinking Water Standards of the U.S. Public Health Service and are therefore not included on the "approved" list. The deficiencies cited include one or more of the following: sub-standard quality; unsatisfactory physical facilities; failure to submit to the Environmental Protection Agency an adequate number of bacteriological water tests. When the communities not on the approved list notify the EPA that these deficiencies have been corrected, their water supplies will be re-evaluated. If they then meet PHS drinking water standards, the water sources will be placed on the approved list.

ALASKA
Cordova
Fairbanks (Int'l Airport)
Kodiak
Valdez

ARIZONA
Lake Havascu City
Winslow

COLORADO
La Junta
Pueblo (Ute Water Conservatory District, Grand Junction)

CONNECTICUT
Stamford

DELAWARE
Lewes
Wilmington

FLORIDA
Fort Meyers
Tallahassee
Palm Beach (Int'l Airport)
Riviera Beach

GEORGIA
Augusta (Bush Field)
Brunswick

IDAHO
Boise

ILLINOIS
Cairo
Harrisburg
Orland Park
Wood River

INDIANA
Middlebury

IOWA
Marshalltown

KANSAS
Wichita Airport

KENTUCKY
Catlettsburg
Fulton

LOUISIANA
Alexandria
Empire (Buras Water District)
Houma

MAINE
Bar Harbor

MARYLAND
Deer Park Spring Water Co.
Hagerstown

MASSACHUSETTS
Fall River
Medford
New Bedford
Quincy

MINNESOTA
East Grand Forks

MISSISSIPPI
Moss Point
Natchez
Pascagoula
Port of Gulfport

MONTANA
Livingston
Missoula Airport

NEBRASKA
Grand Island (Hall County Airport)
Hastings

NEW JERSEY
Atlantic City
Bayonne
Camden
East Paterson
Elizabeth
Hoboken
Jersey City
Kearny
Lakewood
Mahwah
Newark
Perth Amboy
Trenton

NEW YORK
Albany
Auburn
Buffalo
Clinton
Croton-on-Hudson
Erie--Buffalo County Water Authority
Hudson
Latham
Niagara Falls
Oneonta
Peekskill
Schenectady
West Coxsackie
White Plains

NORTH CAROLINA
Asheville
Morehead City
Salisbury

NORTH DAKOTA
Bismarck
Mandan

OHIO
Akron
Toledo Express Airport
Wellsville

PENNSYLVANIA
Altoona
Hanover
Moon Township
Pottsville
York Springs

PUERTO RICO
Aguadilla
Mayagüez
Ponce

SOUTH CAROLINA
Florence
Georgetown

TENNESSEE
Alcoa
Chattanooga
Clarkville
Nashville

TEXAS
Big Spring

UTAH
Ogden
Salt Lake City

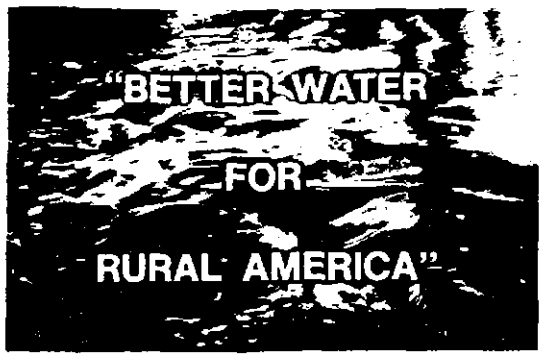
VERMONT
Rutland
White River Junction

VIRGINIA
Crewe

WEST VIRGINIA
Ceredo
Point Pleasant
Williamstown

WASHINGTON
Everett
Raymond

WYOMING
Cheyenne
Green River
Riverton



INFORMATIVE NEW SLIDE FILM ON RURAL WATER PROBLEMS AVAILABLE

"Better Water for Rural America" is a new 20-minute slide film meant for showing to local and national groups interested in improving water and waste disposal facilities for low-income rural Americans. Produced by Demonstration Water Project and the Commission on Rural Water, the 35 mm. color slide/cassette tape presentation requires only a Kodak Carousel projector and standard cassette player for showing. The operator need only change the slides as cued by audible "beeps" on the sound track.

The film documents the need for better water and waste disposal facilities and shows visually the deprivation that results from inadequate facilities. It focuses particularly on the successful programs of Demonstration Water project in Roanoke, Va. and other project areas, emphasizing innovative approaches that could form the basis of new national programs in this field. It also offers pointers on initial local organization, water company formation, training and operation of on-going facilities.

Two versions are available. One, aimed toward national groups, tells them how the Commission can help them reach national and local political leaders. A locally-oriented version explains how the Commission can help start water-sewer projects in particular rural areas. Make sure you indicate below which version you wish to order.

TO: COMMISSION ON RURAL WATER
221 N. La Salle Street
Chicago, Illinois 60601

Gentlemen: I would like to arrange for a loan copy of the slide film, "Better Water for Rural America." I understand that loan copies are limited and that I should allow at least three weeks for delivery. Although there is no cost for one weeks loan, I agree to pay return postage and insurance.

Please send me the (check one) _____ local _____ national version.

I would like to show the film on _____ (date). If not available, my second choice is _____ (date).

I will show the film to _____ (name of group).

I expect approximately _____ people to attend the showing.

Please confirm the availability of a loan copy and ship to:

Name: _____

Group: _____

Address: _____

City, State, Zip: _____

kind. Complete with appendixes illustrating the actual forms and documents involved, the guide provides the local development group with a step-by-step action program. Subjects covered include assessment of local need . . . organization of the development team . . . obtaining official approvals . . . securing necessary financing . . . establishment and training of the individual utility companies . . . the construction process . . . and support company operations.

Printed in inexpensive report style, its cost is **$5.00 per copy.**

FILL OUT THE ORDER FORM BELOW AND ORDER THESE UNIQUE REFERENCES TODAY!

To: COMMISSION ON RURAL WATER
221 N. La Salle Street
Chicago, Ill. 60601

ORDER FORM

Gentlemen, please accept my order for the following publication. I understand that the technical manuals will be ready for mailing at the end of March and that, **by ordering now,** I will be assured of receiving my copy(s) from the initial print run.

_____Copies of **Engineering Guide to Rural Water Systems Development,** at a cost of:
1-9 copies—$12.50 ea. **10-24 copies**—$11.25 ea. **25-99 copies**—$10.75 ea.
100-499 copies—$10.00 ea. **500 copies & up**—$9.00 ea.

_____Copies of **Technical on Wastewater Treatment for Rural Communities,** same as above.
You may combine your orders of the two books to obtain the best price. For example, an order for five copies of each book would receive the ten copy price, or.....$11.25 ea.

_____Copies of **Guide for the Development of Local Water Projects,**
at a cost of.....$ 5.00 ea.

_____Please send me **one copy each of the technical manuals only,**
at a special combined price of $22.50

_____Please send me a **full set of all three publications,**
at a combined price of $27.00

Signed_____

Company_____

Address_____

City_____State_____Zip_____

☐ I enclose full payment. You will pay postage and handling charges.

☐ Please bill me. I agree to pay postage and handling charges.

COMMISSION PUBLICATIONS

Ready to Help You NOW!

The Commission on Rural Water and Demonstration Water Project are now making available a series of publications that will be invaluable to anyone who is active—or about to become active—in providing better water and waste disposal facilities for the millions who lack them in rural America.

Written by experts in their fields—and made more meaningful by actual "on the ground" experience in DWP local project areas—each volume provides practical information and guidance and, taken together, constitute a unique reference library for workers in the field. We are pleased to introduce them.

- **Engineering Guide for Rural Water Systems Development,** by Michael Campbell and Dr. Jay Lehr, both of the National Water Well Association. Written primarily for rural water-sewer companies and their engineering consultants, it includes sections on water system development, construction, pumping and treatment facilities, and relative costs and maintenance. It stresses the complete evaluation of all available alternatives for water source and distribution.

  Hard bound and completely illustrated. $12.50 per copy.

- **Technical Manual on Wastewater Treatment for Rural Communities,** by Steven Goldstein of System Sciences, Inc., assisted by Walter Moberg, Jr. Similar in format and scope to the water systems manual, it is intended to be a guide to systems and components which are available for treating wastewater in rural situations. It includes information on traditional systems, such as septic tanks, and on innovative systems that are now available commercially or in the advanced testing stage. Several of these are discussed in detail.

  Hard bound and completely illustrated. $12.50 per copy.

- **Guide for the Development of Local Water Projects,** by Stanley Zimmerman and Edwin [illegible], both of Conset, Inc. This is the "bible" for local project developers and is the only work of [illegible]

(continued)

Rural Water NEWS

published for: COMMISSION ON RURAL WATER / Demonstration Water Project

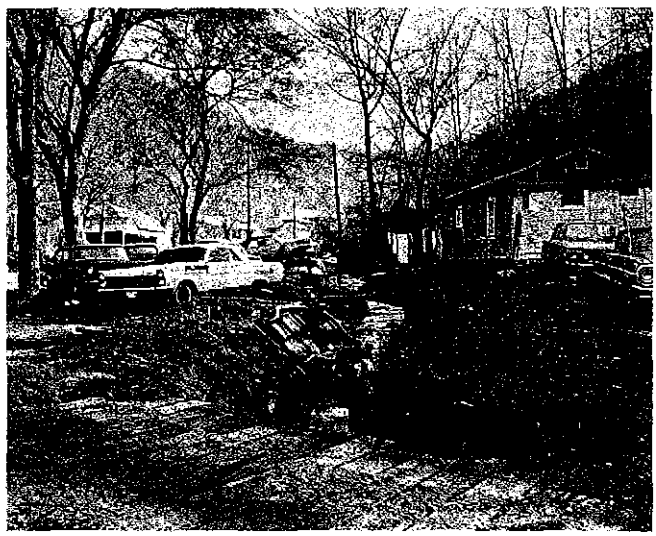
published by: Ground Water Council
221 North LaSalle Street, Chicago, Illinois 60601
Telephone: 312/346-8717

Reports on what's happening on water and waste disposal for rural America.

Number 2 - August, 1972

Cluster Water/Sewer the Answer in Logan

The Demonstration Water Project local project in Logan County, W.Va. -- Guyandotte Water and Sewer Development Corp. -- has received a preliminary engineering report recommending the use of decentralized facilities for both water and waste disposal in its initial project in the county's Big Creek area. The consultant, Swindell-Dressler Co. of Charleston, evaluated four alternatives before making its recommendation.



Long neglected, Logan County's Big Creek area will begin a "comeback" with new water and sewer systems.

Three of these involved the use of a central source-pipe line system for water supply. The most expensive ($441,000) would have required treating raw water from the Guyandotte River, followed by systems using a large deep well ($411,000) and water purchased from a nearby community ($330,000).

The total construction cost for the cluster water system -- using up to nine separate wells to serve as many as 91 families or as few as five -- is estimated at $298,000. According to the report:

"The system of individual wells with separate treatment, storage and distribution for each of the communities is the recommended system. This alternate has the least construction cost, lowest total inplace cost, and minimum user cost per month."

The recommended waste disposal system -- using small package treatment plants serving

=more=

Use Our Information Clearinghouse

To inform the public about developments in the rural water and waste disposal field the Commission has organized a national Information Clearinghouse. We'll be happy to tell you about our program...answer questions about what you can do in your organization or community...put you in touch with Commission members or others who can help you solve your problems.

Call or write the clearinghouse -- c/o Ground Water Council, 221 N. La Salle St., Chicago, Ill. 60601. Telephone: 312/346-8717

NOTE TO EDITORS: Let us know if we can furnish stories or information on how the Commission's ideas and methods can help your readers. Call and ask for Patrick Cannon, Public Information Director.

from five to 61 families each -- was estimated to cost $565,000, as opposed to a central sewer system cost of $646,000. The West Virginia state health department is reviewing this recommendation.

The results of the report confirm the Commission's position that central systems are not always the best or most economical way to provide these essential services to rural people. In this case, 248 families will pay less for water and waste disposal -- and so will the American taxpayer.

Offer Informative New Slide Film

Better Water for Rural America, a 35-mm. slide film presentation sponsored by the Commission on Rural Water and Demonstration Water Project, is now available for showing by local and national groups interested in improving rural water and waste disposal services.

The 20 min. presentation documents the need for improving the delivery of these services throughout the country. It focuses on the experience of DWP in Roanoke, Va. and other project areas, stressing DWP's comprehensive and innovative approach. A step-by-step guide for organizing and operating local projects is included. It covers initial development, company formation, training, construction, and company operation of on-going facilities.

The slide film is useful in explaining and dramatising how DWP ideas can be applied throughout the country. One version, aimed toward national groups, tells how the Commission can help them reach national and local leaders. A locally oriented version explains how the Commission can help start water-sewer projects in particular areas. Send the enclosed card for more information. Or write the Commission, 221 N. La Salle St., Chicago, Ill. 60601.

Rural People Lag in Essential Services

Preliminary 1970 Census figures indicate that more than 22 million rural Americans still lack water in their homes. More than 30 million have inadequate waste disposal. Proportionately, there is more poverty in rural communities. Where one person in 8 in our cities (and one in 15 in our suburbs) is below the poverty level, one in every four is poor in rural areas.

Our city ghettos and their problems have been widely publicized. The opposite is true in rural areas. Although there are many active farmers groups lobbying for higher price supports and other programs, few speak for the poor. The irony of this difference in attention paid to rural as opposed to urban problems is that the two are related. How many of those crowded into our urban ghettos -- both black and white -- arrived from rural America, hoping to escape both poverty and an unhealthy environment?

The health problem is particularly tragic. In many parts of our country, a high percentage of the population is afflicted with debilitating desease. Intestinal and skin

Plumbing Characteristics
Rural and Urban America

	RURAL	URBAN
HOUSING UNITS	17.7*	67.7
Water		
On central systems	39%	82%
Wells (all types)	53%	16%
Other (cisterns, springs haul, etc.)	8%	2%
Waste Disposal		
On central systems	21%	72%
Septic tanks or cesspools	64%	24%
Other (privy, direct discharge, etc.)	15%	4%

*In millions, from the 1970 Census. The Department of Agriculture estimates that there are 25 million Americans without water in their homes - at least 22 million of them in rural areas.

diseases are the most common, but outbreaks of hepatitus and typhoid fever also occur with some regularity. All are related to poor water supply and inadequate waste disposal.

When evaluating these statistics, keep in mind that the dividing line between rural and urban in the Census is a population of 2,500. Thus, many of those counted in the urban totals as lacking facilities actually live in what anyone would consider rural areas. It should also be noted that "wells" doesn't necessarily mean a modern sanitary well with an electric pump; more often than not, it means a shallow dug well with a bucket and a winch.

Report Progress on Local Projects

DWP ROANOKE now has two water companies in operation with the recent addition of the Southern Rural Water Co., serving 87 families. Delaney Court Water Agency, the first company to begin operations, has already sent out and collected its first monthly water bills and is operating smoothly. Four companies are undergoing the DWP training program preparatory to beginning operations later in the year, and eight others are in the engineering stages or awaiting financing.

GUYANDOTTE WATER AND SEWER DEVELOPMENT CORP. in Logan County, W.Va. (see story on page 1) is negotiating with the Farmers Home Administration and the Appalachian Regional Commission for financing for its first project in the Big Creek area. Over 92% of the families affected have signed up as a preliminary to forming their own company.

THE BEAUFORT-JASPER WATER PROJECT in South Carolina has received preliminary engineering reports for its projects in the small town of Bluffton and various areas on St. Helena Island. A large central system, including fire protection, has been recommended for Bluffton. St Helena Island residents will buy their water from an existing utility, the Beaufort Water Authority. Project personnel are now signing up families for both projects, which are being evaluated by local Farmers Home Administration officials.

Commission Holds General Meeting

The Commission on Rural Water held its first general meeting on July 19. The day-long program was chaired by Joseph Van Deventer, chairman of the Commission and project director of Demonstration Water Project (DWP). He was assisted by Stanley Zimmerman, National Coordinator. Reports indicated progress and expansion:

+ The three present local projects are moving forward (as reported elsewhere in this issue of the NEWS).
+ Proposals were heard for two possible new project areas.

=more=

Commission Chairman and Roanoke project director Joseph Van Deventer, Beaufort-Jasper project director Thomas Barnwell, Jr., DWP national coordinator Stanley Zimmerman and Logan County project director Roscoe Thornbury brought the meeting up-to-date on their activities.

Gene Mattern of the Indian Health Service explains how his group brings better water and waste disposal facilities to our Indian citizens.

+ Engineering guides on water systems and on waste disposal are in first-draft form and should be published by fall. Groups and individuals throughout the country have already requested copies.
+ "Better Water for Rural America," a slide film on the work of DWP and the Commission, shown for the first time. See story in this issue.

Commission members and guests then heard reports on what's happening within other government agencies and in the legislative area.

Gene Mattern, of the Indian Health Service told the story of their success in providing our Indian citizens with improved water and waste disposal facilities. He stressed the similarities of the I.H.S. and DWP programs, and offered his assistance to local project directors.

Larry Siegel of Representative Howard Robison's (N.Y.) office told the meeting about the new Rural Drinking Water Assistance Act that the congressman is introducing in this session in an effort to focus greater attention on the drinking water gap that still exists in rural America.

The attendees included observers from the offices of Rep. Mendel Davis (S.C.), Senator Ernest Hollings (S.C.), the American Public Health Association, National Rural Electric Cooperative Association, National Sanitation Foundation, Public Interest Research Group, Environmental Conservation Agency for Vermont, the Federal Office of Economic Opportunity, the Environmental Protection Agency and the Dept. of Health, Education and Welfare.

Rural Development Act Moves Forward

House-Senate conferees have agreed on -- and the House has overwhelmingly passed -- a compromise rural development bill designed to help slow the influx of rural people into urban areas. Most provisions of the bill would apply to rural areas and towns with populations of up to 10,000. Loans and grants for promoting industry would be available to communities of up to 50,000.

Key provisions involving rural water and sewer include increasing Farmers Home Administration grant authorization from $100 million to $300 million a year, with loan authority going up proportionately. Grants of up to $75 million a year would also be available for planning water and sewer facilities. If these amounts are finally appropriated, it will have a significant impact in speeding up the delivery of these essential services to rural Americans. It should be noted, however, that the Administration is currently holding $58 million of the current year's water and sewer association grant money.

Rural Water Information Kit Ready

If you want more information on Commission activities and how you can put its ideas to work -- nationally or locally -- write for the new RURAL WATER INFORMATION KIT.

It includes reports on active Demonstration Water Projects (DWP)...the history of DWP and the Commission...ideas for improvement of the federal government's rural water and waste disposal program...why decentralized wells and sewage systems make economic sense...and how you and your organization can use DWP ideas now!

The Rural Water Information Kit is free. Write to Ground Water Council, 221 N. La Salle St., Chicago, Ill. 60601. Or use the enclosed card.

Information Clearinghouse
Demonstration Water Project
221 North LaSalle Street, Suite 2026
Chicago, Illinois 60601
(312) 346-1862

Commission on Rural Water

Reports on what's happening on water and waste disposal for rural America.

Rural Water News

Number 5
February, 1973

What Does the Farmers Home Freeze Mean?

The recent Administration freeze of Farmers Home Administration grant funds for water and waste disposal facilities is likely to have extremely unfavorable consequences for the small rural communities and groups of scattered families that are the particular concern of Demonstration Water Project and the Commission on Rural Water.

In the short term it will certainly result in even longer lists of needed projects halted for lack of grant funds. The situation had already been critical, since FmHA has received less than half of its authorized $100 million in grant funds for this fiscal year. It is thus important that the program not only get under way again as soon as possible -- but that it be much expanded over past levels.

The Administration's budget for fiscal 1974 does not seem to offer any hope that this will happen. There is no money for water and waste disposal grants or for rural housing subsidies. The Economic Development Administration is to be eliminated. Of the regional commissions, only the Appalachian survives. The Office of Economic Opportunity is to be dissolved and its main program, the support of community action agencies, eliminated altogether. These agencies have often been the focus of local efforts to improve facilities for low-income families. Programs in the Dept. of Housing and Urban Development that reached many rural communities outside of FmHA jurisdiction are to be lumped into a revenue sharing program sometime in the future but, for the present, spending has been frozen.

Revenue sharing has also been most often mentioned -- although not specifically in the 1974 budget -- as the likely basis for any new administration rural development program. We do not believe that this is a desirable alternative for the constituency that we represent. Available grant funds will be in the hands of local government bodies and only the largest of these will receive grant funds adequate enough in size to finance new or improved facilities. They will have very little incentive to use these new funds to aid smaller communities or scattered groups who do not have domestic water and waste disposal service.

It is much more likely that the funds will be used to add such features as fire protection or additional treatment equipment to existing central water systems, or to install new central sewage systems. The rural resident who lives outside of these communities, largely in unincorporated areas, will have no way to obtain similar grant subsidies, which are absolutely essential if he is to have adequate water-sewer facilities.

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We suggest that any acceptable new delivery system must take this into account and make special provisions for this largely ignored group of rural residents.

Viable conditions in these communities should not be traded for improvements in more densely populated areas. We continue to believe that FmHA programs offer -- with some necessary modifications -- the most feasible vehicle for reaching these communities. If, however, revenue sharing becomes a reality as a replacement for current programs, the states should be given a clear direction requiring them to serve all needy rural residents.

As changes in rural water-sewer programs are debated in the weeks and months ahead we will continue our efforts to make the issues clear to those individuals and organizations who are concerned with the future of these programs, and seek their support...we will continue to demonstrate in our model project and field activities that service can be provided efficiently and economically to our target population ...and we will publish and disseminate the technical works and development guides that show others how they can work with smaller rural communities to achieve meaningful progress.

Arkansas Gets New DWP Project

Three Arkansas counties where over 60% of the population lacks inside plumbing are the location of one of two new DWP projects. DWP's partner is the Lee County Cooperative Clinic (LCCC) of Marianna, Ark., founded in 1969 by local citizens and VISTA volunteers in an attempt to remedy shortcomings in the health delivery systems available to the local poor. LCCC Project Director Olly Neal, Jr. will also be responsible for the new water project.

Lee, Phillips and Monroe Counties fall at the extreme of East Central Arkansas with Lee and Phillips bounded on the East by the Mississippi River. Largely rural, the counties have approximately 15,000 dwellings without indoor plumbing out of a total of just under 25,000. 80% of the affected families are classified as low-income.

LCCC found that its efforts to improve the overall health situation were significantly hampered because of the general lack of modern sanitary facilities. This is an experience it shares with another DWP project, the Beaufort-Jasper Special Water

Lack of inside plumbing works a hardship on the elderly in Lee County.

LCCC medical coordinator Dr. Irwin Redlener discusses water problems with local residents.

Project. Shigella, salmonella and ascaris are widespread and have been traced to inadequate water supplies and waste disposal systems. Most residents have shallow hand-dug wells with little or no protection from contamination.

The first year's activities will include development of three separate projects. The small communities of St. Paul and Garrets Grove will be hooked-up to the existing water lines of the Lee County Rural Water Authority. 70 families will be affected. 130 more-scattered families in the Monroe-Smale-Blaokton area will be served by a combination of central, cluster and individual wells. Financing for both projects will be sought from the Farmers Home Administration.

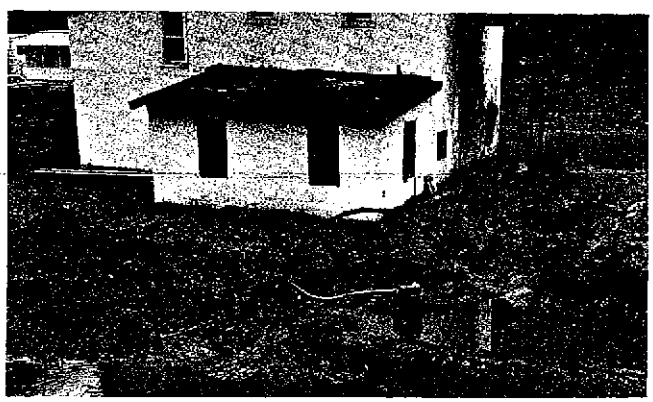
The third project will assist 60 families in the Poplar Grove area -- who already have a modern water system -- in solving their serious waste disposal problem. Clay soil makes current septic tank systems unworkable, with a virtual lake of effluent often reaching the surface. DWP and LCCC will provide a grant for 1/3 of the cost, with the balance to be sought from the Environmental Protection Agency.

How Good As Important As How Many

One of the difficulties in dealing with the rural sanitation question is the scarcity of reliable statistical information. The 1970 Census tells us that approximately 5 million Americans don't have piped-in water in their homes. It doesn't tell us how many homes don't have adequate water supplies. What do we mean by adequate?

Adequate can be defined, we believe, as sufficient safe water to produce that level of personal and household sanitation necessary for good health. We believe there are more than 20 million rural Americans living in dwellings that, in one way or another, do not reach that standard. The sewage disposal numbers are higher. Probably more than 30 million rural people are served by deficient systems, or none at all.

While there has never been a thorough survey undertaken on the extent of the total



"Filtration plant" for an existing water system in one DWP project area. The drum and hose circled in the photo is the water intake!

Water distribution pipe laid in drainage ditch. Note home sewage outfall circled in picture, not uncommon in rural areas.

national problem, several can be cited that illuminate portions of it:

- 75% of the population is served by public water systems. A recent survey by the Public Health Service of representative systems found that 41% failed to meet its Drinking Water Standards. The smaller the system (mainly rural) the more likely it is to be deficient.

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- Individual supplies seem to be in just as bad shape. Survey results in three Southern states show remarkably similar results. More than 40% of all supplies were contaminated. Modern drilled wells showed the least incidence of contamination, but dug wells were 77% and cisterns 85% contaminated. Almost 25% of rural residents rely on individual systems.

- In 1971, 70% of the total population was sewered, but in rural areas the figure is only a little over 20%. Most had septic systems (perfectly adequate in many areas if properly maintained) or cesspools (hardly ever adequate), but 15% were still using outside privies or direct discharge into drainage ditches or waterways.

- A 1969 study by the Farmers Home Administration identifies over 30,000 communities, with populations of less than 5,500, who need a new or improved water system. A sewer study yielded similar results. The study did not even consider areas where central systems would not be appropriate.

We believe that the time has come for an exhaustive survey of rural sanitation conditions. Perhaps the Congress will find the time this year to enact the modest Rural Drinking Water Assistance Act introduced by Rep. Howard Robison (N.Y.) last term, or at least include many of its provisions as part of a strong Safe Drinking Water Act.

DWP Goes Statewide in New Mexico

DWP's first statewide project is the result of the cooperative efforts of three groups: Home Education Livelihood Program, Inc. (HELP) of New Mexico; the state's Environmental Improvement Agency; and the state office of the Federal Farmers Home Administration. HELP, under Executive Director Ray Lopez, will carry the primary responsibility.

Active since 1965, HELP is sponsored by the New Mexico Inter-Church Agency and is committed to economic and social improvement, and community development and self-determination in rural New Mexico. It operates nearly 40 centers with programs in skills-traing, literacy, construction self-help, child development, migrant health and arts and crafts, among many others.

The Environmental Improvement Agency, under John Wright, will bear primary responsibility for identifying needy communities and setting priorities for helping them. They have been active in bringing safe water and wastewater facilities to rural New Mexico areas since 1947 and their wide knowledge of existing conditions will make them an invaluable partner.

In an expanded test of DWP concepts, non-profit development and support (D & S) companies will be established initially in these general areas by HELP. They will offer long term and comprehensive assistance to local communities in meeting their water-waste needs. Assistance will involve the organization of local companies... the planning, financing and construction support required for new companies...and assistance in upgrading and extending existing systems.

The DWP-HELP first year program anticipates 250 completed connections, 250 more under construction and 500 in the organizational stage. It is expected that the project will require nearly five years to reach the total target population.

Commission on Rural Water

PUBLIC INFORMATION OFFICE:
Demonstration Water Project

Ground Water Council
221 North LaSalle Street
Chicago, Illinois 60601
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Rural Water - An Urgent Need

There are more than 20 million people in the United States who still do not have adequate supplies of water in their homes -- most of them in rural areas. This in the last third of the Twentieth Century -- the so-called "century of the common man."

In an effort to help some of these people, Demonstration Water Project, Inc. (DWP) was formed in Roanoke, Va., in 1968. Under the leadership of Joseph Van Deventer, DWP was funded by the Office of Economic Opportunity in October, 1969. DWP's goal was not only to solve local problems but to demonstrate how low-income families in all parts of the country might be assisted in their efforts to obtain adequate, healthful water and waste disposal systems.

Beginnings

DWP began its program by contacting low-income families in the five-county Roanoke area. It identified about 2,000 families with serious water problems. Five hundred sixteen of these families were organized for the first-year effort.

At the same time, government agencies -- local, state and federal -- who might be in a position to assist DWP were contacted. Since the Farmers Home Administration (FHA) -- Dept. of Agriculture -- would be the primary funding source for the new water companies, DWP concentrated its efforts in that area.

Four companies, with 215 member families, were formed and received financing from FHA for conventional central well-pipe line rural water systems. As organized by DWP, these companies are owned and operated by the users themselves. They are run democratically, electing their own officers and also members of the DWP Board.

Thus, low-income people are not only organized to help themselves but -- through the DWP Board of Directors -- can assist others in obtaining needed water supplies.

Training & Assistance

Since most of those involved in company operations have had no prior experience in management, and since the companies are expected to function for at least the 40-year duration of the FHA loan, DWP has developed an exhaustive training program to insure the self-sufficiency of the individual companies. The three-year course includes instruction in water company management, administration, and inspection and service. Although each of the courses is directed specifically at those who have been designated to perform these functions, all interested members are invited to attend and many, indeed, do attend.

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In addition to training, DWP provides important assistance in many other areas, including company organization, loan and grant application, technical assistance in facilities development, and construction supervision. DWP Board and staff help will continue to be available to help the fledgling companies over any rough spots in their first few years of operation.

Breakthrough

Although DWP had met or exceeded every target set for it by OEO for its first grant year, it became obvious that a potential problem existed in FHA regulations that could prevent water service being made available to all needy persons -- FHA's traditional policy of funding only central source-pipe line systems.

Many families in rural areas live in remote locations that can't be economically serviced by a pipe line. The area surrounding Roanoke, for example, is very hilly with many homes entirely remote, or in "clusters" of two or three homes.

When DWP suggested that a more flexible approach to water company financing was needed if these families were to be served, FHA replied that adequate financing could be provided -- under its individual home improvement loan program for low-income families -- to allow these families to have a private system.

DWP was skeptical but decided to give the program a fair test. After six months, and after DWP helped 180 families submit applications, FHA finally tacitly acknowledged that the program was ineffective. Only 32 wells were approved.

Among the deficiences that effectively excluded many families was the requirement that the applicant prove "clear title" to the property. Even where this was possible, the short term nature of the loan resulted in monthly payments of approximately $11.00 -- or $4.00 a month more than other low-income families were paying for pipe line service.

In the meantime, research by DWP and its consultant for program development, Conset, Inc., showed conclusively that Congress had not intended that FHA association loans be limited to central systems only. Mainly as a result of water well/water systems industry testimony before the Subcommittee on Conservation and Credit of the Committee on Agriculture during the 1965 Pogue-Aiken Bill hearings, the following language was included in its report, "the term 'project' shall include facilities providing central service or facilities serving individual properties, or both."

On June 1, 1971, with its homework done, DWP submitted a formal proposal to Virginia FHA for a rural water district that would include single family and "cluster" wells, all to be drilled and maintained by a single company. With the support of several Virginia congressmen, the proposal went up through channels to Washington and was approved in principle in late August. It now appears likely that final approval will come early in 1973.

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Success in Roanoke

DWP's local program has been, by any standards, a notable success. More than a thousand families have been organized into 16 companies thus far. The first company, Delaney Court Water Agency, began serving its 48 member families in April. Early in 1973, nine companies will be pumping water to over 450 families. The ultimate goal of service for 2,000 families is within reach.

Throughout its brief history, DWP has been aware that the success of its local projects and methodologies could form the basis for a change in national policy for developing rural water and waste disposal facilities. Indeed, OEO had this in mind when it originally funded DWP. Recognizing the success obtained in the project areas in other states, where low-income families could reproduce the Roanoke success.

As it assists the new local project areas, the DWP national unit will be developing the methodologies required to assist rural residents on a national basis. Manuals will be prepared for local project directors, for first year training and assistance of new companies, and for the guidance of government agencies involved in assisting rural residents. Since each new project area will have its own unique problems, the manuals will stress flexibility of approach.

Technical assistance to new project areas will be provided through manuals prepared under contract to DWP by the National Water Well Association (Engineering Guide for Rural Water System Development)and the Mitre Corporation (Technical Manual on Wastewater Treatment Systems for Rural Communities). These manuals will provide local projects with the information necessary for evaluating their own options for water and waste disposal systems and for choosing the most appropriate and economical one.

Commission on Rural Water

As a vehicle for bringing DWP's concepts to the attention of those in a position to help bring about change in national policy, DWP fostered the formation of the national Commission on Rural Water. Chaired by the DWP Project Director, Mr. Van Deventer, membership now includes representatives from new project areas, interested government agencies, the National Water Well Association, and the Ground Water Council, which will be responsible for the National Education Campaign and Clearinghouse, a publicity program designed to gain a wide audience for the Commission and DWP. Coordinating the total Commission effort will be Stanley Zimmerman of Conset, Inc. Additional members will be added from groups interested in taking an active role in improving the standard of living for rural residents.

For the Future

The aim of Demonstration Water Project, and the Commission on Rural Water is ambitious -- nothing less than a reordering of national priorities to insure that every rural resident has adequate potable water and a non-polluting waste disposal system. To accomplish this will require a willingness to try new methods, to build enough flexibility into government programs so that solutions can be tailored to fit real needs. There are no "favorite" delivery systems in the DWP approach -- only the best available system for the rural people affected, and eventually for the 20 million rural people affected.

# # #

January, 1973

Commission on Rural Water

PUBLIC INFORMATION OFFICE:
Demonstration Water Project

Ground Water Council
221 North LaSalle Street
Chicago, Illinois 60601
312/346-8717

WHAT IS THE STRUCTURE OF THE

COMMISSION ON RURAL WATER?

The Commission is a national organization intended to dramatize the water and sewage disposal needs of rural Americans, particularly the poor, and to develop workable programs for meeting these needs.

It is an outgrowth of DEMONSTRATION WATER PROJECT, which has organized rural water projects in the Roanoke, Va. area and is now expanding to other areas. Current DWP programs are underway in Logan County, W. Va. and Beaufort-Jasper Counties, S.C., both involving water and sewage services. DWP is the organizer; these projects will be locally funded in part, and will be run locally. Two or three additional project areas will be in operation by December, 1972.

Responsibility for national program development is in the hands of CONSET, INC., a consulting firm. This includes selecting new project areas, working out joint venture programs for these areas, and coordinating all project activities.

CONSET is also responsible for technical assistance and particularly training. This includes Training Manuals for Local Company Operation, a Local Development & Support Company Manual, and a Guide for Government Program Agencies.

Two technical reports are also in preparation. One on water systems is being developed by the NATIONAL WATER WELL ASSOCIATION, the water well industry trade association. The other, on waste disposal systems, is being prepared by THE MITRE CORP., a systems consulting firm.

Responsibility for national education and the information clearinghouse belongs to the GROUND WATER COUNCIL, a public information organization.

Membership of the Commission on Rural Water now consists of project directors, the principals of organization handling study and information assignments, and interested government agencies. It is anticipated that additional persons with specific interests in rural water will be asked to become Commission members.

# # # # # # #

June, 1972

Commission on Rural Water

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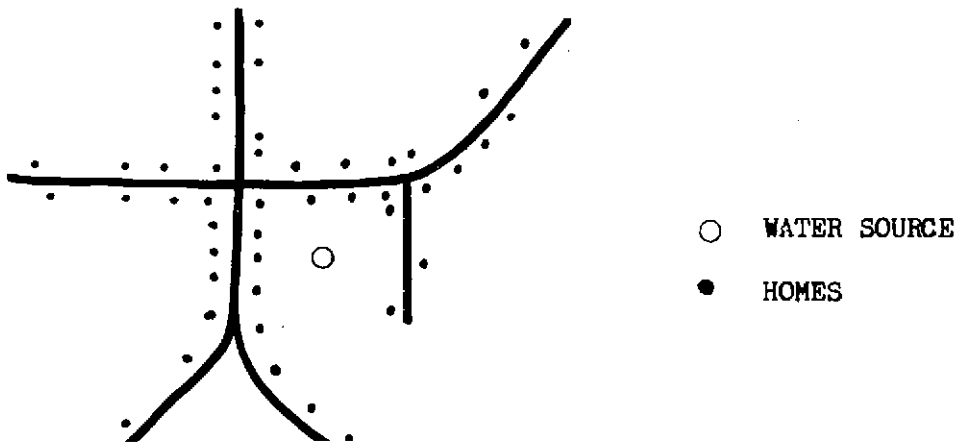
WHAT DO YOU MEAN ---

"FLEXIBLE SYSTEMS DESIGN?"

The desirability of a central water (or sewage, or water/sewage) association in a rural or small town area comes through clearly to everyone. It's just like a city system. There is a utility which organizes and finances the total installation. It owns a water source, puts in and maintains a network of mains, and collects periodically for its services.

In an over-simplified way, its service area looks like this -- central management plus central service:



But what if we have more isolated farms and families in the area who also need water service? Can we have central management? Of course. Do we have to stick with central service? Absolutely not.

Where it would cost too much per user to run pipelines, we can put in wells and plumbing to service one or two or three or several families. The wells are paid for and owned by the central association. They are maintained by the central association. And payments for water service are made by the user to the central association.

We have the advantages of central financing, with long-term payment for

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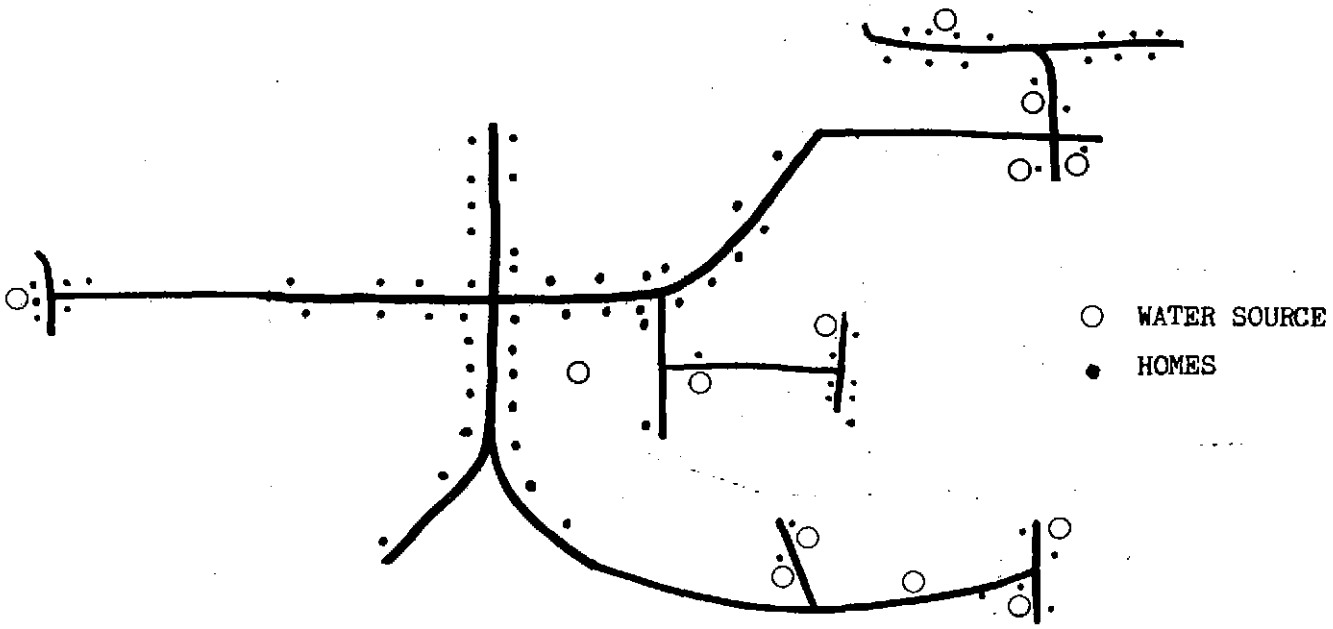
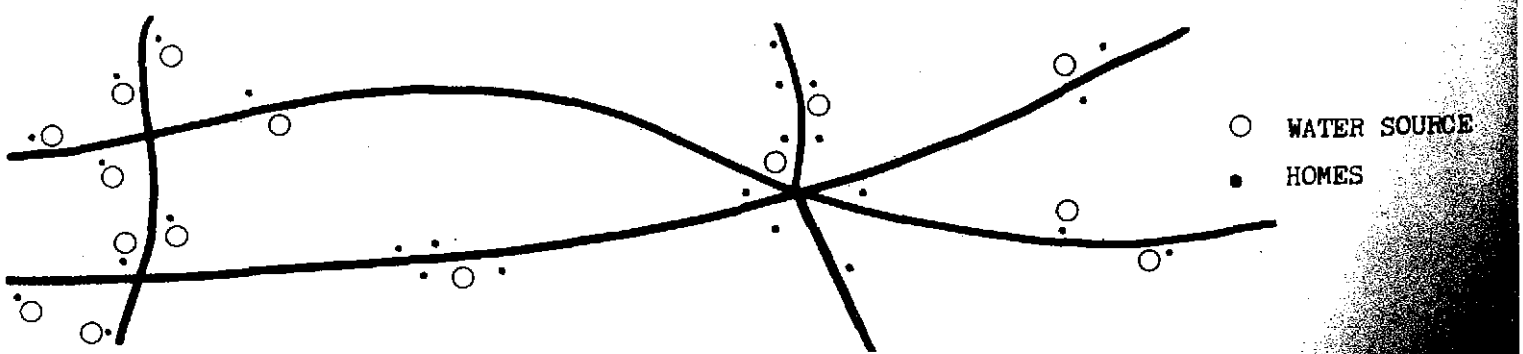
original costs. We have the advantages of central maintenance. At the same time, we avoid the high costs of running pipelines down sparsely settled country roads. If, for example, it costs $1,000 to put in an individual well and $1,200 to connect a particular household to a central pipeline, economics dictates the use of the individual well owned and maintained by the central management.

So we have a second alternative -- a central system, plus one or more small cluster systems:



There's a third alternative, viable where the population is radically dispersed. It involves central management of small cluster systems:



This is what we mean by flexible systems design. Use central financing, management and maintenance. Then use the system, or mix of systems, for water distribution which combines both logic and economy.

# # # # #

June, 1972

Commission on Rural Water

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HOW CAN YOUR ORGANIZATION

HELP STRENGTHEN RURAL WATER/SEWER SERVICES?

The 1970 Census shows that 22 million rural area people (or about 5 million households) do not have inside water or plumbing. It is estimated that two-thirds of these families have incomes under the poverty line of $3,000. Less comprehensive but scientifically valid local studies show a dramatic effect on health from this inadequate water supply -- not to mention the human and economic loss to a stagnating rural America.

Because of inadequate incomes, over 3 million American rural families lack both inside water, and modern waste disposal systems and are in no position to pay for these essential services within our normal credit system. They need financing assistance.

The broadest and most active program to bring better water/sewage services to rural Americans is administered by the Farmers Home Administration (FmHA). Yet FmHA's programs help only thousands of families a year -- and even then, proportionately few of the rural poor.

What is the solution? It comes in three parts:

1) More money for rural water/ sewage services	Additional money under the Rural Development Act of 1972 is a big step forward
2) Central Water-sewer association organization, financing and on-going management	This is the traditional FmHA method. It works, as proven by the backlog of association applications and the solid workings of associations already financed by FmHA
3) Flexible approach to systems design	This is where FmHA's program has faltered. FmHA insists on central systems, even where cluster well systems would serve more people at lower cost

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How can you help the Commission carry this message to national and local leadership of key organizations?

Inform your staff and membership leaders about rural water/sewage disposal needs. Inform them about the Commission's program for using cluster wells, either alone or in combination with central systems, to provide a better answer to this need.

Tell the story to Congress, with emphasis on committees concerned with agriculture and rural welfare. Contact committee members, their staff personnel, and committee staff personnel. Your support of Commission programs will benefit the rural poor and improve rural areas as a desirable place to live and work.

Tell the story to your membership. They may know the need but will act only if it is dramatized. Tell them about the Commission and its program to "stretch" federal programs to furnish more water to more people more economically.

Encourage your members to initiate local water action programs. Tell them how to get started -- organization, surveys of need, sources of engineering and legal help, and of financing.

How can the Commission help?

1) We can put your leadership on our mailing list. We'll send them Rural Water Information Kits and our Rural Water Newsletter.
2) Give us the opportunity to talk to your leadership group and your general membership. We have a tape/slide presentation which tells our story briefly and effectively. We'll be happy to provide a Commission member to make presentations, if this is advisable.
3) Let us furnish you information to communicate to your members by bulletin and newsletters, and at meetings.
4) Put local people who have problems and want a local action program in touch with us. We'll offer them information and assistance. They can then adapt our procedures and ideas to meet their own needs.

# # #

June, 1972

WHAT TO DO IF YOU HAVE A LOCAL AREA WATER AND SEWER PROBLEM

There are few rural areas in America that have entirely adequate water and waste disposal facilities. Your local County Agricultural Agent will probably be aware of those families who have the most urgent need and will also be able to tell you if there are any current plans to meet this need. Another source of information, especially for low-income people, will be the local Office of Economic Opportunity Community Action Agency. These groups exist in most rural counties where there are large groups of poor people. Politicians, especially at the county level, should also prove a good source of information. You should certainly contact the County Sanitarian, who will be very much concerned with the health problems involved with poor water and waste disposal facilities.

The primary funding source for rural water and sewer systems is the U.S. Department of Agriculture's Farmers Home Administration. They should be contacted at the beginning and made aware of your interest in this area. All applications for loan and grant funds originate at the county level, and the man to see here is the County Supervisor. Any time spent cultivating his interest and support will be very worthwhile.

Another source of funds, especially in depressed areas, is the Economic Development Administration of the Department of Commerce. You should contact their regional office for information. More localized agencies, such as the Appalachian Regional Commission, are an excellent source of grant funds. They should be contacted at the state level, usually the governor's office.

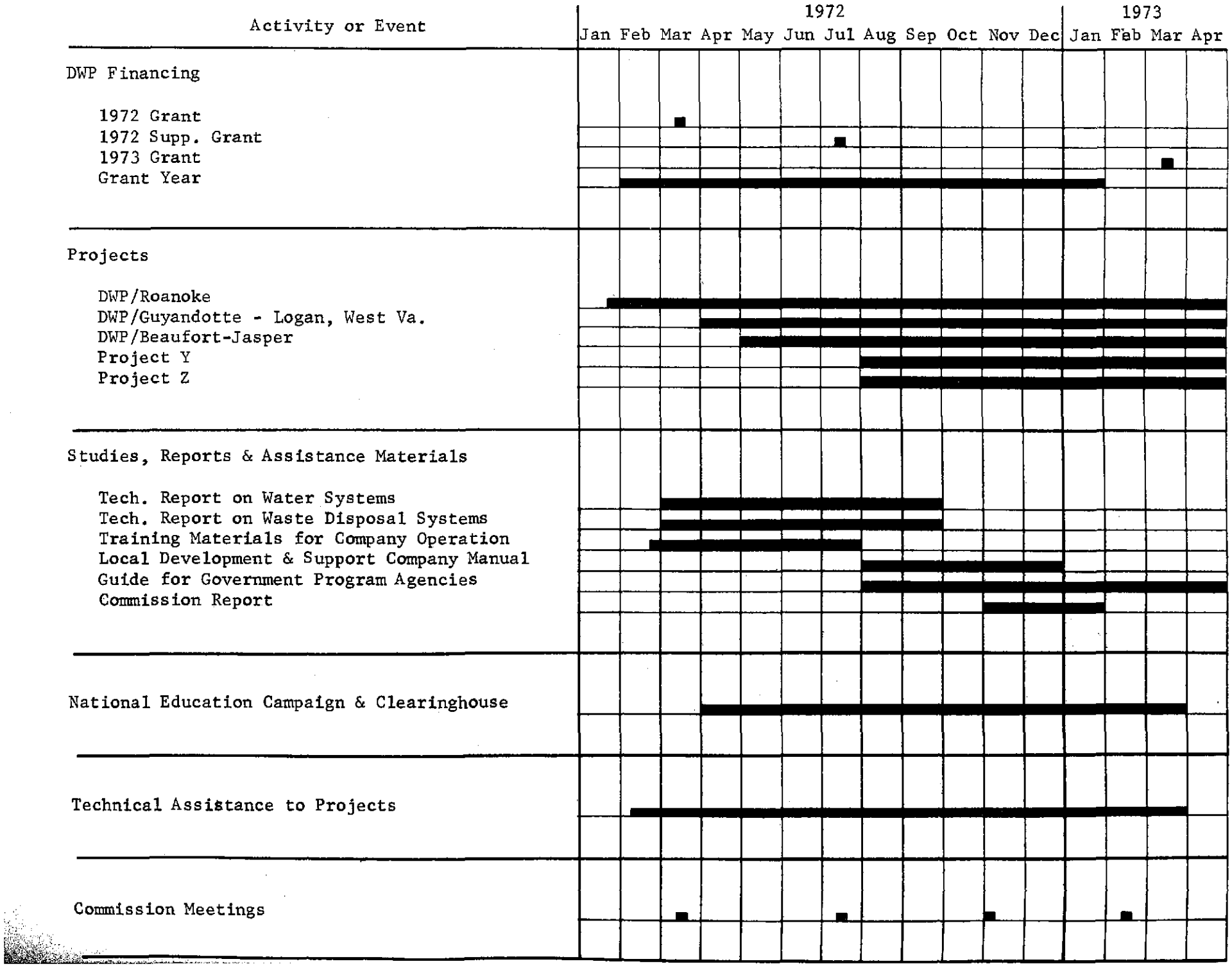
The approval process will very from state to state, but will typically include such groups as the County Board of Supervisors, a regional Planning Commission, and the State Board of Health, in addition to the local, state and national office of the funding agencies involved. The interest and support of local members of Congress will be helpful during the approval process.

In all of your contacts you should make individuals and groups aware of the Demonstration Water Project success story, especially in areas not suited to the central source-pipe line approach.

June 5, 1972

# # #

OVERALL DWP PROGRAM



TOTAL EXPENSES TO DATE ON WATER PROBLEM.

SANDECKI — POSTAGE 6.87
TELEPHONE 23.41
PROF. OSBERG 30.00
CHECK #428 FARNHAM CHIS 10.75
CHECK #544 ATTORNEY GREENE 50.00

121.03 TOTAL.

FARNHAM — TELEPHONE 5.55
MAY-JULY 70
W/A 1.00
CHECK TO GREENE 6/29/70 50.00

56.55 TOTAL

GRAY — CHECK #489 25.00
7/19/70

TOTAL SPENT - 201.58

A. SANDECKI
21 AUGUST 1970

TOTAL EXPENSES TO DATE ON WATER PROBLEM.

POSTAGE - APRIL 1969 TO PRESENT — 6.87
CONCERNING WATER.
CERT. MAIL ETC. 1.01 W/T. AUG 3/70

TELEPHONE - NEW YORK, GREENE, CALLAHAN, ME.
N.Y. - 10.25
D.I. - 10.66
PHILA. - 1.50
PERMUTIT CO.
23.41 TOTAL — 23.41

OBBERG REPORT UNIV. MAINE — 30.00

CHECK TO MARIAN FARNHAM #425 — 10.75
JULY/AUGUST 1969 TELEPHONE CALLS. 10/13/69.

CHECK TO SHERMAN GREEN #544 6/29/70 — 50.00

TOTAL SPENT TO DATE. — 121.03

FARNHAM PHONE CALLS TO GREENE — 5.55
MAY - JULY 1970

CHECK TO SHERMAN GREENE. 6/29/70 — 50.00

TOTAL SPENT — 55.55

CHECK RECIEVED FROM MALCOLM GRAY CHECK #489 7/19/70 — 25.00

SANDECKI — 121.03
FARNHAM — 55.55
GRAY — 25.00
202.59

65.00 PER FAMILY AS OF AUG 2,

LISTING TELEPHONE TO ATTORNEY
IN REFERENCE TO WATER SUPPLY

Bill #	1	3 calls	$ 2.10
"	2	2 calls	.85
"	3	8 calls	7.40
			10.35
		4% tax	.40
		Total July/aug.	10.75

As per Marian Farnham's rec.

PAID TO MARIAN 10/13/65 CHECK #428

Winter, 1969
Volume 2, Number 2

GROUND WATER RESOURCES INSTITUTE QUARTERLY

GROUND WATER RESOURCES INSTITUTE QUARTERLY

TABLE OF CONTENTS

Quarterly Editor: Christine Kaski

The GWRI QUARTERLY invites the submission of original articles and speeches. Material should be suitable for a layman's audience, including government legislators and administrators, educators, business leaders, and others with a voice in national water management policies. The editors reserve the right to decide on editorial content. Extracts or digested material shall be approved by the author, and shall be so identified. Unused manuscripts will be returned.

Address all correspondence to:

GWRI QUARTERLY
Ground Water Resources Institute
221 North LaSalle Street
Chicago, Illinois 60601

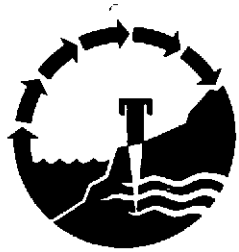
ON OUR COVER: Governor Winthrop Rockefeller (third from right) introduces dignitaries participating in GWRI's 5th Annual Seminar. Guests included: Senators John McClellan (Ark.) and Henry Bellmon (Okla.); Representatives William Alexander, John Paul Hammerschmidt and David Pryor (Ark.), and Don Clausen (Calif.); Nils Boe, in charge of the White House Office on Intergovernmental Relations; and L. A. Heindl of the National Academy of Science.

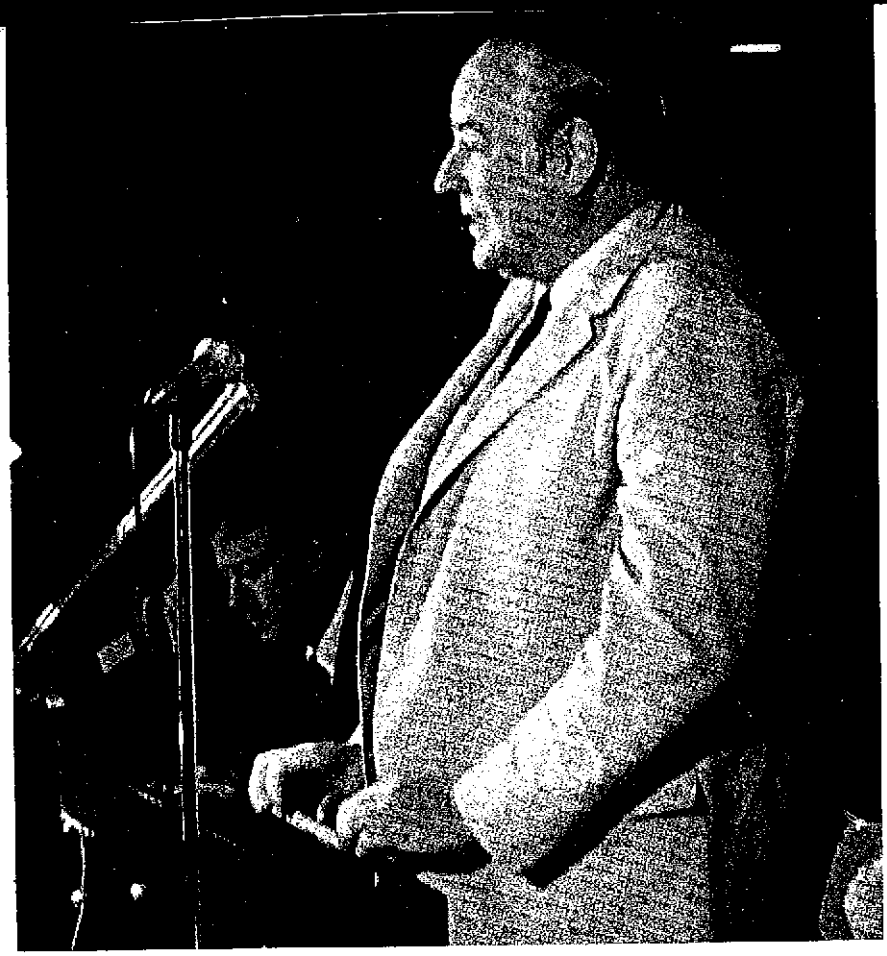
NOT IF - BUT HOW

Natural fluctuations in water level play a prominent role in the hydrologic cycle. Long-term water level declines reflect the withdrawal of water for use; levels will continue to decline so long as discharge (natural and man-made) exceeds recharge. A rise in water level represents an increase in the water stored in the ground — storage which drains out to sustain the low flow of rivers in humid regions. Thus, ground water storage is a natural regulator of river flow as well as a direct source of water to wells.

There is reason to believe, however, that ground water storage could be an even more efficient regulator of streams than it is at present, through *artificial* recharge and discharge of the natural ground water reservoir. Water would be withdrawn to compensate for decreased streamflow during droughts and then replenished during the next wet period.

Unfortunately, though the technology of withdrawing ground water is highly developed, the technology of artificial recharge still requires research. Our management of ground water is still one of "capture" — diversion of water before it gets to its natural outlet — rather than planned sowing and a harvest. The storage capacity of the ground is an asset brought into use only through variations in the water level. Our ability to manage this resource will be advanced through better understanding of ground water hydrology and the technology of recharge. The GWRI QUARTERLY is dedicated to communicating this story.





Winrock Farms, Ark.:

GROUND WATER AND GOVERNMENT

In welcoming guests to the 5th Annual GWRI Seminar, Arkansas Governor Winthrop Rockefeller summarized the program's purpose as reflecting a deep and growing concern about the nation's water resources. "This conference," he noted, "is designed not only to appraise you but, through the news media, all people — of the urgency of the problem." The productive two-day session brought together experts in the field of hydrology and representatives of both Federal and state governmental agencies in exploring the various aspects of the problem — with particular emphasis on the related responsibilities of government at all levels. The two talks presented here capture the flavor of that meeting.

PROTECTING OUR WATER SUPPLY— WHO AND HOW

BY CHARLES F. LUCE

Urgencies of pollution control, intelligent regulation of water withdrawals and constant research demand the cooperative action of state and Federal agencies.

The findings of experts studying the Nation's ground water resources have brought into sharp focus a number of problems which must be solved if this great resource is to be used efficiently.

In some areas, for example, the ground water has been very rapidly exploited since the introduction of the electric pump. Valuable deposits of ground water have been literally "mined out," giving rise to serious economic and social dislocations.

An extremely complex and difficult problem arises when it becomes necessary to regulate the distribution of the underground water among all those having a legal right to utilize it. This creates a need for governmental regulation of use under laws which are in accord with correct physical principles.

Interstate problems are beginning to appear and we do not yet have tested ways for working out solutions to such problems.

In a few places, the ground water is being polluted and many more pollution problems may develop in the future if steps are not taken to forestall them.

State laws and court decisions governing the utilization of ground water differ widely and, unfortunately, some of them have been based upon misinterpretations of the basic nature of ground water and of the physical laws which govern its movements and its relationships with surface water supplies.

We have learned relatively little about making efficient use of aquifers for the underground storage of surface water, and thus have not taken advantage of a potential means of reducing the great evaporation losses attendant upon storage in surface reservoirs — losses which are particularly large in the arid zone.

There is an urgent need for comprehensive plans, embracing both surface and subsurface waters, scientifically designed to insure that the Nation's water needs are met both wisely and economically.

If we are to develop such plans, we must have two kinds of information: utilitarian data on the extent and nature of the specific aquifers to be embraced by each plan; and a better understanding of fundamental principles.

All of this serves to point up the urgent need for public entities empowered to carry out such plans. In order to establish such entities, and to provide the powers and policy guidance they require, there must be adequate state legislation — and this presents still another problem of major significance.

Finally, there is a real need for better public understanding of the true nature of the ground water resource, and of the problems which must be solved if that resource is to be used to its fullest potential.

Some Major Policy Issues

Inherent in these problems are significant policy issues which must be resolved by the various levels of government.

One major issue involves reaching decisions on whether a particular ground water deposit should be "mined" and, if so, when and at what rate the resource is to be used to produce optimum gains for the Nation, the region, and the locality.

When a deposit of ground water becomes exhausted, there arises the question of the degree to which government is obligated to cushion the shock to the local economy resulting from termination of the mining process.

To what extent is the public, through its various levels of government, obligated to "bail out" those who bear the brunt of the exhaustion of a resource? What are the alternatives? Should, for example, some provision be made to set aside profits during the period in which the resource is exploited?

These are only a few of the issues with which governments must come to grips as they attempt to solve the problems outlined earlier.

The Role of Governments

In this context, then, what is the proper role of governments in the development, use and conservation of the ground water resource?

First, it is evident that there is a need for basic research. Obviously, the Federal and state governments must assume primary responsibility for meeting these research needs.

The enactment of the Water Resources Research Act of 1964 constituted a giant step toward meeting such needs. Grants now being

made by the Office of Water Resources Research from appropriations authorized by that Act are enabling the Nation's scientists to carry out many fundamental studies that were previously impossible.

Another need which requires both Federal and state programs is that of delineating and evaluating the important underground fresh water reservoirs, or aquifers. The major effort here is the admirable program of investigations being carried out cooperatively by the states and the U.S. Geological Survey.

It has been estimated that during fiscal 1969 approximately $12 million was expended to carry out this cooperative program, of which slightly less than half was provided by the Federal government. In the neighborhood of $6 million additional was spent for straight Federal investigations, making the total Federal expenditure roughly $12 million.

This would have seemed a large sum only short years ago. But today an investment on the order of $12 million appears rather puny, particularly in light of the demand for information which has accompanied the striking rate of increase in the use of ground water.

Governments also have an obligation to broaden the investigational program now underway. It is not enough to map and determine the capabilities of the fresh water aquifers. We need to know a great deal more about the potentialities of geological formations for the storage of surface waters, and more about the methods that may be used to introduce water into these formations.

Treated waste water is already being injected into the sands of Long Island to combat the encroachment of salt water, and the use of this practice will undoubtedly become common during the next several decades.

In California artificial recharge of aquifers has been practiced on a large scale for some time, and much has been learned through this experience. In particular, it has demonstrated that the storage of surface waters in underground reservoirs is both physically and economically feasible under certain conditions.

We also need to learn how to utilize the crust of the earth as a depository for wastes that cannot safely be released to surface streams. This means that we will need to know more about deep-lying formations from which injected wastes cannot escape to aquifers man may someday wish to utilize as a source of water.

It is imperative that we broaden present investigations of aquifers to include those containing saline water. Methods for removing the salt from such waters are being perfected, and we can already foresee a time when it will be possible to utilize saline ground water as a source of municipal and industrial supply.

Next, of course, various governmental entities — both Federal and state — must cooperatively formulate the comprehensive plans required if we are to make optimum use of the ground water resource. The Water Resources Planning Act of 1964 provided a sound basis for such planning, and Congress appears to have provided an adequate charter. To date, however, there has been a tendency to emphasize the development of surface waters and to give less than full consideration to subsurface waters.

Control of withdrawals from aquifers is another function that can only be exercised by government. Here the principal burden must fall upon the states and upon the public entities which they establish to manage the resource. The states must, of course, provide the basic policies under which such entities operate. Consequently, there is a real need for state laws which: (1) establish the basic principles and policies which are to govern the development, the utilization (including control) and the conservation of ground waters within the State, and (2) authorize the establishment of the public entities required to insure that aquifers are managed in accord with an optimum plan.

There remains one further function in which both Federal and state governments must play a leading role: pollution control. The necessity for intelligent pollution control measures is increasing rapidly as greater use is made of the Earth's mantle as a repository for industrial wastes, such as brines. Fortunately, the pollution of subsurface waters is not yet widespread, and the Nation is, therefore, afforded an opportunity to prevent the development of the type of serious problem it now faces with surface water.

The responsibilities I have mentioned in this quick inventory will place a heavy load upon the governmental agencies concerned, and it is incumbent upon all of us here to give them such assistance as we may find it within our power to render.

THE ROLE OF GOVERNMENT IN GROUND WATER DEVELOPMENT

The areas in which Federal, state, and local public agencies must assume major responsibilities are:

☐ *In financing much of the basic research on ground water.*

☐ *In delineating and evaluating the important deposits of ground water so that they may be developed, used, and conserved in accordance with optimum plans. These investigational programs must be broadened to provide a basis for storing surface waters underground, to learn how to safely use deep-lying formations for the storage of wastes, and to collect the information on the saline aquifers we shall be turning to in the not too distant future.*

☐ *In developing the comprehensive, balanced and coordinated plans required to insure optimum development and control of important aquifers in proper combination with the development of surface waters.*

☐ *In controlling withdrawals from these aquifers. This key function rests with the states and with any local public entities they may establish for the purpose. It calls for bringing state laws into harmony with sound principles, and also providing therein for the establishment of public entities capable of exercising control at local levels.*

☐ *In preventing the pollution of important deposits of ground water.*

Charles F. Luce is Chairman of the National Water Commission, and also serves as a member of the Board of Directors of United Air Lines, the New York Urban Coalition, and Resources for the Future.

The National Water Commission

The newly-formed National Water Commission, of which I have the honor to serve as Chairman, was formed to offer such assistance.

The Commission is made up of seven citizens who, having no other connection with the Federal government, are in a position to weigh the Federal programs and policies objectively, and to furnish the Congress and the President impartial findings and recommendations.

We have developed a tentative program of 31 studies and have submitted this program to the Federal Departments, the states, and numerous organizations concerned with water, with a request for their views and suggestions.

We have initiated a series of seven conferences, six regional and one national, to obtain the views of the state and regional agencies, as well as of national non-governmental organizations. The Commission is also meeting separately with the agencies which carry out the present Federal water programs.

We are being assisted in our work by a panel of well-known consultants, and have assembled ad hoc advisory panels of ecological experts and outstanding economists.

At present, we plan to complete a report early in 1973.

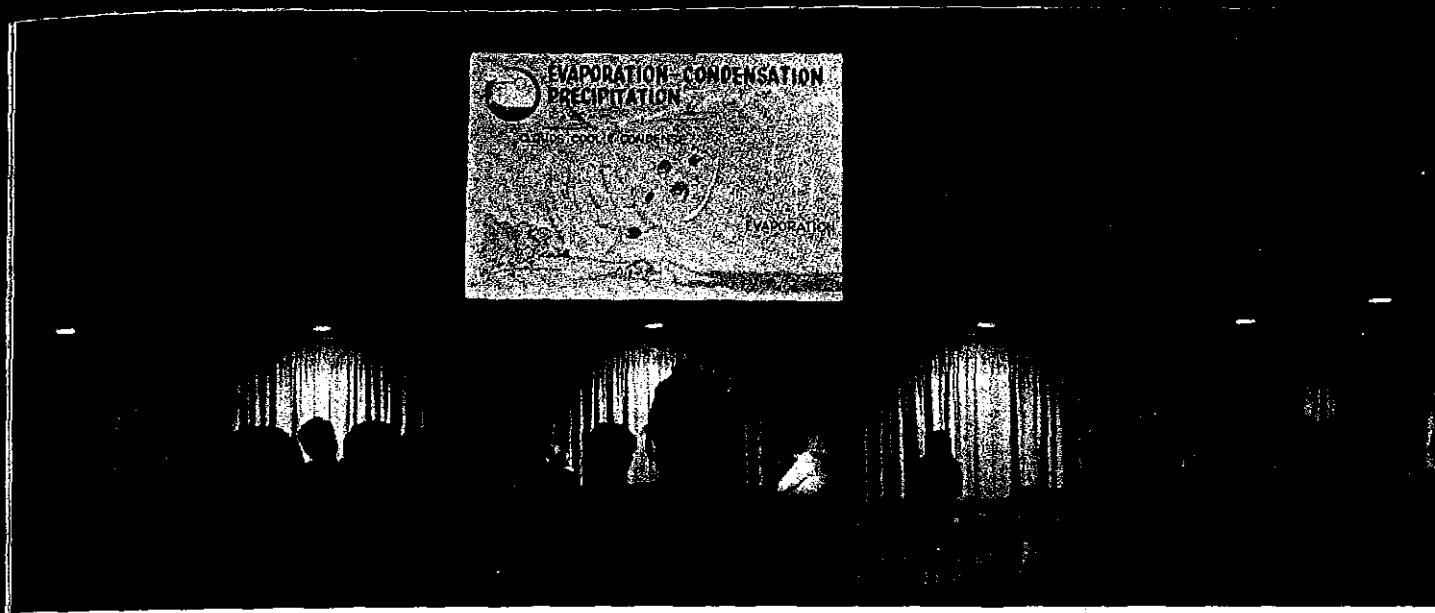
It is certain that our studies will give careful consideration to the development, utilization and conservation of the ground water resource. In fact, our tentative program provides for:

(a) A study of the ways in which the Nation's future water demands may be met, including the development of underground supplies.

(b) A study of water laws, including the Federal and state laws concerned with the development and use of ground waters.

(c) A study of the methodology of developing comprehensive plans for optimum development and use of the Nation's water resources.

The results of these studies, fortified by the assistance we expect to receive from the states, the Federal Departments, interested non-governmental organizations, consultants and advisers will, I am sure, enable the Commission to deal meaningfully with the ground water problems.



Seminar guests view slide series which accompanied Richard Sniegocki's talk on the "Physical Behavior of Ground Water."

THE GWRI SEMINAR IN RETROSPECT

Last September 7 and 8, Governor Winthrop Rockefeller opened his Arkansas home, Winrock Farms, to participants in the Institute's 5th Ground Water Seminar. Over 150 persons, including water decision-makers from government, industry, and education, attended.

The Seminar centered around the theme "Ground Water and Government," and included presentations on "The Future of Ground Water Development," "Physical Behavior of Ground Water," "Ground Water and Economics," and "Ground Water and the Law."

"What we are trying to accomplish here," said retiring president Leslie Mack, "is to stimulate an awareness among our lawmakers of the social, administrative, legal and judicial aspects of ground water management. We hope, too, to serve as a vehicle for promoting closer communication among the various administrative agencies that deal with water."

Above, Governor and Mrs. Winthrop Rockefeller entertain seminar participants during a reception at Winrock Farm.

Among the Seminar speakers were Richard Sniegocki (left), district chief, U.S. Geological Survey, and Fred B. Hout (below), President of Barnes Manufacturing Company. Mr. Hout spoke on the subject of "Ground Water and Economics."

Opening the program, Governor Rockefeller introduces speakers (from left) Sniegocki, Klein, Mack, Luce, and Hout.

Dignitaries arrive at Winrock airport. A charter flight brought Seminar participants from Washington, D. C.

Though seemingly secure beneath the earth's crust, our ground water supplies are seriously threatened by pollution. The same pollutants that taint surface supplies will eventually also affect ground water — with greater impact and longer-lasting results. The dual specter of dwindling supply and doubled demand gave rise to . . .

GOVERNMENT'S NEW HARD LINE POLICY ON POLLUTION

BY CARL L. KLEIN

Only in the past few years have we begun to care about the quality of our environment — about preservation of those precious resources which always seemed somehow limitless and now so suddenly are almost gone. And even now the work is too often stalemated by apathy and indifference.

Yet the need for control is critical. And the ability to stem pollution may mean the ability to insure man's continued survival on this planet. It's as clear-cut and as urgent as that.

Look around you. At the Calumet River in Illinois. Or the Passaic in New Jersey. At Lake Erie slowly dying in Ohio, in Pennsylvania and New York State. At the devastation of Galveston Bay. Then consider the arithmetic that tells us the world's population may double by the year 2000.

The plain fact is that we need pollution abatement now. That is the essence of my message — and my mission.

Ground Water Problems

Our fresh ground water resources, for example, seem vast. They far exceed our surface supplies and are available almost everywhere in the United States. The absence of sediment and bacteria in most ground water means it can usually be used with little or no treatment. It is potentially of extreme importance in industrial, agricultural and urban development.

In most parts of the country, ground water use is increasing and will continue to increase with population growth and greater per capita use of water.

One of our problems, however, is recharging the ground water. A case in point. The ground water supply for metropolitan Chicago started 200 miles away at the Wisconsin River — 1000 years ago. Chicago is gradually depleting that supply by failing to recharge. And Chicago is not alone. This failure is a national phenomenon which seriously threatens our total supply of ground water.

Surface disposal of domestic and industrial waste, seepage from septic tanks, mine drainage, feedlot concentrations, deep well disposal

Carl L. Klein, former Illinois Congressman, is Assistant Secretary of the Interior for Water Quality and Research.

— the same types of pollutants that affect surface water will eventually also affect ground water, with greater impact and longer-lasting effects.

Clearly, though the supply seems vast, ground water is a limited resource and, unless we take precautions *now* to prevent pollution, we may deny ourselves full use of this resource in the future.

The Federal Government and Water

"The central race in the world today," President Nixon said recently, "is neither an arms race nor a space race. It is the race between man and change." Government must focus "not only on tomorrow, but on the day after tomorrow."

Our job, then, is water quality — today, tomorrow, and the day after tomorrow. We cannot allow our ground water to deteriorate to the same extent as our surface supplies before we act.

The Federal government is working not just on an overview but on many fronts. We are developing an all-out effort to enforce present anti-pollution laws. We are looking for new sources of water and new ways to purify used water. We are searching for new and better ways to combat pollution at all levels. We are looking for ways to insure an adequate supply of water for this nation in the years ahead.

Chemical-physical treatment, the most promising technological development in the last 50 years, may provide the breakthrough for which we have been searching. My scientists and engineers were sufficiently impressed to give the go-ahead for a 100,000-gallon-per-day physical-chemical plant at Blue Plains on the Potomac.

Essentially the process involves adding lime to raw sewage to precipitate the phosphates and coagulate the solids. The effluent is then filtered through activated carbon. The lime is recycled and the resultant ash made into sterile fill. We expect to start testing the process for general use shortly and to have the results in about 12 to 18 months.

This is a new project for the District of Columbia and is properly a Federal concern, but the Federal government cannot and will not do the job everywhere. Pollution is basically a local and state responsibility.

Most states have had their water quality standards approved. But because of the relative newness of the concern, some states have experienced difficulty in securing the necessary implementing legislation. Others have done so but, for a variety of reasons, have had problems in bringing these laws to bear on a particular problem. Most often, such delays are the product of small but vocal groups with special anti anti-pollution interests.

Basically the Federal role is to bring home the necessity for action. But if local enforcement procedures are ineffective and pollution continues, then the Federal government must and will step into the situation.

My orders are to abate pollution — and the orders are for abatement now.

Secretary of the Interior Hickel has stated unequivocally that the government intends to "prosecute those who pollute."

Improving Water Quality

Pollution is not one of the great inevitables of civilization. Water quality *can* be improved on a massive scale. The "Times" of London, for example, recently noted fish returning to the lower Thames for the first time since the 1920's thanks to pollution control.

We already have within our hands the technical skills necessary to solve the pollution problem. But we have not as yet solved it. Why?

Technical know-how is not enough. Programs are ineffective without implementation, without action. Pollution, after all, is a public problem and cannot be solved without public support. Lethargy, apathy and aimlessness must be overcome.

That is the job before us, and that is the Federal view of our nation's water problem.

We must match our research and technology with the will to get this job done, to encourage those responsible for pollution to do the job.

Whatever the obstacles, that job will be done. Whatever is called for — whether it be assistance in terms of providing technical advice, or seed money for construction or enforcement — the Federal government stands prepared to offer.

For as Secretary Hickel said recently: "The people of America have made it abundantly clear that they will no longer tolerate pollution of their environment. This administration believes this is a reasonable demand and one which we have a mandate to satisfy quickly and thoroughly."

ECONOMIC GROUND WATER WITHDRAWAL

Noted hydrologist reviews the principles involved in tapping ground water resources.

When properly designed and constructed, wells permit the economic withdrawal of water from a water-bearing formation. How adequately any well will accomplish this purpose depends on:

- Intelligent application of the principles of hydraulics in the analysis of well and aquifer performance.
- Skill in drilling and well construction that insures taking best advantage of the geologic conditions.
- Selection of materials that will insure long life.

Nature of Converging Flow

When pumping is begun, the water level in the vicinity of a pumped well is lowered. Water moves from the surrounding water-bearing formation into the well to replace that being withdrawn by the pump. The pressure that drives that water toward the well is the head, represented by the difference between the water level in the well and at any place outside the well.

As the water moves closer to the well, it must move through successive cylindrical sections that are progressively smaller in area. Accordingly, the velocity of the water must increase as it approaches the well.

In Figure 1, A_1 represents the area of a cylindrical surface 100 ft. from the center of the well, and A_2 represents the area of a similar surface 50 ft. from the center. It is readily seen that A_1 is twice A_2. But the same quantity of water is flowing toward the well through both areas, so the velocity V_2 must be twice V_1.

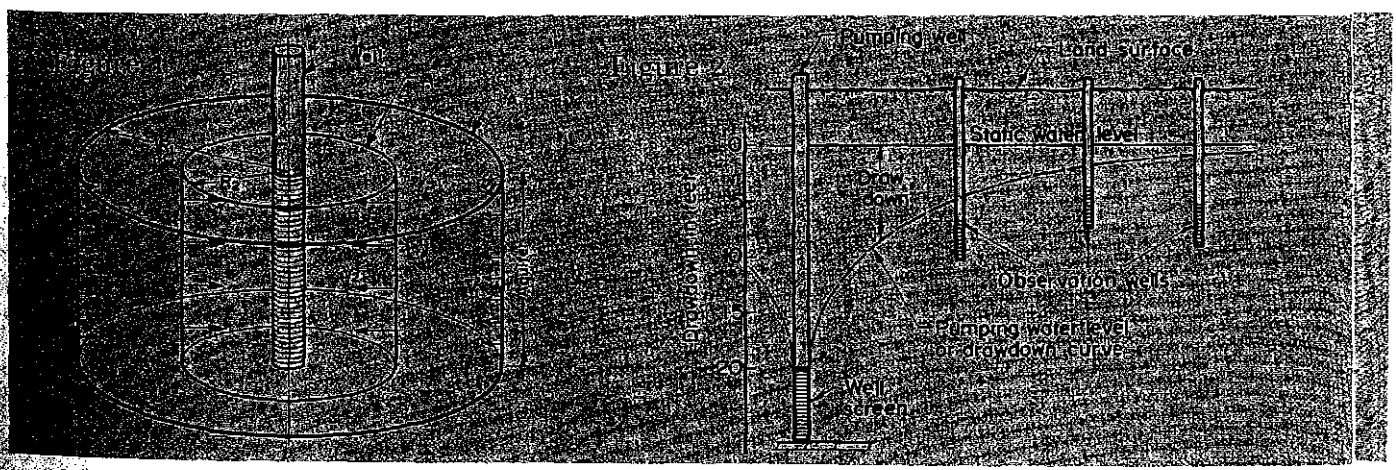
With increasing velocity, the hydraulic gradient increases as flow converges toward a well. As a result, the lowered water surface develops a continually steeper slope toward the well. The form of this surface is described as the *cone of depression.*

Any well, when pumped, is surrounded by such a cone. Each differs in size and shape depending upon the pumping rate, length of pumping period, aquifer characteristics, slope of the water table, and recharge within the zone of influence of the well.

Cones of Depression

In a formation with low transmissibility, the cone is deep and has a small base with steep sides. In a high transmissibility formation, the cone is shallow and has a large base with flat side slopes. The amount the original water level, or pressure surface, is lowered on the base of the cone and within the well itself is called the drawdown at that point.

Figure 2, representing a transverse section of the cone, shows how the drawdown is distributed within the cone on one side of a pumping well. The curve shows the levels at which water would be found in observation



BY GERALD F. BRIGGS

This article is based on information in the book, "Ground Water and Wells."

wells drilled at various distances from the pumped well. This is sometimes called the drawdown curve. In a water-table aquifer, it represents the water surface within the aquifer as the well is being pumped. In an artesian aquifer, it represents the hydrostatic pressure in the aquifer. The difference between the water level indicated by the curve and the static water level is drawdown at any given point.

Head loss is a term used to represent the force required to overcome the resistance to flow. The head losses from point to point along the pumping water-level curve in Figure 2 are the changes in drawdown between these points.

Suppose, for example, the well is being pumped at a constant rate of 200 gpm. At a distance of 20 ft. from the well the drawdown is about 6 ft.; 6 ft. of head are required to force 200 gpm through the formation from the outer limit of the cone of depression to within 20 ft. of the well. It requires another 6 ft. of head to move the 200 gpm from 20 ft. to within about 5 ft. of the well. At this point the drawdown is about 12 ft. The remainder of the total drawdown, or head loss, is used in pushing the water through the last 5 ft. of formation and through the well screen.

The total drawdown of 20 ft. measured in the well is the head in feet required to move 200 gpm through the aquifer and into the well.

When water is pumped from a well, the quantity discharged initially is derived from aquifer storage immediately surrounding the well. As pumping continues, more water must be derived from storage at increasingly greater distances from the well bore. This means that the cone of depression must expand, increasing the radius of influence of the well. Drawdown also increases as the cone deepens to provide the additional head required.

Initial Flow From Aquifer To Well

The cone expands and deepens at a decreasing rate with time, however, because with each additional foot of horizontal expansion a larger volume of stored water is available than from the preceding one. (See Figure 3)

Assume that after one hour of pumping the radius of the cone is 400 ft. and its depth 6 ft. at the well bore. At the end of the second hour, the cone's radius has expanded to 570 ft. and its depth increased to 6.3 ft. In the second hour, therefore, the cone has extended outward an additional 170 ft. and deepened by 0.3 ft.

The third hour of pumping produces an additional radial expansion of only 130 ft. and an increase in depth of only 0.2 ft. Calculation of the volume of each of the cones would show that C_2 has twice the volume of C_1, and C_3 has three times the volume of C_1.

After some hours, the deepening or expanding

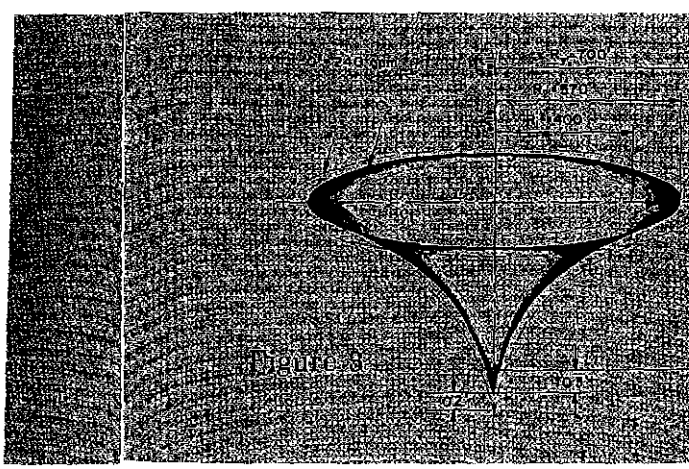


Figure 3

Well Diameter vs Yield Ratio, in %

Well Diameters						
6"	12"	18"	24"	30"	36"	48"
100	110	117	122	127	131	137
	100	106	111	116	119	125
		100	104	108	112	117
			100	104	107	112
				100	103	108
					100	105

Figure 4

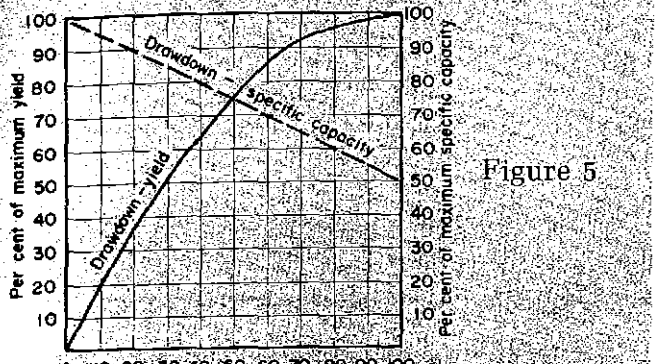


Figure 5

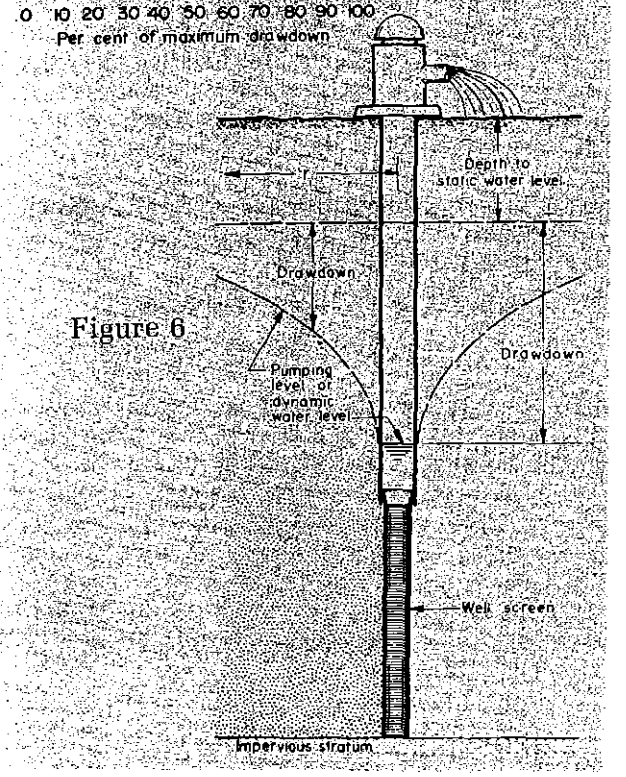


Figure 6

of the cone during short time intervals is not always noticed, which often leads observers to conclude that the cone has reached a stabilized position. The fact is, however, that the cone continues to enlarge until aquifer recharge occurs in an amount equal to the pumpage.

When the cone stops expanding, a condition of equilibrium exists. There is no further increase in drawdown with increase in pumping time. In some wells, this occurs within a few hours; in others it never occurs, even though the pumping period may be extended for years.

Relation of Well Size to Yield

Many persons assume that doubling the diameter of a well doubles its yield. This is untrue.

Figure 4 shows the figures obtained when R = 400 ft. — a typical value for water-table conditions. As indicated on the table, if a 6-in. well will yield 100 gpm with a certain drawdown, a 48-in. well constructed on the same spot will yield 137 gpm, or 37 percent more water at the same drawdown.

These ratios apply both to specific capacity and total yield. For example: if a 12-in. well is producing 20 gpm per foot of drawdown, then a 24-in. well in the same location would provide 111 percent as much, or 22.2 gpm per ft. of drawdown. Thus, doubling the diameter of a water-table well will increase its yield about 11 percent.

For artesian wells, where R is much larger, the percent increase resulting from doubling the well diameter is smaller — generally about 7 percent.

Relation of Drawdown to Yield

For a well operating under artesian conditions the yield is directly proportional to the drawdown, as long as the drawdown does not exceed the distance from the static piezometric surface to the top of the aquifer. Theoretically, this means that if the drawdown is doubled, the yield is doubled. Or, the specific capacity of the well is constant at any pumping rate as long as the aquifer is not unwatered.

For a well in a water-table aquifer, the part of the formation within the cone of depression is actually unwatered during pumping, thus changing the ratio of drawdown to yield. When the drawdown is doubled, the well yield is less than doubled. The specific capacity decreases proportionally with increased drawdown.

Figure 5 shows the relation between drawdown, yield, and specific capacity for a water-table well. The solid curve shows the relationship between drawdown and yield.

Maximum drawdown means lowering of the water level to the bottom of the well; 50 percent drawdown means lowering the water level to a point halfway between the static water level and the well bottom.

Maximum yield is the quantity the well will produce at maximum drawdown. As an example, suppose that a well 120 ft. deep has a static level of 20 ft. and that the saturated thickness of the formation is 100 ft. During a test, the well is pumped at 100 gpm and the pumping level stabilized at 40 ft., or at a drawdown of 20 ft. How much will the yield be with 40 ft. of drawdown and the pumping level at 60 ft.?

Here, 100 percent drawdown is 100 ft.; thus the 20-ft. drawdown during the test was 20 percent of the total possible drawdown. The solid curve in Figure 5 shows that at 20 percent drawdown, the yield is 36 percent of the well's

maximum yield. A drawdown of 40 ft. is 40 percent of the total possible and would provide 64 percent of the maximum yield. If 100 gpm is 36 percent of maximum, then 64 percent would be:

64/36 x 100 = 178 gpm

The well can be expected to yield 178 gpm at 40 ft. of drawdown.

The broken line in Figure 5 shows how specific capacity varies with drawdown. Theoretically, maximum specific capacity corresponds to zero drawdown because there is no reduction in the saturated thickness. The minimum occurs when drawdown and yield are maximum. Note that the minimum specific capacity is 50 percent of the maximum. In the previous example, 90 percent of the maximum specific capacity would be obtained with 20 ft. drawdown and 80 percent with 40 ft.

Optimum well operating characteristics are obtained when the product of yield and specific capacity is largest. This occurs at about 67 percent of the maximum drawdown.

At 70 percent of maximum drawdown, 92 percent of the maximum yield is obtained — so the well is yielding within 8 percent of its maximum. To obtain that remaining 8 percent would require an additional 30 percent drawdown. Clearly, then, it is uneconomical to operate a well with a drawdown greater than 70 percent.

Objectives of Tests

The usual purpose in testing a water well is to obtain information about its performance and efficiency. Taken under controlled conditions, data reflecting yield, observed drawdown, and calculated specific capacity give a measure of the well's productive capacity and provide data on which the selection of pumping equipment can be based.

Well testing may also be conducted to obtain data from which the principal factors of aquifer performance can be calculated. However, a test set-up for this purpose is more properly called an "aquifer test."

Briefly, aquifer tests consist of pumping one well at a constant rate and recording both the drawdown in the well and the drawdown caused by this pumping in nearby observation wells. At the instant of each measurement, the time interval of pumping is also recorded. These data can be analyzed to show the hydraulic characteristics of the aquifer.

Gerald F. Briggs, vice president of engineering for UOP-Johnson Division, is a member of the Ground Water Resources Institute's Technical Advisory Committee.

DEFINITIONS . . .

of a number of the terms used in discussing the hydraulics of wells are given here.

☐ **Static Water Level** is the level at which water stands in a well when no water is being taken from the aquifer, either by pumping or free flow. It is generally expressed as the distance from the ground surface to the water level in the well.

For a well which flows at the ground surface, the static level is above ground and is often referred to as the shut-in head. If a well is said to have a shut-in head of 10 ft., this means that the artesian pressure is such that water would rise 10 ft. above the measuring point in a pipe extended above that point.

☐ **Pumping Level,** also called the "dynamic water level," is the level at which water stands in a well when pumping is in progress. In the case of a flowing well, it is the level at which water may be flowing from the well.

☐ **Drawdown** is the difference, measured in feet, between the static water level and the pumping level. It represents the head that causes water to flow through the aquifer material toward a well at the rate that water is being withdrawn.

☐ **Residual Drawdown.** After pumping is stopped, water levels rise and approach the static water level. During this period, the distance that the water level is found to be below static water level is called residual drawdown.

☐ **Well Yield** is the volume of water per unit of time discharged from a well, either by pumping or free flow.

☐ **Specific Capacity** of a well is its yield per unit of drawdown. Dividing the yield by the drawdown gives the value of the specific capacity.

☐ **Radius of Influence (R)** is the distance from the center of the well to the limit of the cone of depression.

☐ **Coefficient of Storage (S)** of an aquifer is the volume of water released from storage, or taken into storage, per unit of surface area of the aquifer per unit change in head. In water-table aquifers, **S** is the same as the specific yield of the material unwatered during pumping. In artesian aquifers, **S** is the result of two elastic effects — compression of the aquifer and expansion of the contained water — when the head or pressure is reduced during pumping. The coefficient of storage is a dimensionless term. Values for **S** for water-table aquifers range from 0.01 to 0.25; for artesian aquifers, from 0.00001 to 0.001.

☐ **Coefficient of Transmissibility (T)** of an aquifer is the rate at which water will flow through a vertical strip of the aquifer one foot wide and extending through the full saturated thickness, under a hydraulic gradient of 1.00 or 100 percent.

Values of the coefficient of transmissibility range from less than 1,000 to over 1,000,000 gpd per ft.

THE CRITICAL BALANCE: SUPPLY VS DEMAND IN WATER USE

BY C. RICHARD MURRAY

Current water supply problems can — and undoubtedly will — be solved. But more planning and ingenuity will be needed and higher costs can be expected.

If the nature of water use permits most of the water to be returned in a reusable condition, then a demand of several times the supply can be met. But in 1965 (the last year for which we have hard figures) 85 percent of U.S. water consumption took place in the relatively arid 17 Western states — where only a quarter of the country's supply is found.

The practical relationships between supply and demand are further complicated by other important factors such as time, location, and economics.

The broader the geographic area under consideration, the more uniform and amenable to treatment the problems appear. In a specific drainage basin, however, deficiencies in precipitation and runoff can produce a serious imbalance between supply and demand.

Water Management

Fortunately, increased dependability of supply generally can be obtained through investment in water control measures, such as constructing reservoirs, controlling evaporation, or artificially recharging ground water aquifers. Thus water-supply management may play an important role in meeting demands.

Withdrawal of fresh ground and surface water in the 48 conterminous states in 1965 was 310 bgd, or approximately three-fourths the dependable fresh supply. Consumption was 77 bgd, about one-fifth the estimated dependable supply.

The critical nature of the supply *vs* demand situation over the 17 Western states is shown in Figure 1. All fresh water withdrawals for off-channel uses in these 17 states amounted to about 130 bgd, compared to about 150 bgd for the estimated dependable supply. Consumption amounted to about 66 bgd — 45 percent of the dependable supply.

Comparing dependable supplies with withdrawals and water consumption in the water resource regions west of the Mississippi Valley (Table 1), it is apparent that only the Pacific Northwest has a very favorable supply-demand ratio.

With increasing aridity, a larger percentage of the water withdrawn is consumed and the withdrawals approach or may exceed the dependable supply. If the regions shown in Table 1 are further subdivided, the supply may be inadequate to meet demands in the subregions, such as the Upper Missouri and Upper Arkansas, or in individual river basins and, therefore, chronic water shortages are experienced.

Except for areas of local overdraft, increased

Table 1

Supply Compared with Demand in Western United States—bgd

Region	Estimated Dependable Supply, 1980	Total Withdrawal 1965	Water Consumed 1965	Fresh Surface Water Withdrawn 1965
Missouri	33	21	10.2	16.5
Arkansas	20	10.4	5.7	5.0
Western Gulf	20	30	14	10
Colorado	15	17	8.4	12
Great Basin	9	6.9	3.8	5.3
South Pacific	28	38	15	14
Pacific Northwest	70	29	10	24

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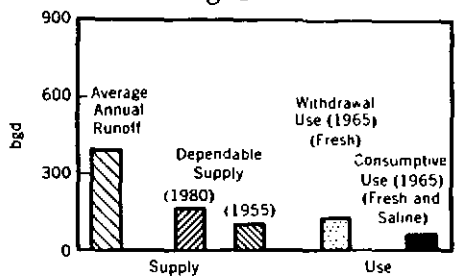
Figure 1



development in most parts of the country is still possible. However, the cost of increasing the dependable supply compared to the added benefits that may be derived will exercise a restraining influence on the extent of development.

When the demand exceeds the supply from all available sources, changes will then be largely conversions from one type of use to another offering greater economic benefits. Low consumptive use and suitability of discharge water for reuse are important factors in determining to which use the water will be put as the competition for available supply increases.

Trends In Withdrawal Uses

In general, estimates of both ground and surface water withdrawals (Table 2) show fairly uniform increases over each 5-year period. The estimates for surface water used for irrigation declined from 1950 to 1960 and changed little for 1965. However, estimates of ground water use for irrigation increased from 30 bgd in 1960 to 42 bgd in 1965.

No definite trend in the use of ground water in industry is noted. Industry will probably increase ground water withdrawals as competition for sources of surface water becomes greater.[1]

In industrial plants using fresh water for cooling, particularly those located in arid regions, more emphasis will be placed on repeated use of the water. In many parts of the West, water scarcity has already led to the adoption of conservation measures, particularly in thermoelectric power plants.

Current water supply problems can — and undoubtedly will — be solved. But if they are to be solved, more planning and ingenuity will be necessary and increased costs can be expected.

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[1]*Excluding thermoelectric plants, ground water amounted to 24 percent of all water withdrawals for industry in the West and 13-1/2 percent in the East. However, ground water furnished 42 percent of the fresh water withdrawals for industry in the Western states and 15-1/2 percent in the East.*

QUARTERLY SPONSORS

STATEMENT OF PURPOSE

The purpose of the **Ground Water Resources Institute** is to stimulate public awareness of ground water, which comprises most of the available fresh water supply in the United States and the world.

Underground water has long been used for private and public supply. But in comparison to surface water sources, too little is known by our leaders and citizens about the intrinsic value and benefits of this great resource. Only when the benefits of ground water are fully understood can it fulfill its rightful role in total water management programs.

The Institute is a non-profit educational organization striving for broader ground water use and conservation of this vital resource.