

RECEIVED

FEB 10 2016

DEPT. OF WATER RESOURCES

RECEIVED

FEB 04 2016

DEPT. OF ENVIRONMENTAL QUALITY  
WASTE PROGRAM

Re: [unclear]

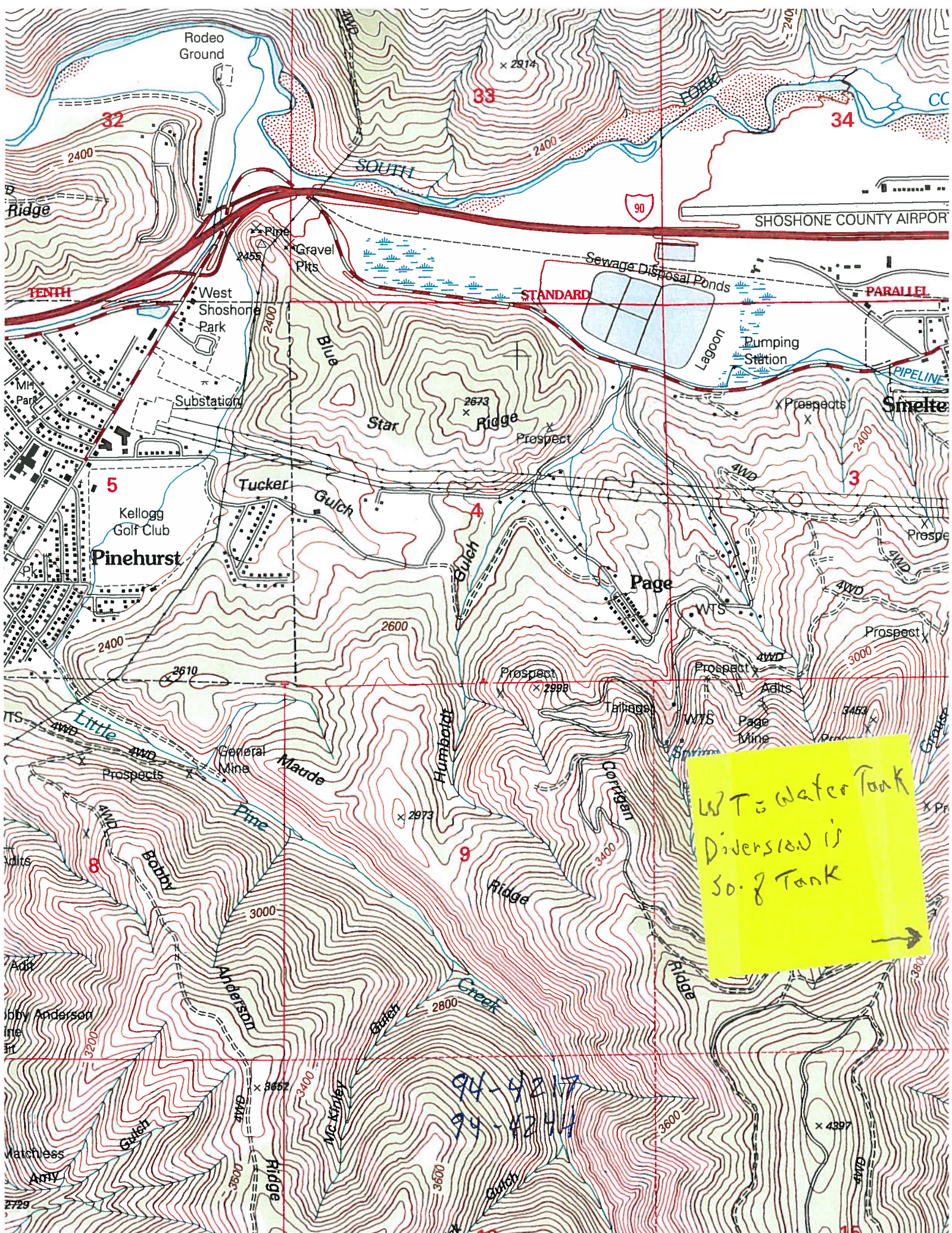
Here is the Water Right information you requested. Let me know if you need more or if we should get together by phone or Water Resources to go over it as a group.

Superfund/ICP mandates require local governments to conduct day to day activities that require clean-up of soils & dust. This is also true as it relates to catastrophic events. These soils & dust are contaminated w/ lead & other metals that pose a public health risk to local residents, especially children. All of this requires an expensive alternative for water.


This needs to be reconsidered as the request for this water right is processed.

94-4217  
94-4244

Jessy [unclear]  
[unclear]  
2/2/16



WT = Water Tank  
Diverston is  
30.8 Tank



94-4217  
94-4244

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FEB 10 2016

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DEPT. OF WATER RESOURCES

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WASTE PROGRAM

On 1/29/16 I spoke with Shane Sciuchetti regarding the Government Gulch water system. Shane is the Road Supervisor for Shoshone County at their Smelterville Shop. Shane provided the following information:

- He has little to no information about the system. No plan drawings, photos or specifications.
- He is only familiar with stand pipe & valving to activate & close the system.
- Shoshone County uses water trucks w/ 3,800 gallon tanks. He estimates around 7 minutes to fill the tanks.
- The county hauls between 50 & 100 truck loads of water each year. This can vary to a large degree depending on the year, the weather & the projects that need to be completed.

Clean-up after flood events or to support fire departments or others

4424-76  
4424-76

also increase water usage

- Idaho Department of Transportation contractors use the system during spring clean-up on I-90. No volume estimates are available for this use.
- The local farm range adjacent to the standpipe also use this system for multiple non-potable purposes including clean-up, which would be used if for fire suppression if needed.
- Other entities also use the system including Eagle Crest when they built the Galena Ridge Golf Course.
- Shoshone Co. has cleaned out the reservoir twice & maintains the standpipe system for their use.

Shank noted that the system is of high value to the County as it relates to their clean-up work as well as part of Institutional Controls Program (ICP) as it relates to the Superfund

cleanup. It is of major importance  
to avoid buying filtered & treated  
water for the local water District

Jerry Cobb

Jerry Cobb  
1/29/16

94-4217

94-4244

On 2-11-16 I met with Craig Lewis. Craig is the current City of Kellogg, Public Works Director & the past Road Supervisor for Shoshone County at their Smelterville shop.

Craig developed the standpipe system the County now uses. He confirmed that expenditures were in party to my 2000.

Craig noted that Kellogg uses the Rev. Gulch system yet today when necessary.

Craig stated that the Rev. Gulch seed is of great value to local government for a wide variety of projects regarding to dust control & clean-up of roads to I/P requirements associated w/ sintered metals containing ~~metals~~

94-4217  
94-4244

Jerry Cobb  
Big Eagle  
2/1/16

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WASTE PROGRAM

Photographs to provide time line  
& show uses for the Government Gulch  
Water System.

Additional photos can be provided  
if necessary

Jerry Cobb

Jerry Cobb

1/30/18

uses include:

Fire Suppression.

Dust control during demolition

Decontamination

Dust control during construction of Golf course

94-4217

94-4244







1986 Sorekew Flint  
Photographed by Jerry Todd



1986 Smelter Fire

Photographed by Jerry Cobb



1986 San & Her Conc  
Photo provided by Jerry Ross



1986 Summer Cruise  
Photographed by Terry 1086



9/23/97 Fine of 104.00 for  
AHOHOSEWARD by STARRY FFB



9/23/94

File of Coarctation  
of the aorta by Dr. J. J. J. J. J.



9/23/91 FINE OF CONDUCTOR

PAID BY JERRY (188)



9/23/01 Fine at Courthouse  
pics supplied by Jimmy Ricks



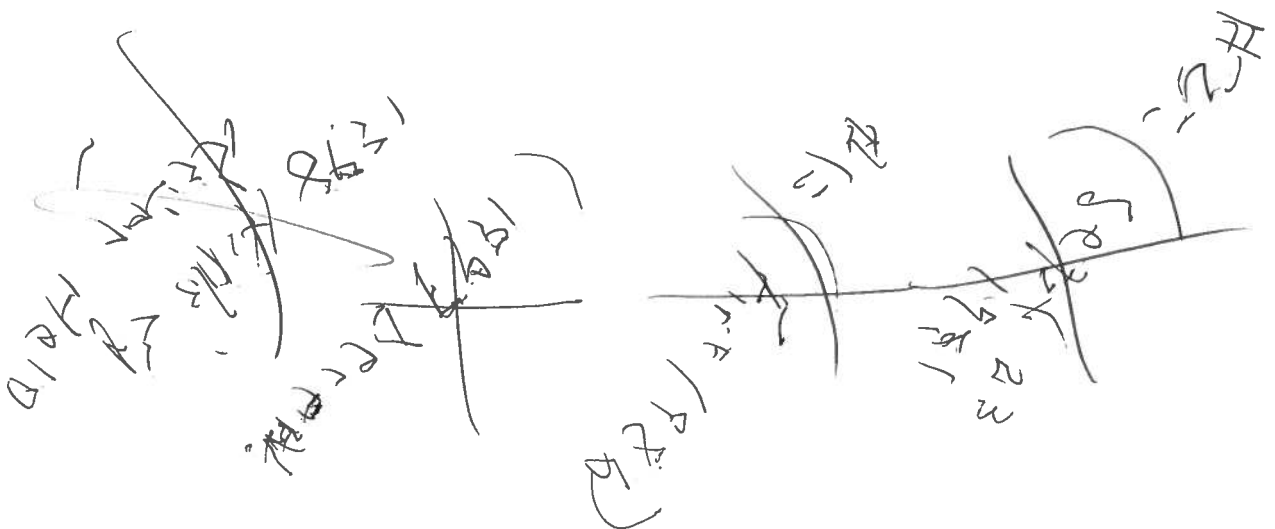
9/23/91 FIRE AT BACKSTAIRS  
PLOTS SUPPLIED BY VFRAY FELL



Sept 20 1995  
Zoe Plant Penetration

Dist. Form /  
Photographed by U.S. Army Corp

1995  
Sept 20





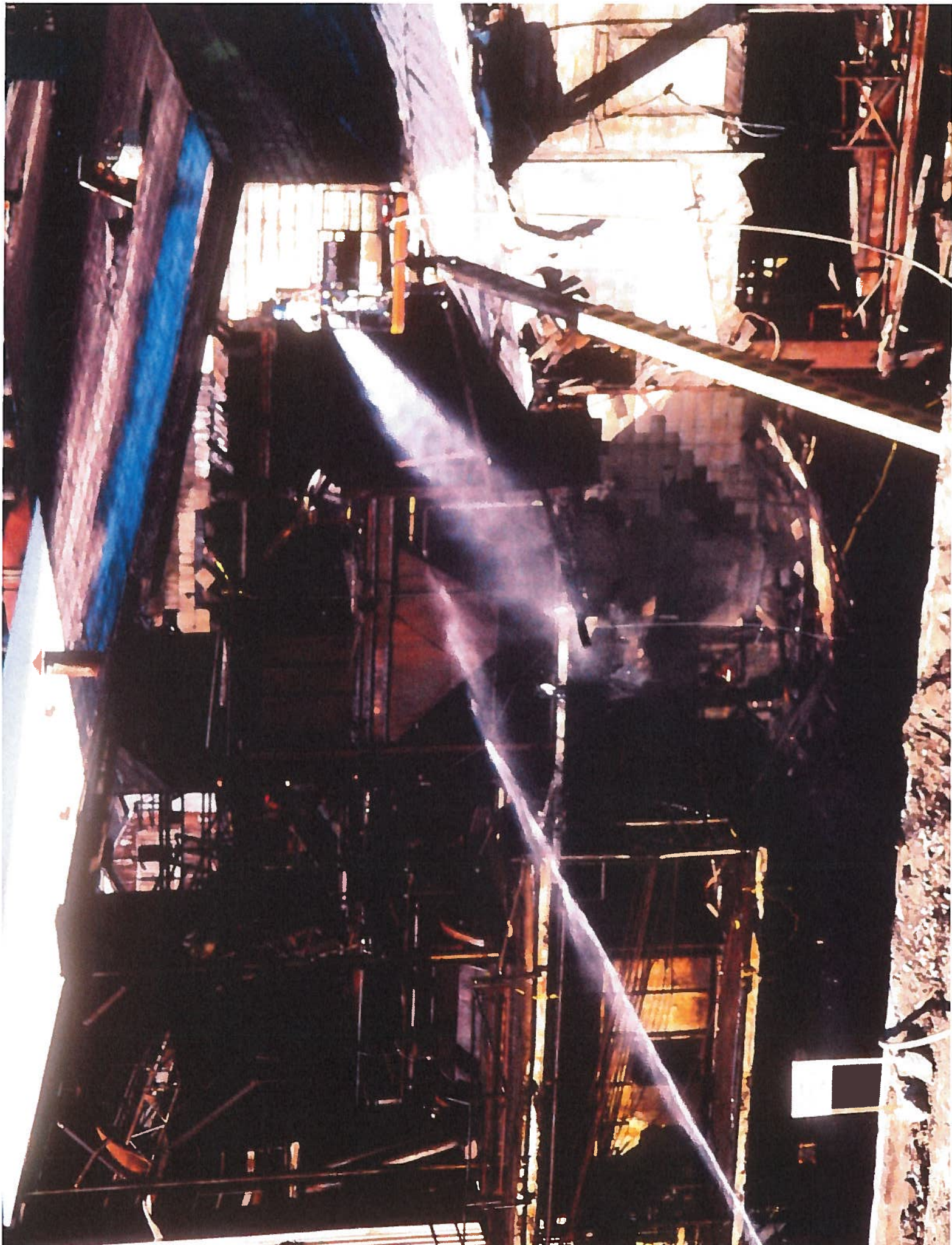
1995 Jane Her Davidson

D. W. T. Conner

Photo supplied by U.S. Army Corps



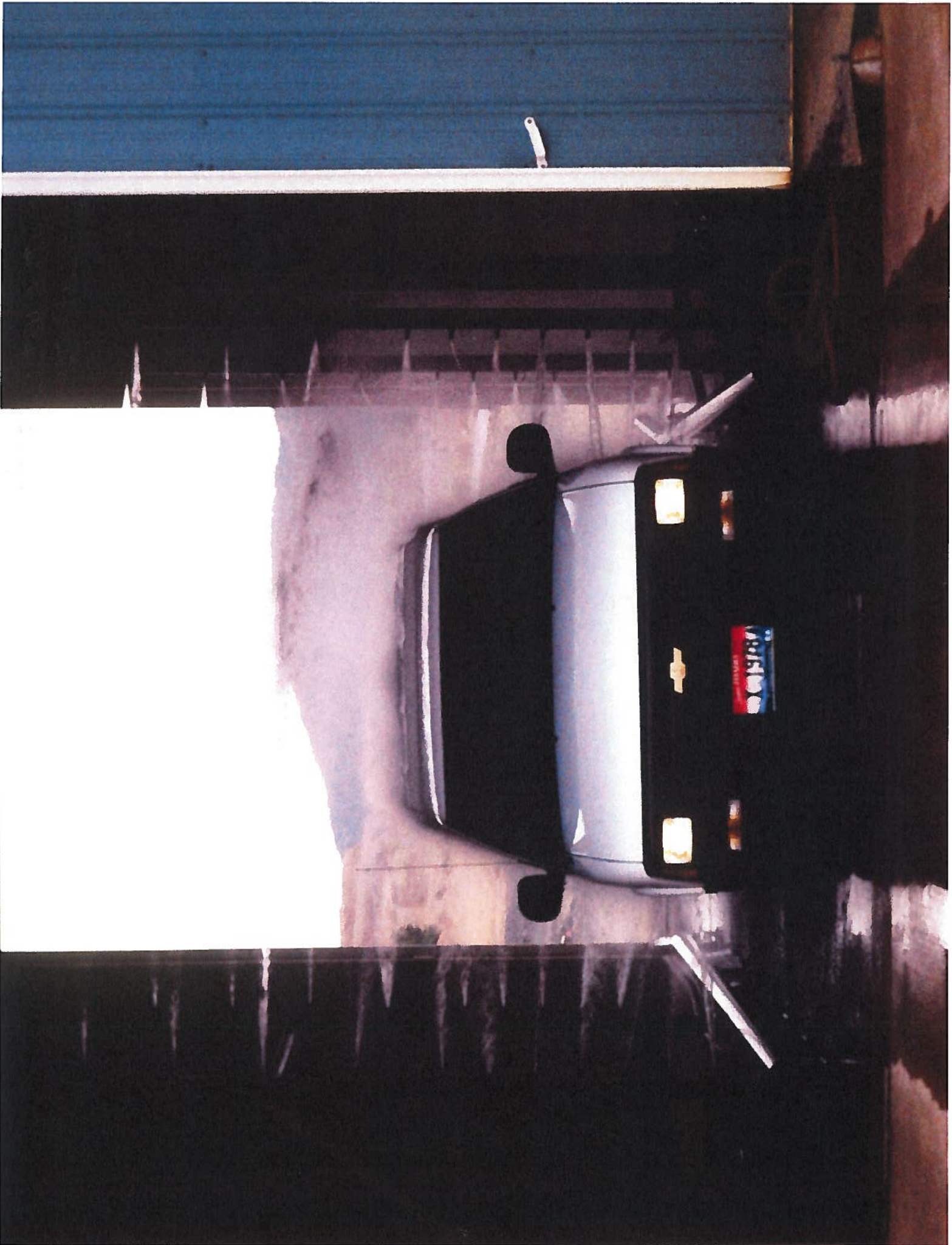
1954 - PS Semester Dissertation  
Prof Coates  
Photographed by Jerry RB



1995 Summer Dev. Demonstration

Day 1 (Feb 10)

Photographed by J. C. S. Army (10:30 P)



1997 DRY TERMINATION B/DY.  
500, GULCH H20

6 01:05



1998 Hillside REGENERATION  
GOLF GOLF H2O  
DACHS FORWARD BY STONY CREEK



1958 Nislide Rejuvenation  
Gas. Gen H2O  
Photographed by Jerry Bell



2007 6" water line  
Feeding Deep Tank  
used for Dust Control  
during construction  
of Gatona Ridge Golf  
Course  
photographed by Jerry Cobb



2007 Galena Ridge Park (earliest construction)

Drop table to fill water towers

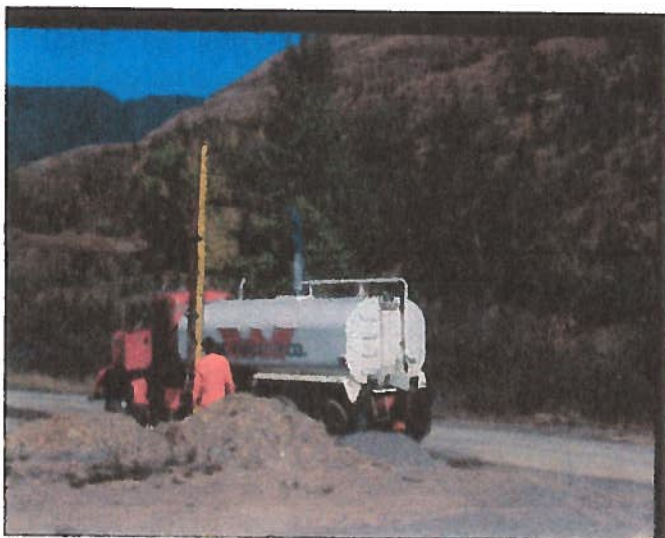
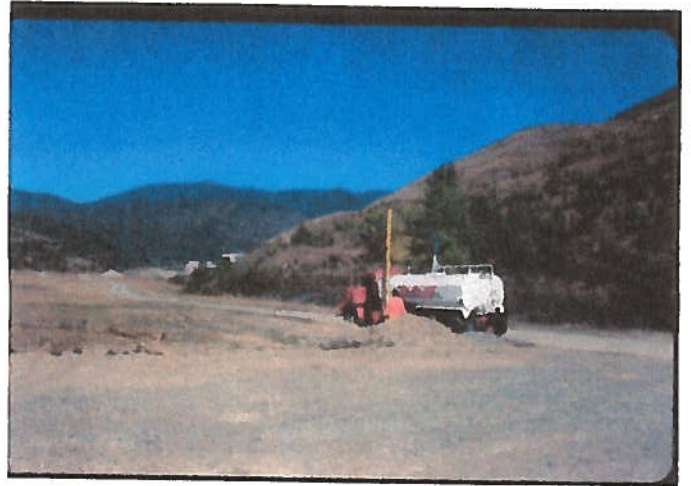
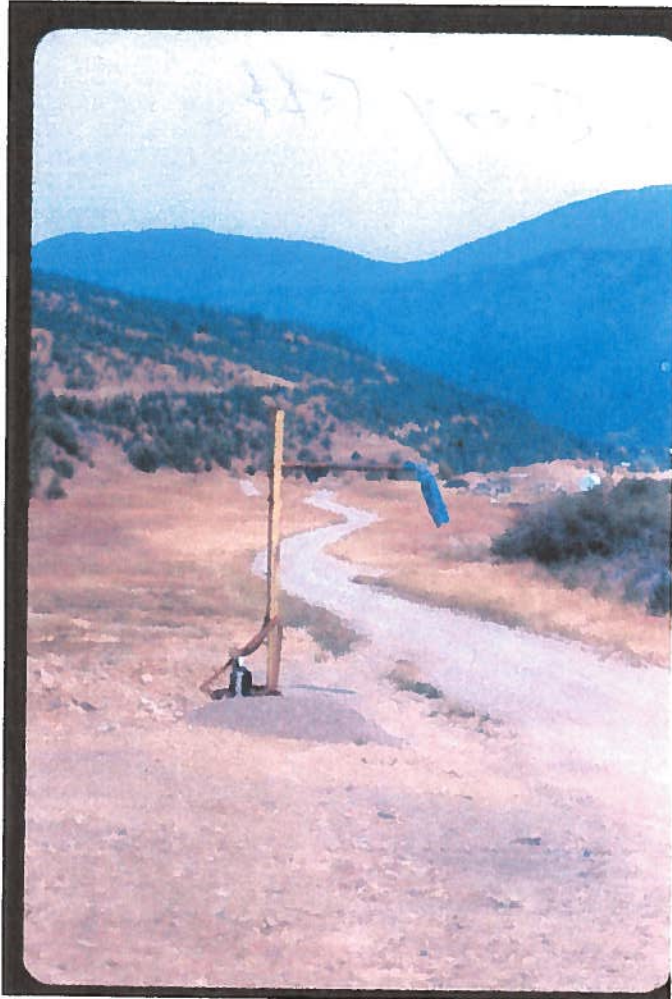
Fill by 6" H<sub>2</sub>O line from Government of Greenville

Photographed by Jerry Fish



2007 Galena KAPC Golf Course Construction  
Dist. Golf Club  
Photos provided by Terry Cook

GOVERNMENT GULCH - WATER SYSTEM STAND PIPE



Gov. Gulch Water System Standpipe  
used by Shoshone County, Idaho Dept. of  
Transportation & others  
Photographs by Jerry Lebb

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WASTE PROGRAM

Information on the Government Dutch Water system. It includes correspondence from IDEQ to Bunker Hill, system inspections done by IDEQ w/ system drawings, sample data & copies of claims to a water right.

The system drawing provided as part of the inspections are the only ones I have ever seen.

Jerry Cobb  
JAC  
2/30/16

94-4217  
94-4244

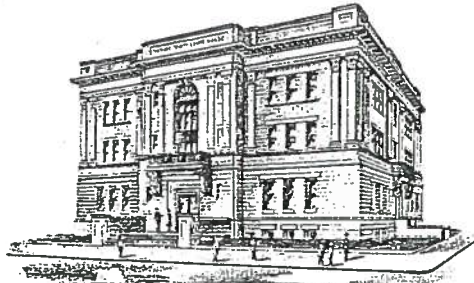
VICTORIA WHITE, CLERK DISTRICT COURT  
AUDITOR and RECORDER

SHERRY KRULITZ, TREASURER and  
TAX COLLECTOR

DUANE E. LITTLE, ASSESSOR

LEWIS GARDNER, SHERIFF

RICHARD G. MAGNUSON, PROSECUTING  
ATTORNEY



## County of Shoshone

WALLACE, IDAHO

May 29, 1975

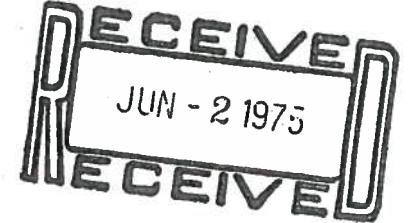
COMMISSIONERS:

VINCENT ALEXANDER, ~~CHAIRMAN~~

VERNON T. LANNEN

A. E. SAGDAL, Chairman

ALBERT M. PETERSON, CORONER



The South Fork of the Coeur d'Alene River Rehabilitation Committee was organized June 25, 1974 for the purpose of initiating the upgrading of the quality and appearance of the river. The Committee was of the opinion that a demonstration site was desirable to utilize designs from various agencies that might be applied to an overall plan for the South Fork. Furthermore, if a demonstration project was successful, combining the efforts of local and state interests, it probably would help create interest on the part of federal agencies to assist on the overall plan.

The State of Idaho, through the Governor's Office, has obtained from the Pacific Northwest Regional Commission, a tentative grant of \$25,000 to assist in this project; has expressed support of the Committee's interest, and has set this \$25,000 aside for use in a demonstration project subject to local support. However, if local financial support is not forthcoming by the first part of June, then the funds will be withdrawn.

A demonstration site was selected by the Committee (Big Creek to the Evolution Bridge), a tentative plan drawn, and preliminary costs were developed. The estimated cost was approximately \$100,000 for the total length. However, it is the Committee's understanding that the downstream 1/3 was being considered for a future tailings pond. If that portion was eliminated from the project, the costs would be reduced to an amount somewhere between \$50,000 and \$75,000.

If local cash or contributed services (equipment and operators) were available to match or make up the difference between the amount offered by the Governor, and the actual cost, the demonstration project could be started in July or August of 1975.

94-4217

94-4244

As Chairman of this Committee, I am aware of your interest in upgrading the area, and that you have, and are, investing money in cleanup and revegetation. Since the proposed demonstration project fits well with your previous and existing efforts, I feel it would be beneficial to yourselves, the Committee, and residents if we obtained your support and financial assistance.

Without your assistance, it would appear that the project has little chance of success.

If you have any questions on this matter, please feel free to call.

Sincerely,

A handwritten signature in cursive script that reads "Vernon T. Lannen". The signature is written in dark ink and is positioned above the typed name.

Vernon T. Lannen, Chairman

VTL/mm

VICTORIA WHITE, CLERK DISTRICT COURT  
AUDITOR and RECORDER

SHERRY KRULITZ, TREASURER and  
TAX COLLECTOR

DUANE E. LITTLE, ASSESSOR

LEWIS GARDNER, SHERIFF

RICHARD G. MAGNUSON, PROSECUTING  
ATTORNEY



County of Shoshone

WALLACE, IDAHO

November 19, 1975

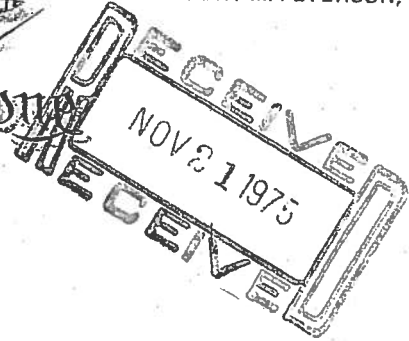
COMMISSIONERS:

VINCENT ALEXANDER,

VERNON T. LANNEN

A. E. SAGDAL, Chairman

ALBERT M. PETERSON, CORONER



Jerry Cobb  
Panhandle Health Dist.  
Silverton, Idaho 83867

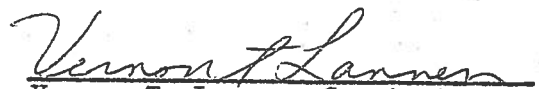
Dear Sir:

There will be a meeting of the South Fork Coeur d'Alene Rehabilitation Committee on Monday, December 8, 1975 at 9:30 o'clock a.m. in the County Commissioners' Conference Room, Wallace, Idaho.

James Wrigley and Warren Reynolds, Dept. of Water Resources, will present a preliminary review of the State Water plan for the South Fork.

Also, recently taken aerial photos of the South Fork will be available at the meeting.

Sincerely,

  
Vernon T. Lannen, Commissioner

VTL/mm

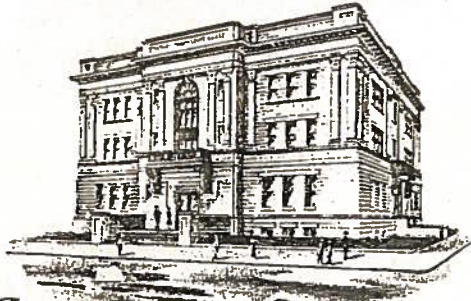
VICTORIA WHITE, CLERK DISTRICT COURT  
AUDITOR and RECORDER

SHERRY KRULITZ, TREASURER and  
TAX COLLECTOR

DUANE E. LITTLE, ASSESSOR

LEWIS GARDNER, SHERIFF

RICHARD G. MAGNUSON, PROSECUTING  
ATTORNEY



COMMISSIONERS:

VINCENT ALEXANDER,

VERNON T. LANNEN

A. E. SAGDAL, **Chairman**

ALBERT M. PETERSON, CORONER

# County of Shoshone

WALLACE, IDAHO

April 14, 1976

Jerry Cobb  
Panhandle Health Dist.  
Silverton, Idaho 83867

Dear Sir:

There will be a meeting of the South Fork Coeur d'Alene Rehabilitation Committee on Wednesday, April 28, 1976 at 9:30 o'clock a.m. at the Public Safety Facility, Wallace, Idaho.

James Wrigley, Dept. of Water Resources will be present to discuss the proposed State water plan and the possible affects it would have on the South Fork of the Coeur d'Alene River.

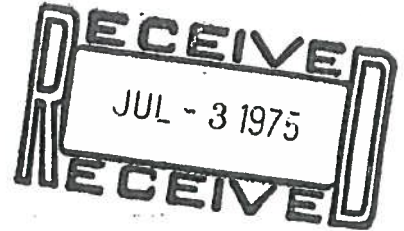
Sincerely,

A handwritten signature in blue ink that reads "Vernon T. Lannen". The signature is written in a cursive style.

Vernon T. Lannen, Commissioner

VTL/mm





REPORT OF WATER SUPPLY

Year 1974

Place Bunker Hill Company County Shoshone Census Population.....

Ownership Bunker Hill Company

Supply used by Company surface and underground workers and processes, part of Kellogg, Wardner

Deadwood Gulch, Silver King (Sherman Ely, Service Foreman) Population served 2,000 + 2000 workers

FIELD SURVEY DATA

DESCRIPTION OF SUPPLY: Give a brief description of the source and the main features of treatment, pumping equipment, storage available, adequacy of system, distribution or direct pumping, supervision of additions and extensions from a public health viewpoint, adequacy of pressures, separation between sewers and water mains, laboratory and related controls of quality. If supply is untreated or chlorinated only, describe protection against entrance of contamination. Attach additional sheets if necessary.

The 3 sources of water for the domestic water system are as follows: Milo Creek, dam, screened diversion 3/4 miles above Wardner, W&T gas chlorinator, flow meter, unused 6 year old 1 MGD filter, 8" line to 90 connections in Wardner, 400 connections in Kellogg, 8" line to Mine Plant and mine, 4" line to 12 houses in Deadwood Gulch. The system includes 250,000 gallon storage in 4 tanks. The system can be connected at one location to the Idaho Water Company system in Kellogg. Average total water use is about 750,000 gpd. Government Gulch, dam, screened diversion 3/4 mile above zinc plant, 12" line, W&T gas chlorination with 15,000 gallon detention, 12" line to zinc plant, phosphorus plant and 40 houses in Silver King, with overflow at smelter to processes. The system includes 60,000 gallon storage in one steel tank near the source. Average total water use is estimated at 600 GPM. North Fork Coeur d'Alene River, pumps above Enaville at bridge, 20" line, booster pumps, hypochlorinator at smelter for domestic, 50,000 gallon storage, overflow to processes. This system can also feed the Government Gulch system when needed in times of turbid water or low flows in Government Gulch. The system supplies raw water to the control building at the SFCDARSD Page Ponds. Chlorine residuals for all systems was measured at 0.1 mg/l at the company buildings. Bacteriological samples have been good. The operation and maintenance of the systems appeared to be very good although some equipment and piping are very old. The company also has wells for processed water.

PUBLIC HEALTH DEFECTS: Describe briefly the sanitary defects such as by-passes, cross connections, emergency intakes to unsafe supplies, inadequate protection against sources of pollution, inadequacy of treatment, defective structural features, possibility of flooding, deficient operating practices, inadequate sanitary control of additions or extensions to system, lack of proper plumbing regulations and enforcement, inadequate control of water in distribution system. Attach additional sheets if necessary.

1. All 3 sources are surface water and filtration is not provided. The existing Milo Creek filter has not been used. The Milo Creek watershed contains the Silverhorn Ski Bowl; the Government Gulch watershed contains very little vegetation; the North Fork watershed includes farms and recreational developments and houses.
2. Chlorine residuals and bacteriological samples have not been obtained in the mine.
3. The possibilities for cross connections with process waters may exist because of the large piping complex and varied uses and sources of the waters.
4. The wooden storage tanks appeared to be in poor condition.
5. Chlorine contact time for the Milo Creek System may not be adequate for the first users.

Engineer Jeff Cook, P. E. Date of Investigation September 19, 1974

94-4217  
94-4244

**LABORATORY DATA  
BACTERIOLOGICAL ANALYSES**

Number of samples required per month SIX Laboratory Coeur d'Alene

MONTH AND YEAR	No. SAMPLES	10-ML. PORTIONS POSITIVE		SAMPLES HAVING 8 OR MORE PORTIONS POSITIVE	
		Number	Percent Positive (a)	Number	Percent Positive (a)
THREE SYSTEMS COMBINED					
9-73	5	0			
10-73	3	0			
11-73	6	1			
12-73	6	1			
1-74	8	0			
2-74	6	0			
3-74	3	0			
5-74	3	0			
6-74	6	0			
7-74	6	0			
8-74	9	0			
9-74	3	0 DHW Samples			

(a) Should not exceed 10% in any one month

(a) Should not exceed 5% in 20 or more per month nor one sample in less than 20 per month.

**CHEMICAL AND PHYSICAL ANALYSES**  
(Chemical results in p. p. m.)

Results collected during period from \_\_\_\_\_ to \_\_\_\_\_

pH		Calcium		Hardness	
Temperature		Magnesium			
Turbidity		Alkalinity			
Color		Sulfates			
Taste		Chlorides			
Odor		Fluoride			
Total Solids		Lead			
Iron and Mang		Arsenic			

**CONCLUSIONS AND RECOMMENDATIONS**

Based on Engineering Survey and Laboratory Data

1. The filter on the Milo Creek system should be operated continuously.
2. Filtration should be provided for the domestic water from the Government Gulch system and the North Fork System.
3. Chlorine residuals should be measured weekly in the underground domestic water system and bacteriological samples should be obtained twice per month underground.
4. A cross-connection program should be conducted to locate and eliminate all connections of potable and process water.

Recommendations should be complied with on or before 1,3 immediately. 2 by December 31, 1976

This water supply is \_\_\_\_\_ satisfactory for \_\_\_\_\_ provisional \_\_\_\_\_ approval.

Date Sept. 27, 1974

*James M. Kimball*  
Director, Categorical Programs

**STATE OF IDAHO**  
*Cecil D. Andrus, governor*

department of health and welfare

STATEHOUSE, BOISE, 83720

Environmental Services Division

412 Lakeside

P. O. Box 608

Coeur d'Alene, Idaho 83814

August 23, 1974

*James A. Bax, director*

Safety Director  
Bunker Hill Mining Company  
P. O. Box 29  
Kellogg, Idaho 83837

Dear Sir:

Please find enclosed a copy of the "Idaho Drinking Water Standards." We call your attention to the following information and requirements contained within the Standards:

IDAHO STATUTES; Section 37-2102. (as amended) "Domestic Water To Be Protected. --Any person or persons, corporation or corporations or officers of a municipality, owning or maintaining any plant or system for the supply to the inhabitants of this State, or any part thereof, of water for domestic purposes shall protect the same and keep it free from all impurities and all other foreign substances which tend to injure the health of the ultimate consumers of such water, whether such impurities or foreign substances are chemical or bacterial....."

DEFINITION; "Water supply system includes the works and auxiliaries for collection, treatment, and distribution of the water from the source of supply to the free flowing outlet of the ultimate consumer."

SECTION 1.2; "Frequent sanitary surveys shall be made by the purveyor of the water supply system to locate and identify health hazards which might exist in the system. The manner and frequency of making these surveys and the rate at which discovered health hazards are to be removed shall be in accordance with a program approved by the Department of Health."

We, therefore, request that you initiate the following program regarding the domestic water system:

1. Bacteriological samples should be obtained and submitted to our laboratory for analyses. At least two bacteriological samples should be submitted each month, preferably one from the surface system and one from the underground system. Mike Broadwater of the Coeur d'Alene Laboratory should be contacted regarding the submission of samples (phone 664-9296).

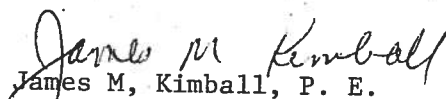
Safety Director  
Bunker Hill Mining Company  
August 23, 1974  
Page 2

2. A sanitary survey should be made on the present water system. The results of the survey, including a sketch map of the system should be submitted to this office.

We request that you initiate this program immediately. If you have any questions, please contact this office, or Jerry Cobb of the Panhandle Health District, Silverton, Idaho, phone 752-1235.

Sincerely,

DEPARTMENT OF HEALTH & WELFARE

  
James M. Kimball, P. E.  
Regional Environmental Supervisor

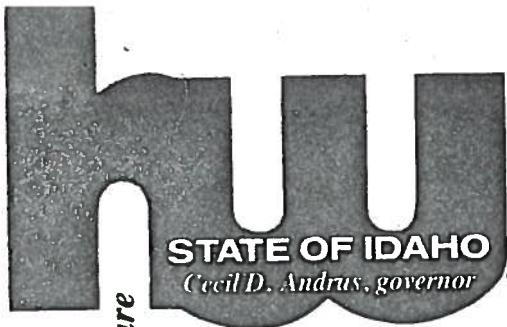
JMK:nj

Enc-1

cc: Bob Olson

Jack Ross

Jerry Cobb



department of health and welfare

STATEHOUSE, BOISE, 83720

James A. Bax, director

Environmental Services Division  
412 Lakeside  
P. O. Box 608  
Coeur d'Alene, Idaho 83814  
September 6, 1974

Mr. J. E. McKay, Vice President  
Technical Services  
The Bunker Hill Company  
P. O. Box 29  
Kellogg, Idaho 83837

Dear Mr. McKay:

This is in reply to your letter of August 29, 1974 regarding the company's domestic water systems.

We are aware of your bacteriological sampling program and have copies of all test results. The sample report forms indicate the original source of the water, "North Fork," "Government Gulch" and Milo Creek" but do not indicate sample locations. We are asking that samples be obtained at the surface and underground domestic water sources every month. Please indicate the location of each sample on the report forms.


The second part of our letter of August 23, 1974, asked the Company to conduct a sanitary survey of the domestic water systems to locate and identify any health hazards. Investigations of the entire water systems should be an ongoing program for any purveyor of domestic water. Our files indicate the Company has not recently conducted such investigations. If such investigations have recently been made, please supply this office with the results of the study, including plans for correcting any noted deficiencies. We also request you supply us with sketch maps of the systems to update and complete our files.

This office is required to make investigations of all public water systems every two years. We will conduct investigations and obtain samples of the Company's systems in the near future. The requested Company investigations and/or submission of information will facilitate inspections by this office.

Please submit the information as requested. If you have any questions, call.

Sincerely,

DEPARTMENT OF HEALTH & WELFARE

  
James M. Kimball, P. E.  
Regional Environmental Supervisor

JMK:nj  
cc: Bob Olson  
Jack Ross  
Jerry Cobb

Environmental Services Division  
P. O. Box 608  
Coeur d'Alene, Idaho 83814  
December 6, 1974

Mr. J. E. McKay, Vice President  
Technical Services  
The Bunker Hill Company  
P. O. Box 29  
Kollogg, Idaho 83837

Dear Mr. McKay:

Please find enclosed copies of the analytical data for samples obtained from the Bunker Hill water systems.

The data show a violation of the Drinking Water Standards for manganese in the Government Gulch system, 0.26 mg/l versus 0.05 mg/l standard. This sample was obtained in the shower room of the zinc plant boiler room. The manganese drinking water standard is mainly based on taste and appearance of the water. This manganese level may also be of concern to you in some of your industrial processes.

If you have any questions, please contact this office.

Sincerely,

DEPARTMENT OF HEALTH & WELFARE



Jeff C. Cook, P. E.  
Environmental Engineer

JCC:nj  
enc-3  
cc: Bob Olson

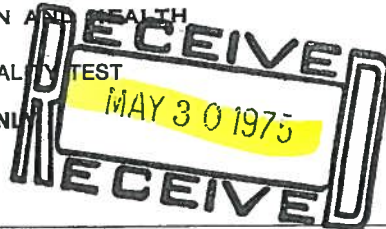
C  
O  
P  
Y

LABORATORIES:

BOISE  
COEUR D'ALENE  
IDAHO FALLS  
LEWISTON  
POCATELLO  
TWIN FALLS

STATE OF IDAHO — DEPARTMENT OF  
ENVIRONMENTAL PROTECTION AND HEALTH  
WATER SAMPLE  
FOR BACTERIOLOGICAL QUALITY TEST  
(PURITY TEST)

PLEASE PRINT PLAINLY



See Back of Form for Collecting Instructions

SOURCE Bunker Hill  
(Type of Well, Spring, Stream, Etc.)

LOCATION OF SOURCE 819 W. Park Monte Laisen Ave.  
(Address if City: Distance and Direction from Town if Farm)

REPORT RESULT TO:

NAME ~~R. Taylor~~ Jerry Cobb

IF WELL, GIVE DEPTH \_\_\_\_\_  
Feet

ADDRESS Box 108

SAMPLE COLLECTED 11:30 AM  
Hour

Silverton Ida. 83867  
City State Zip Code

5-27-75  
Date

RESULT OF WATER TEST:

INTESTINAL BACTERIA WERE  FOUND IN THE WATER SAMPLE

INTESTINAL BACTERIA WERE NOT  FOUND IN THE WATER SAMPLE

MEMBRANE FILTER 0 COLIFORMS/100 ml.

DATE RECEIVED 5-28-75 M. Brubaker  
Microbiologist

**EXPLANATION:** Intestinal bacteria should not be present in your water supply. The presence of these organisms indicates that your water is contaminated. This may be due either to poor quality of water at its source or improper construction and maintenance of the system. Because the quality of water may vary from time to time, it is recommended that repeat samples be submitted. For Department of Environmental Protection and Health recommendations or approval of your water supply, please contact your sanitarian or public health engineer.

PRESUMPTIVE TEST

DATE	10cc	10cc	10cc	10cc	10cc
	5 ml = 0				
	50 ml = 0				

CONFIRMATORY TEST

DATE	RESULT

FILL TO NECK OF BOTTLE. ALLOW AN AIR SPACE AT THE TOP



# STATE OF IDAHO

DEPARTMENT OF HEALTH  
AND WELFARE

DIVISION OF ENVIRONMENT  
Statehouse  
Boise, Idaho 83720

*Bob [signature]*

April 9, 1981

James H. Boyd, P.E.  
Manager, Environmental Affairs  
The Bunker Hill Company  
P.O. Box 29  
Kellogg, Idaho 83837

Dear Jim:

Thank you for the opportunity to meet with you and the representatives of other mining companies to discuss requirements for public water systems. We have reviewed the Idaho Drinking Water Regulations and will explain our application of these Regulations in the following discussion with regard to non-community water systems. All section citations refer to the Idaho Regulations for Public Drinking Water Systems.

The major emphasis of Idaho's Public Water Supply Program in implementing the Safe Drinking Water Act is directed toward community water systems (i.e., cities, subdivisions, mobile home parks). This emphasis follows the national program as directed by Congress and the Environmental Protection Agency.

Our involvement with non-community water systems is minimal; however, we do expect these systems to conduct certain minimal monitoring requirements including bacteriological monitoring [Section 1-8100.01(b) and (c)] and the one-time nitrate analysis [Section 1-8101.03(b)]. Bacteriological monitoring requirements for groundwater sources is once every quarter and monthly for surface water sources.

Turbidity monitoring [Section 1-8103.02] is required only for supplies of water for community water systems. At the end of February, 27 out of 80 surface water systems were monitoring for turbidity.

The following outlines our intent with regard to application of the Idaho regulations for community and non-community public drinking water systems.

- Section 1-8003 - All systems
- 1-8004 - All systems
- 1-8100 - As designated for community and non-community systems

James H. Boyd, P.E.  
April 9, 1981  
Page Two

- Section 1-8101 - As designated
- 1-8102 - Community systems only
- 1-8103 - All systems should meet turbidity requirements. Only community systems are required to conduct turbidity monitoring.
- 1-8104 - The primary concern of secondary quality standards is for community systems.
- 1-8105 - The intent of this provision is for community systems. *records*
- 1-8106 - All systems
- 1-8107 - All systems
- 1-8108.01 - All systems
- 1-8108.02 - Community systems
- 1-8108.03 - Non-community systems
- 1-8108.04 - All systems
- 1-8108.05 - All systems
- 1-8200.01 - All systems
- 1-8200.02 - All systems
- 1-8200.03 - Community systems
- 1-8300 - All systems
- 1-8301 - All systems
- 1-8302 - All systems
- 1-8303 - All systems
- 1-8304 - All systems
- 1-8305 - All systems
- 1-8306.01 - Cross connection control is required for all systems. For non-community systems, it is the responsibility of the purveyor to ensure that unsafe substances do not enter the system.

James H. Boyd, P.E.  
April 9, 1981  
Page Three

Sections 1-8306.02 through 1-8306.08 - Applicable to community systems.

- 1-8307 - All systems
- 1-8308 - All systems
- 1-8400 - All systems. However, Sections 1-8400.01 through 1-8400.10 or portions thereof may be waived for non-community systems if the project is reviewed by Health Department staff prior to construction.
- 1-8500 - All systems. This Section authorizes the Director to waive any requirement of Sections 1-8200 through 1-8400.

We hope you will find the above information helpful.

When we propose modification of the regulations, we will clarify the intent of requirements for community and non-community public water systems.

Sincerely,



Al E. Murrey, P.E.  
Chief, Bureau of Water Quality

AEM:par  
cc: Lee Stokes  
Dick Rogers  
Field Offices  
Bob Olson ✓



# STATE OF IDAHO

## DEPARTMENT OF HEALTH AND WELFARE

Division of Environment, 2110 Ironwood Parkway, Coeur d'Alene, ID 83814  
(208) 667-3524

JUL 16 1982

July 14, 1982

### MEMORANDUM

TO: Jim Goodloe  
FROM: Steve Blackhurst JB  
RE: Bunker Hill Inspection, July 13, 1982

1500 GPM  
= 3.34 cfs  
5800 GPM  
= 12.9 cfs

On the morning of July 13, 1982, Dwight Hagihara and I met with Ralph Gilges and Dick Padgett at the Bunker offices. Mr. Gilges said from the beginning that he could not agree to bring the system up to "State Standards". If, however, there were specific items that needed correcting he would consider them individually to see if he could agree to correct them. He didn't like the possibility of an open-ended agreement with which we could add more things later. Mr. Padgett then gave us an overview of the water system. After that Mr. Padgett took us on a tour of the facility.

There are basically two systems. They have a surface source up Government Creek above the zinc plant which can supply as much as 1500 GPM. Just above the lead smelter the line from Government Creek joins with a supply line from the other source, two shallow gravel bar wells at Enaville. The combined flow from the Enaville wells is about 5800 GPM.

With reference to Bunker Hill supplying water to CSC, Mr. Padgett said they basically give water from the Government Creek source to CSC in the area of Silver King School which is distributed to the school and about 12 homes. This water has been previously chlorinated with adequate contact time. They also have an intertie at the east end of the plant through which they sell water to CSC on an as needed basis. They can also buy water from CSC if needed. The water at this point is probably a mixture of Government Creek and Enaville water. It has been previously chlorinated with adequate contact time by the time it reaches this point.

After the inspection, I showed Mr. Gilges a list of what we considered deficiencies in the system, as follows:

#### Government Creek Source:

- Balance Tank - Vent on tank needs screen replaced.
- Manhole cover needs lock for security.
- Chlorination Room - Lights and vent fan were not operational and need to be repaired.

94-4217  
94-4244

Government Creek Continued:

The Cl<sub>2</sub> gas cylinder needs to be secured to keep it from falling over.  
There was no Cl<sub>2</sub> air mask available at the site.  
Water Rights - A clear water right apparently has not been obtained.

Enaville Wells (constructed in the late 1950's):

The <sup>one</sup> ~~two~~ 5-foot diameter wells are in a pit which is subject to at least <sup>2 pumps</sup> annual flooding.  
The casings are not sealed to prevent surface water contamination.  
The casings are not properly vented.  
High pressure system off Enaville Wells.  
There is insufficient chlorine contact time before their people drink it but it has sufficient contact time before going to CSC.  
The chlorination room is not properly vented, does not have a sign indicating what it is, and there wasn't a Cl<sub>2</sub> air mask available at the site.  
Pump House Booster Station - The booster pumps were located in a pit about 20 feet away from three (3) PCB transformers which could result in contamination.

Sampling:

The company was not up to date on inorganic samples from both sources, an organic sample from the surface source and radiochemical samples as required in the Regulations. We took the samples and Mr. Gilges said he would pay for them.

Bacti sampling has previously been taken of raw water only rather than from the distribution system.

Cross-Connections:

We expressed our concern over cross-connection potential, especially during demolition. We told them at the very least they needed an active cross-connection program which probably would include isolation, draining and flushing of lines in the demolition areas and possibly R. P. devices at the phosphate plant or other high contamination potential areas that would not be demolished.

The system was in fairly good shape. However, much of the system operates on a manual basis including pumps, chlorinators, etc. Without constant attention from maintenance people there could easily be problems.

In addition, I believe we should be concerned about the relationship between Bunker and others using their water. It is not clear to me who is responsible for treating the water supplied to CSC. Who really owns the distribution system to the homes in Government Gulch? Is CSC an extension of Bunker Hill?

Memorandum to Jim Goodloe  
RE: Bunker Hill Inspection, July 13, 1982

July 14, 1982  
Page 3

What limitations are placed on Linfor Lumber and the Lions Club, both of which take untreated water from the Enaville line before it reaches Bunker Hill?

After Mr. Gilges reviewed the list of deficiencies, he said he could commit to fixing all of them but the chlorine contact time within the plant itself and the Enaville well. He also said that he would personally go out and look at the situation to see what could be done.

The afternoon of July 14, 1982, I talked to Mr. Gilges by telephone about Enaville and he said he was prepared to extend the pit walls above the expected high water lever (four or five feet), seal the wall as well as he could, and put a check valve in the drain line from the pit to the river to prevent the river from filling up the pit. He said he couldn't commit to raising and sealing the well casing and putting a sanitary seal on it, which I had suggested as an acceptable alternative. Apparently, an alternative like I suggested had been proposed by plant people previously at a cost of about \$35,000 but was never approved. (I believe their cost included some automatic control valves and radio operated equipment as well.) Mr. Gilges believes any contamination in the pit would be so diluted in 5800 GPM as to be insignificant. If that line of reasoning is acceptable then there would really be no need to do anything to the wells.

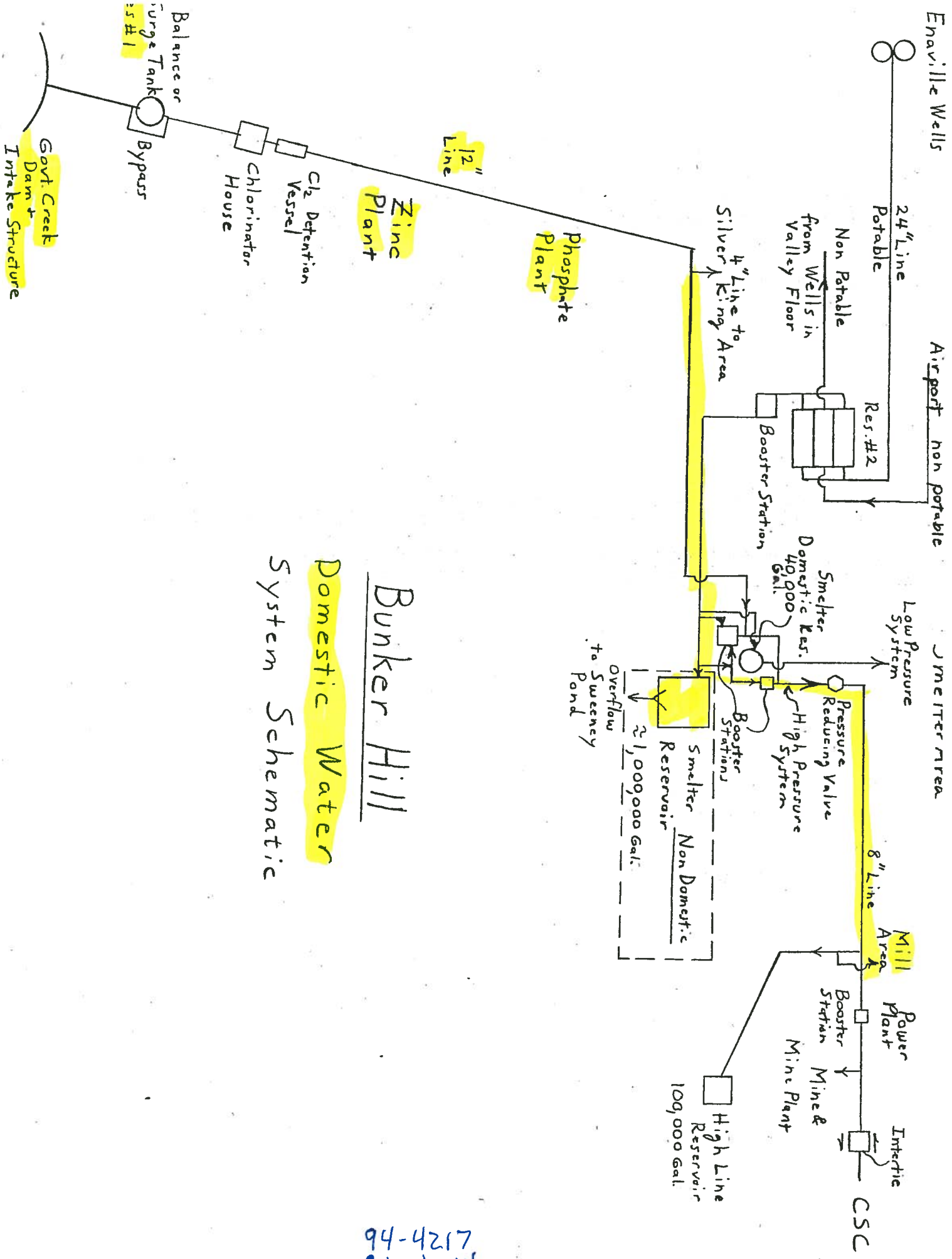
The attached schematic may help in understanding what is a fairly complex system that has been added to and modified many times over the years. I am also attaching the list I showed Mr. Gilges at the completion of our inspection. The items circled were the ones he wasn't sure he could commit to.

SB:zmj

#### Attachments

cc: Al Murrey  
Larry Koenig  
Jack Hockberger  
Dick Rogers  
Dwight Hagihara  
Jerry Cobb

JUL 16 1982



Bunker Hill  
**Domestic Water**  
 System Schematic

94-4217  
 94-4244

## Govt. Creek

- Balance Tank - Need to replace screen on vent ✓
- Need locked manhole cover ✓
- Chlorination Room - Need Cl<sub>2</sub> mask available ✓
- Secure cylinder to keep from falling ✓
- Lights + vent fan need to be functional ✓
- Should secure water rights

## 7-58 Enaville Wells - Help!

- Casing needs to be extended above high water
- Sanitary seal on casing
- Proper vent

Low Pressure System - O.K.

High Pressure - Cl<sub>2</sub> contact time prob.

- Cl<sub>2</sub> Room - poor venting ✓
- need sign ✓
- need Cl<sub>2</sub> mask ✓

Power House - PCB's 20' from pumps - need catch basin or? ✓

Samples - inorganic - Govt. + Enaville ✓

organic - Govt. Creek ✓

radiocesium - ✓

High line reservoir - check vent + hatch

X- Conn. - isolate - drain - waste

R.P. at Phos. Plt.

Bacti-sample in distribution system.

JUL 19 1982

Water System Bunker Hill

Date 7/13/82 Inspected By Steve + Dwight

Location Kellogg

P.O. Box 29  
Kellogg, ID 83837 CONNECTIONS

Actual                      Restaurants 0 Membership Fee 0

Design                      Schools 0 Monthly Rates 0

Approximate Population Served In past 2000+ plus upper Kellogg

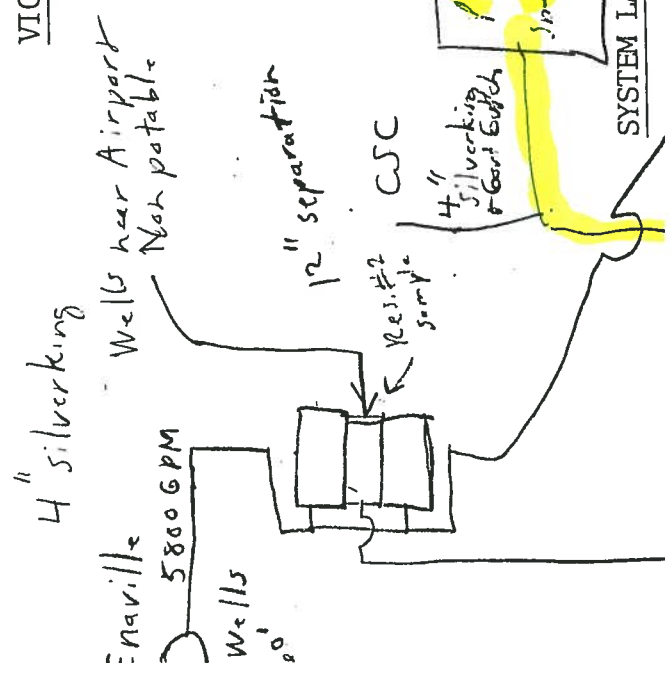
Owner The Bunker Hill Company Phone                     

Operator Dick Padgett, Ralph Gilges Phone 784-1261

Type Supply:  Spring  Well  River  Lake

VICINITY

See Attached Dwg's for better Sketch



STORAGE:

Res. # 2

Age 25 yrs. Type of Storage: Gravity Tank Pneumatic Tanks

Open Reservoir Stand Pipe Other

Size 109,000 (gals.) Construction Concrete

Overflow Screened No overflow walls Height Above Ground 5 ft.

Flow Through Rides On System

Adequate Cover No Adequate Manhole

Adequate Security Yes Level Controlled By Not controlled

Sanitary Defects

Structural Defects No

Comments

Govt. Gulch Balance Tank

Age 30 yrs. + Type of Storage:  Gravity Tank Pneumatic Tanks

Open Reservoir  Stand Pipe Other

Size 20,000 (gals.) Construction Steel

Over Flow Screened Needs repair Height Above Ground 20 ft.

Flow Through Rides On System

Adequate Cover Yes Adequate Manhole Yes

Adequate Security needs lock Level Controlled By overflow

Sanitary Defects No

Structural Defects No

Comments

DISTRIBUTION SYSTEM:

Date Installed Turn of Century

Recent Extensions No As-Built Plans Available Some

Location \_\_\_\_\_

Type of Pipe in system AC \_\_\_\_\_ Plastic  Steel  Cast  Wood

Other \_\_\_\_\_

Length of Pipe: 33 Miles Less than 2" \_\_\_\_\_ 2" \_\_\_\_\_ 3" \_\_\_\_\_ 4" \_\_\_\_\_

6" \_\_\_\_\_ 8" \_\_\_\_\_ Above 8" Yes 24", 20", 12" \_\_\_\_\_

Looped \_\_\_\_\_ Adequate valves \_\_\_\_\_

Fire Hydrants Yes \_\_\_\_\_

Local Fire Protection Available Yes Who Company \_\_\_\_\_

Pressure Problems No Where \_\_\_\_\_

Why \_\_\_\_\_ Remedy \_\_\_\_\_

Gravity Tank \_\_\_\_\_ Pneumatic Tanks  Booster Pumps \_\_\_\_\_ Other \_\_\_\_\_

Cross Connection Control No Sanitary Defects Yes \_\_\_\_\_

Service Connections installed per system standards \_\_\_\_\_

Meters Yes \_\_\_\_\_

BOOSTER PUMPS: Location(s) Smelter, Power House \_\_\_\_\_

Type Centrifugal, Centrifuge Model Number \_\_\_\_\_

Hp 5 @ 60 HP, 30 HP, 50 HP, 60 HP Capacity ? ? (gpm) \_\_\_\_\_

Number of Connections Served \_\_\_\_\_ Size of main at connection 8 in., 6 in.

Discharge pipe 2", 4", 3" Low pressure cut off switch Yes, ? No

Set at 5/65? Type of Pump: \_\_\_\_\_ Public \_\_\_\_\_ Private \_\_\_\_\_

Comments \_\_\_\_\_

PUMP NUMBER

& PLUMBING:

Location \_\_\_\_\_

PUMP CONTROL: Float Switch \_\_\_\_\_ Pressure Switch \_\_\_\_\_ Other \_\_\_\_\_

Horsepower \_\_\_\_\_ Type Pump \_\_\_\_\_

Capacity \_\_\_\_\_ TDH \_\_\_\_\_ LUBRICATION: \_\_\_\_\_ Vegetable Oil \_\_\_\_\_ Water \_\_\_\_\_

Flow Meter \_\_\_\_\_ Pressure Gauge \_\_\_\_\_ Gate Valve \_\_\_\_\_

Check Valve \_\_\_\_\_ Blowoff \_\_\_\_\_ Surge Control \_\_\_\_\_

Vents & Discharge Points Screened? \_\_\_\_\_ 12" above floor \_\_\_\_\_

Size Discharge Line \_\_\_\_\_ Material \_\_\_\_\_

Cross Connections \_\_\_\_\_

Sample Tap \_\_\_\_\_ Adequate Pressure \_\_\_\_\_

Comments \_\_\_\_\_

Enaville Well  
PUMP & PLUMBING: \_\_\_\_\_ PUMP NUMBER \_\_\_\_\_  
*Need seal  
Need casing raised*

Location Enaville

PUMP CONTROL: Float Switch \_\_\_\_\_ Pressure Switch \_\_\_\_\_ Other On or off

Horsepower 250 HP Type Pump Submersible Waste excess

Capacity 3400 GPM TDH \_\_\_\_\_ LUBRICATION: \_\_\_\_\_ Vegetable Oil  Water

Flow Meter No (Flume at Reservoir) Pressure Gauge No Gate Valve

Check Valve  Blowoff No Surge Control No

Vents & Discharge Points Screened? No 12" above floor No

Size Discharge Line 12" Material Steel

Cross Connections No

WELL HOUSE & SITE:

Adequate Floor & Drain In Pit

Daylight

Screened ?

To River

Heating No

Ventilation No

Lighting No

Cleanliness Mediocre

Security O.k.

Structural Defects

Subject To Flooding Yes !!! Nearest Water 100 ft.

DIST. TO:

Sewer Line (50') ✓ Septic Tank (50') ✓

Cesspool (150') ✓ Livestock (50') ✓ Stream (50') ✓

Disposal Field (100') ✓ Seepage Pit (100') ✓ Dry Well (50') ✓

Property Line (50') ✓ Road (50') ✓ Other ✓

Comments

WELL: 2 Pumps down hole

Dug ? Driven ? Drilled ?

DATE: 1957, 58

Depth of Well 54' Depth to water River level/21 ft. Drawdown 6"

Depth to intakes 35' Depth of Casing All heavy size 6 ft. dia. steel

Height of Casing Flush w/ floor Sanitary Seal No

Pitless Adapter No Vented No Screened No

Depth of Water, Measurement No How

Copy of Well Log Available No Water Rights Obtained Yes

Comments

WELL HOUSE & SITE:

Adequate Floor & Drain

Daylight

Screened

Heating

Ventilation

Lighting

Cleanliness

Security

Structural Defects

OR SPRING:

Watershed Development: Undeveloped, partially divided by 502 etc.

Access By Public to Watershed Good Moderate  Restricted

Ownership of Watershed  Purveyor Fed State Private

Water Right Obtained In process Number \_\_\_\_\_

Maximum Flow 1500 GPM Minimum Flow 300 GPM

Appearance of Raw Water Good

Describe collection or intake facilities Dam with intake box and removable screens  
 ← Intake box  
 ← Screens

Sanitary Defects Pond was fenced before pollution ate it up. Although not crucial a fence would help since elk have been known to wallow in it.

**Govt. Crk**

INFLECTION:

Type Equipment W+T V-Notch old type Capacity 300 lbs/day

Rate of Feed 2 1.5 Contact time > 30 min 5' x 100' Retention Pipe

Chemical Used Cl<sub>2</sub> gas Residual 0.3 checked in 3 places

Ventilation Fan out Separate Room OK

Testing Equipment Safety Equipment Need Cl<sub>2</sub> mask

Same type chlorinators used at Smelter - 3 each - Contact time less than 30 min for their employees. No ventilation, no mask.

TREATMENT:

Plant Capacity \_\_\_\_\_ When Constructed \_\_\_\_\_

Pre chlorination \_\_\_\_\_ Chemical Used \_\_\_\_\_

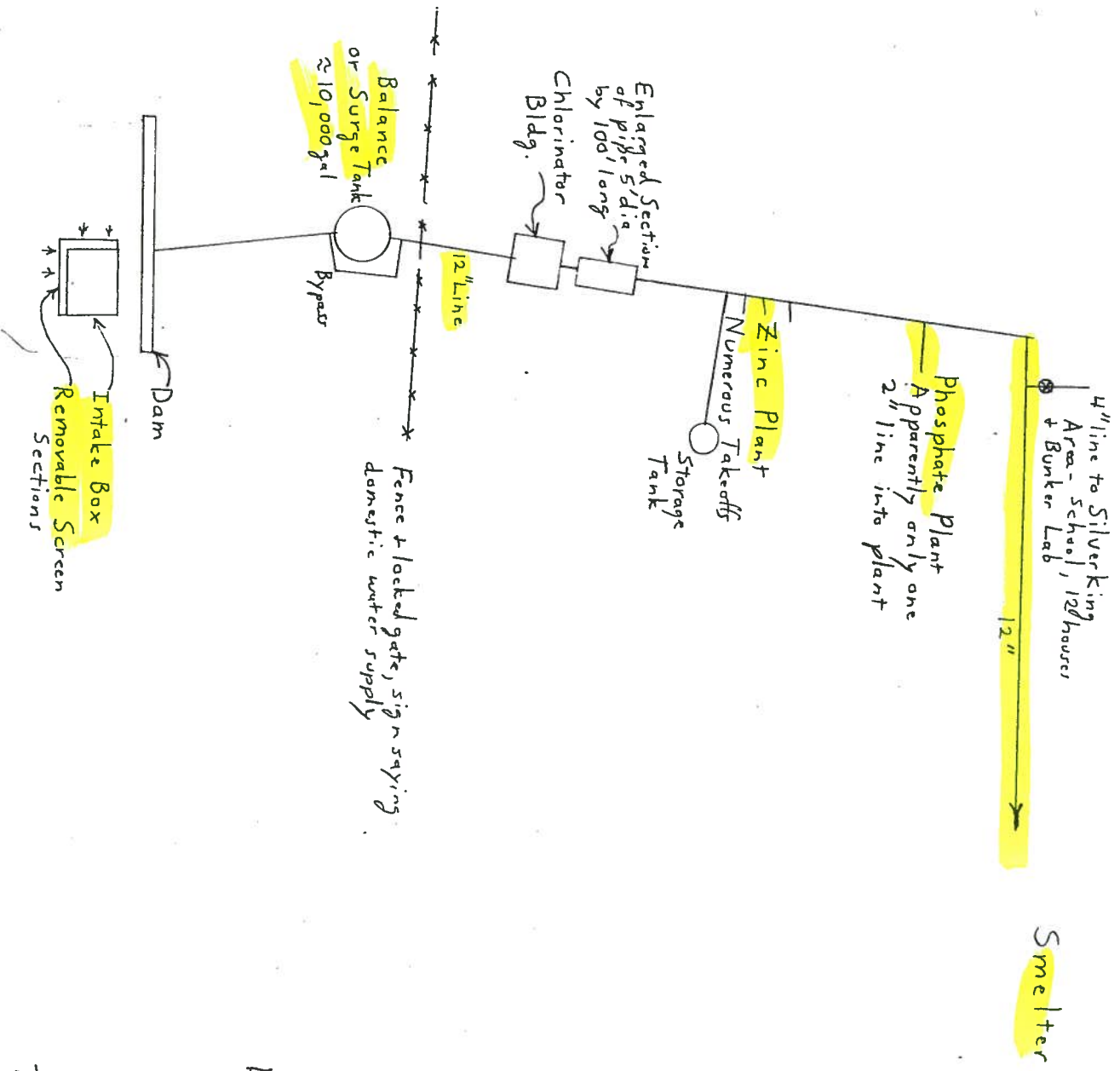
pH Control \_\_\_\_\_ Chemical Used \_\_\_\_\_

Coagulation \_\_\_\_\_ Chemicals Used \_\_\_\_\_

Flocculation \_\_\_\_\_ How Mixed \_\_\_\_\_

Govt. Creek Source

? CSC operates, maintaining + bills?



Smelter

94-4217  
94-4244

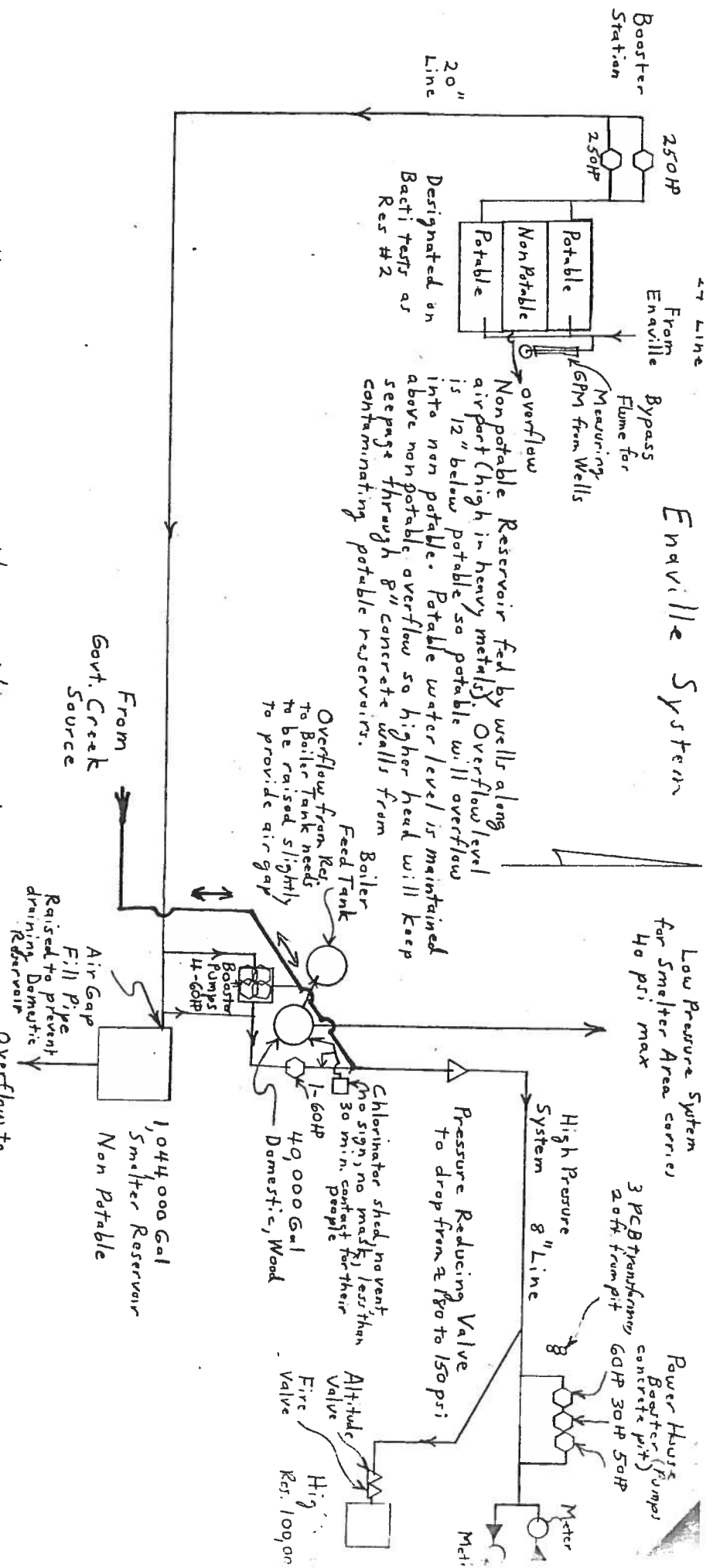
Dam Area was fenced at one time but SO<sub>2</sub> has eaten it away. Elk have used as a wallow in past. Numerous brook trout seen in pond.

Chlorinator Bldg. - Lights and vent fan were not operational. Cl<sub>2</sub> cylinder was on scale in middle of floor without any supports. There was a box outside the bldg for a Cl<sub>2</sub> mask but it was empty.

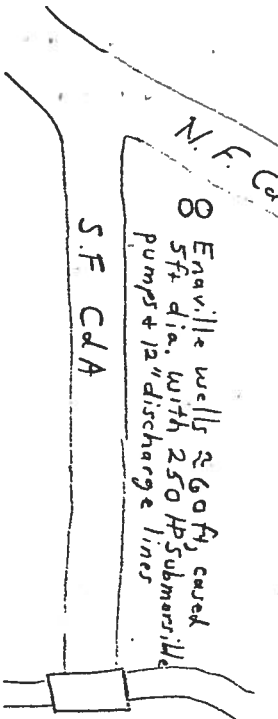
Balance Tank needs vent screen replaced, manhole cover needs to be secured to prevent access.

The company needs to finish the process of securing water rights.

# Enaville System



The Enaville System is apparently providing good quality water. Most of the raw water bacteria are in teens. Mr. Padgett said sampler indicated the wells are pumping N.F. CDA water. Much of the system is manually operated. Pumping wells is controlled by eyeballing to ensure no overflow at reservoirs and adjusting valves at wells. Booster pumps at Res. #2 are also controlled manually to balance with flow from wells. Chlorinator is manually set at constant flow. The greatest potential for problems in the system probably comes from X-cont. The system has been added to and modified for 80 years or so & they really aren't sure where all of the connections are. We discussed and they agreed in principle to an active X-cont. program to minimize the dangers, especially during the demolition phase.

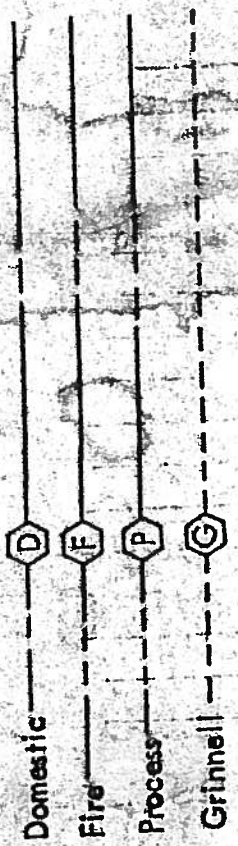


Chlorinator just  
High Pressure side (approx. same flow) no contact  
Kelllogg can't tell whether or not 15th  
7/10/12

2.

KEY

a. All water lines are coded with dash lines and letters shown thus:



b. All multiple pipe runs are shown thus:



c. Valves are shown thus:



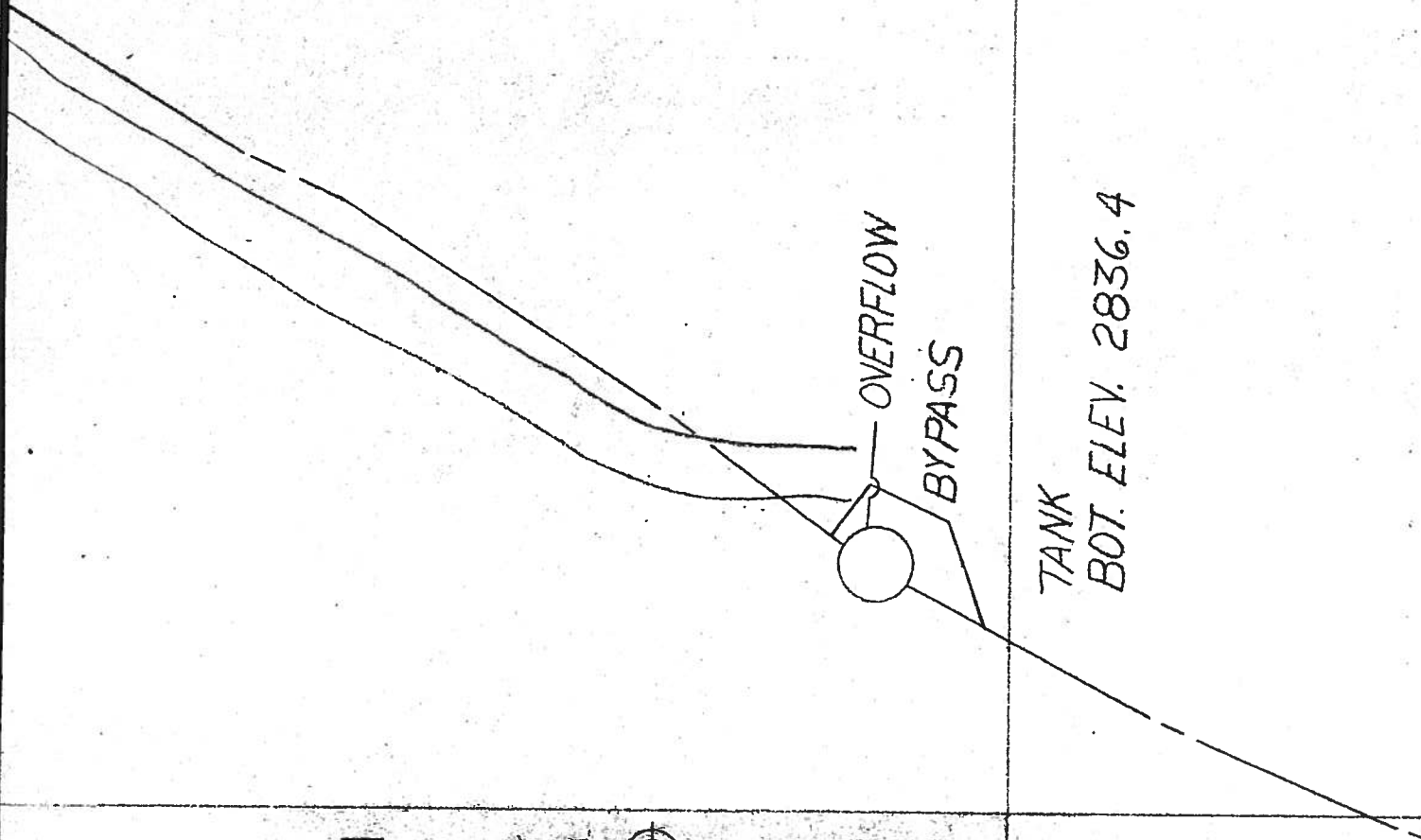
d. Fire plugs are shown thus:



e. Valve boxes are shown thus:



10. W35-54



TANK  
BOT. ELEV. 2836.4

# RECEIVED STATE OF IDAHO DEPARTMENT OF WATER RESOURCES

JUL 1 1983

## CLAIM TO A WATER RIGHT

### Department of Water Resources Northern District Office

Under the provisions of Section 42-243, Idaho Code, any person using or claiming rights to the public waters of Idaho established by diversion and application to a beneficial use must file a claim with the Department of Water Resources on or before June 30, 1983. Exempted from this filing are single family domestic uses as defined in Section 42-230(d), Idaho Code. Also exempted are rights represented by a permit, license, decree, adjudicated right, or a previously filed claim.

The filing of this claim does not confirm the water right claimed but failure to file may result in forfeiture of a water right.

Notice is hereby given that BUNKER LIMITED PARTNERSHIP  
(Name of Claimant)  
P. O. Box 29, Kellogg, Idaho Telephone No. (208) 784-1261  
(Mailing Address) (Zip Code)

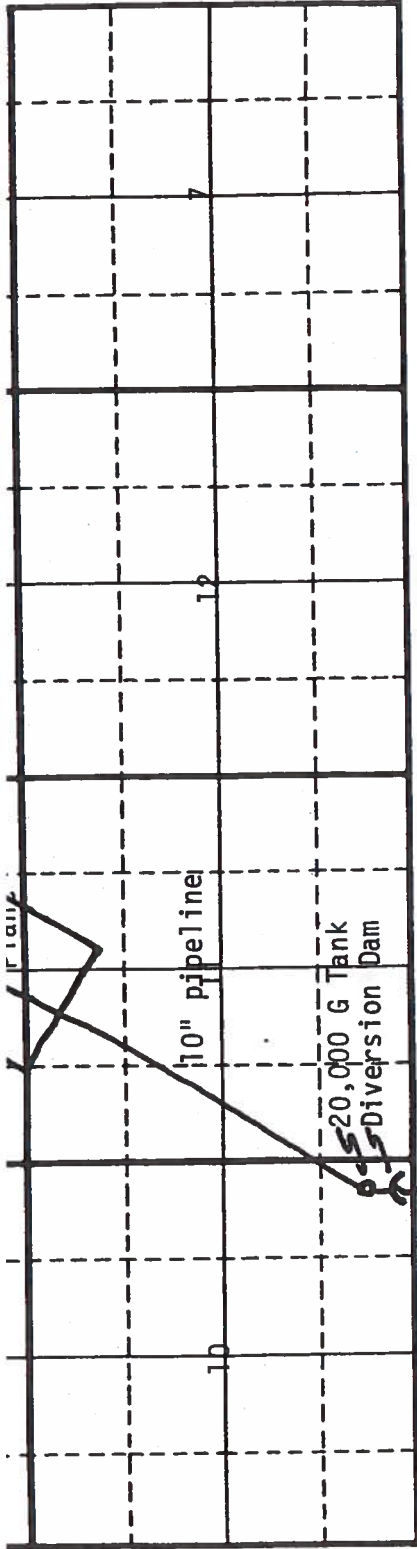
claims a right to the diversion and beneficial use of the surface or ground water. The extent and nature of said claim is as follows:

- (1) Date of priority: (When was the water first applied to a beneficial use) 1899  
A claim is not acceptable on a ground water source with a priority later than March 25, 1963 or on a surface water source with a priority later than May 20, 1971. An exception is that a claim may be filed on single family domestic use from a ground water source.
- (2) Describe the source of water: (Name of stream, lake, spring, etc., or ground water)  
Government Creek tributary to S. Fork of Coeur d'Alene River
- (3) Describe the purpose for which the water has been used and the time during the year when you have used the right claimed:

Quantity	Use	(Domestic, Irrigation, Stock, Etc.)	(Both dates inclusive)	
			(Mo., Day)	(Mo., Day)
Quantity <u>3 CFS</u>	Use <u>Industrial</u>		Period of Use From <u>1-1-</u>	To <u>12-31</u>
Quantity _____	Use _____		Period of Use From _____	To _____
Quantity _____	Use _____		Period of Use From _____	To _____
Quantity _____	Use _____		Period of Use From _____	To _____
Quantity _____	Use _____		Period of Use From _____	To _____
TOTAL QUANTITY USED.				
(4)	<u>3 CFS</u>			

(5) A) Point of diversion: (Location of point where water is diverted from its source)  
SE 1/4 SE 1/4, Sec. 10 Twp. 48N Rge. 2E B.M., County of Shoshone  
Additional points of diversion: \_\_\_\_\_

B) Describe means of diversion of water: (Pump and pipeline, well, diversion dam, reservoir, length of ditch and field, etc.). Give sizes and capacities: be as specific as possible. Describe any changes in the system and give the date of the change. Diversion dam, 8" pipeline to 20,000 gallon tank, 10" pipeline to Zinc Plant.  
(See narrative supplement). Smelter and Mine.



Map should show the location of the point of diversion and the place of use of the water by 40-acre subdivisions, section, township and range of the public land survey system.

State of Idaho )  
County of Shoshone ) ss.  
 )

Be it known that the undersigned, being duly sworn, deposes and says that he, she, they subscribed the foregoing claim to a water right, together with all attached information, and that the matters and facts therein are true to the best of the affiant's knowledge.

Sworn to before me this 24<sup>th</sup> day of June, 1983.  
Rose Mandak  
(Claimant)  
Notary Public  
Residing at Sellogg, Idaho

My commission expires 11-18-86

FOR DEPARTMENT USE ONLY		Forwarded to	Date	
Received by <u>DLB</u>	Date <u>6/28/83</u>	claimant by:		
Prelim. check by <u>DLB</u>	Date <u>6/28/83</u>			Exception filed by: <u>(28396)</u>
<del>\$20.00</del> fee received by <u>DLB</u>	Date <u>6/28/83</u>			
Published in <u>Idaho Eye News</u>	Dates <u>8/30/83</u>			

REGULATIVE

PROOF OF PUBLICATION SEP 2 1943

County of Shoshone, )

Department of Water Resources

NOTICE OF CLAIMS TO WATER RIGHTS

The following claim(s) have been filed on water right(s) created by diversion and beneficial use:

Name: TESTER, BENJAMIN WAYNE
Address: PRICHARD ROUTE, WALLACE, ID 83873
Source: EAGLE CREEK, WEST FORK trib. to EAGLE CREEK
Priority Date: June 1, 1963
Diversion Point: NESW Sec. 24 T 50N R 04E

Use: IRRIGATION (2.20 CFS).
In: NESW SWSW SESW NWSE SWSW Sec. 24 T 50N R 04E NWNE SWSW Sec. 25 T 50N R 04E FOR 120 ACRES.

94-4241
Name: HIGGINS, LEWIS R.
Address: P.O. BOX 832, OSBURN, ID 83849
Source: TWOMILE CREEK trib. to COEUR D'ALENE RIVER, SOUTH FK.

Priority Date: June 6, 1948
Diversion Point: SWNW Sec. 08 T 48N R 04E
Use: IRRIGATION (4.00 CFS)
In: SWNW Sec. 08 T 48N R 04E FOR 3 ACRES

94-4242
Name: HIGGINS, LEWIS R.
Address: P.O. BOX 832, OSBURN, ID 83849
Source: UNNAMED STREAM trib. to TWOMILE CREEK

Priority Date: June 6, 1948
Diversion Point: SWNW Sec 08 T 48N R 04E
Use: DOMESTIC (6.00 CFS).
In: SWNW Sec. 08 T 48N R 04E

94-4243
Name: HIGGINS, LEWIS R.
Address: P.O. BOX 832, OSBURN, ID 83849
Source: UNNAMED SPRING trib. to COEUR D'ALENE RIVER, SOUTH FK.

Priority Date: Jan. 1, 1901

s/Gary A. Corbeil, being first duty sworn deposes and says: THE KELLOGG EVENING NEWS, a daily newspaper of general circulation in said county, published in the City of Kellogg, in the County of Shoshone and the State of Idaho, and which has been published continuously in said county for a period of 76 weeks immediately prior to the publication of the notice hereinafter described, and that the

WATER RIGHTS
71, 4237 to 9A, 4350

of which the annexed is a true copy, was published in each regular weekly/daily issue of said newspaper, and not in a supplement thereto, for a period of 2 consecutive weeks/days, the

thereof, for a period of 2 consecutive weeks/days, the

Address: P.O. BOX 832, OSBURN, first publication thereof being in its issue dated 9-2-43

and the last publication thereof being in the issue dated 9-10-43

Subscribed and sworn to before me this 11th day of

Notary Public

94-4246
Name: ROYAL APEX SILVER
Address: 416 RIVER ST., WALLACE, ID 83873
Source: TWO MILE CREEK trib. to COEUR D'ALENE RIVER, SOUTH FK.

Priority Date: Oct. 1, 1911
Diversion Point: NESW Sec. 03 T 48N R 04E
Use: MINING (1.00 CFS).
In: SWNE Sec. 05 T 48N R 04E

94-4247
Name: HIGHLAND AURORA MINING CO.
Address: 416 RIVER ST., WALLACE, ID 83873
Source: MC FARREN GULCH trib. to COEUR D'ALENE RIVER, SOUTH FK.

94-4250
Name: HIGHLANDS AURORA MINING CO.
Address: SUITE 1-615 CENTRAL AVE. WEST, GREAT FALLS, MT 59404
Source: DEER CREEK trib. to BEAVER CREEK

Priority Date: July 12, 1900
Diversion Pt.: SWSW Sec 21 T 49N R 04E

Use: MINING (10.20 CFS)
In: SWSW Sec 21 T 49N R 04E

94-4251
Name: HIGHLANDS AURORA MINING CO.
Address: SUITE 1-615 CENTRAL AVE., WEST, GREAT FALLS, MT 59404
Source: BEAVER CREEK trib. to COEUR D'ALENE RIVER

Priority Date: Jan. 1, 1920
Division Pt.: SESW Sec 22 T 49N R 04E

Use: IRRIGATION (0.30 CFS); MINING (1.00 CFS)
In: SWSE Sec. 22 T 49N R 04E SESW Sec. 22 T 49N R 04E FOR 20 ACRES

94-4252
Name: COEUR D'ALENE MINES CORP.

Address: 416 RIVER ST., WALLACE, ID 83873
Source: MC FARREN GULCH, WEST FORK trib. to MC FARREN GULCH

Priority Date: Sept. 1, 1929
Diversion Point: NWNE Sec. 24 T 48N R 03E
Use: MINING (0.50 CFS)
In: NWNE Sec. 24 T 48N R 03E

94-4253
Name: COEUR D'ALENE MINES CORP.
Address: 416 RIVER St., WALLACE, ID 83873
Source: MC FARREN GULCH trib. to COEUR D'ALENE RIVER, SOUTH FK

Priority Date: Nov. 1, 1940
Diversion Pt.: NENE Sec. 24 T 48N R 03E
Use: INDUSTRIAL (1.50 CFS); MINING (1.50 CFS)

# STATE OF IDAHO DEPARTMENT OF WATER RESOURCES

## CLAIM TO A WATER RIGHT

Under the provisions of Section 42-243, Idaho Code, any person using or claiming rights to the public waters of Idaho established by diversion and application to a beneficial use must file a claim with the Department of Water Resources on or before June 30, 1983. Exempted from this filing are single family domestic uses as defined in Section 42-230(d), Idaho Code. Also exempted are rights represented by a permit, license, decree, adjudicated right, or a previously filed claim.

The filing of this claim does not confirm the water right claimed but failure to file may result in forfeiture of a water right.

Notice is hereby given that BUNKER LIMITED PARTNERSHIP  
(Name of Claimant)  
P. O. Box 29, Kellogg, Idaho 83837 Telephone No. (208) 784-1261  
(Mailing Address) (Zip Code)

claims a right to the diversion and beneficial use of the surface or ground water. The extent and nature of said claim is as follows:

(1) Date of priority: (When was the water first applied to a beneficial use) 1899  
A claim is not acceptable on a ground water source with a priority later than March 25, 1963 or on a surface water source with a priority later than May 20, 1971. An exception is that a claim may be filed on single family domestic use from a ground water source.

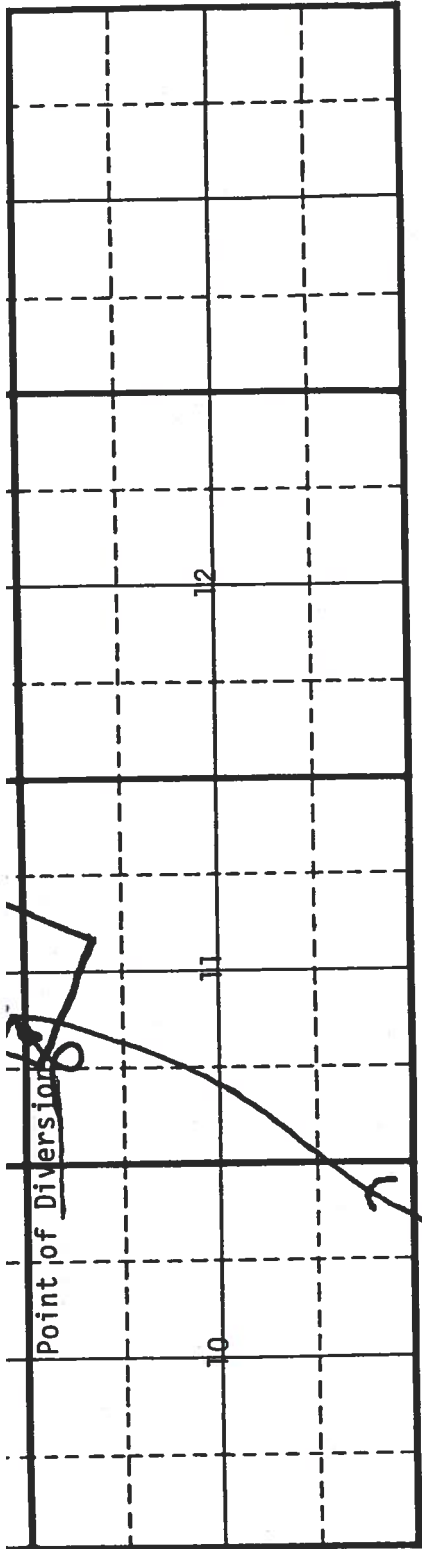
(2) Describe the source of water: (Name of stream, lake, spring, etc., or ground water)  
Government Creek tributary to S. Fork of Coeur d'Alene River

(3) Describe the purpose for which the water has been used and the time during the year when you have used the right claimed:

Quantity	(cfs, gpd, AFA)	Use	(Domestic, Irrigation, Stock, Etc.)	(Both dates inclusive)	
				(Mo., Day)	(Mo., Day)
7 CFS		Industrial		1-1-	To 12-31
Quantity		Use		Period of Use From	To
Quantity		Use		Period of Use From	To
Quantity		Use		Period of Use From	To
Quantity		Use		Period of Use From	To
Quantity		Use		Period of Use From	To
TOTAL QUANTITY USED.					
7 CFS					
(cfs, gpd, AFA)					

(5) A) Point of diversion: (Location of point where water is diverted from its source)  
SE 1/4 SW 2 Twp. 48N Rge. 2E B.M., County of Shoshone  
Additional points of diversion:

B) Describe means of diversion of water: (Pump and pipeline, well, diversion dam, reservoir, length of ditch and field, etc.). Give sizes and capacities: be as specific as possible. Describe any changes in the system and give the date of the change. Diversion Gate in 6' x 6' concrete lined ditch diverting stream flow into a reservoir measuring 125' x 125' and holding 17 million gallons.



Map should show the location of the point of diversion and the place of use of the water by 40-acre subdivisions, section, township and range of the public land survey system.

State of Idaho )  
 ) ss.  
 County of Shoshone )

Be it known that the undersigned, being duly sworn, deposes and says that he, she, they subscribed the foregoing claim to a water right, together with all attached information, and that the matters and facts therein are true to the best of the affiant's knowledge.

Sworn to before me this 24<sup>th</sup> day of June, 1983.  
 (Claimant)  
Rae Mandak

Notary Public  
 Residing at Kellogg, Idaho

My commission expires 11-18-86

FOR DEPARTMENT USE ONLY

Received by	<u>RLB</u>	Date	<u>6/28/83</u>	Exception filed by:		Forwarded to		Date	
Prelim. check by	<u>RLB</u>	Date	<u>6/28/83</u>			claimant by:			
\$20.00 fee received by	<u>RLB</u>	Date	<u>6/28/83</u>	<u>(28396)</u>					
Published in	<u>Kellogg Evening News</u>								
Dates	<u>7-20-83</u>								

# PROOF OF PUBLICATION

County of Shoshone, )  
)  
STATE OF IDAHO )

s/Gary A. Corbeil, being first duly sworn deposes and says:  
THE KELLOGG EVENING NEWS, a daily newspaper of general circulation in said county, published in the City of Kellogg, in the County of Shoshone and the State of Idaho, and which has been published continuously in said county for a period of 78 weeks immediately prior to the publication of the notice hereinafter described, and that the \_\_\_\_\_

WATER RIGHTS CLAIM  
STATE OF IDAHO

## NOTICE OF CLAIMS TO WATER RIGHTS

The following claim(s) have been filed on water right(s) created by diversion and beneficial use:

Name: BUNKER LIMITED PART-  
NERSHIP  
Address: P.O. Box 29, KELLOGG,  
ID 83837  
Source: GROUNDWATER  
Priority Date: Jan. 1, 1883  
Diversion Point: SWNW Sec. 06 T  
48N R. 03E SENE NENE NWNE Sec.  
01 T 48N R 02E  
Use: INDUSTRIAL (3.34 CFS);  
MINING (3.34 CFS).  
In: SENE Sec. 01 T 48N R 02E SESW  
NENE Sec. 02 T 48N R 02E

Name: BUNKER LIMITED PART-  
NERSHIP  
Address: P.O. BOX 29, KELLOGG,  
ID 83837  
Source: GOVERNMENT CREEK  
trib. to COEUR D'ALENE RIVER,  
SOUTH FK.  
Priority Date: Jan. 1, 1899  
Diversion Point: SESW Sec. 02 T 48N  
R 02E  
Use: INDUSTRIAL (7.00 CFS).  
In: NENE SESW Sec. 02 T 48N R  
02E.

Name: BUNKER LIMITED PART-  
NERSHIP  
Address: P.O. Box 29, KELLOGG,  
ID 83837  
Source: MILO CREEK trib to  
COEUR D'Alene River, South FK.  
Priority Date: Jan. 1, 1885  
Diversion Point: SWNE Sec. 13 T  
48N R 02E  
Use: INDUSTRIAL (0.30 CFS);  
MINING (0.30 CFS)

of which the annexed is a true copy, was published in each regular weekly/daily issue of said newspaper, and not in a supplement thereto, for a period of 2 consecutive weeks/days, the first publication thereof being in its issue dated 7.20.83

and the last publication thereof being in the issue dated

7.27.83  
Lucy A. Child

Subscribed and sworn to before me this 28th day of July, 1983.

Wendell R. Brainerd  
Notary Public

94-4222  
Name: MAXWELL, THOMAS E.  
Address: STAR RT. BOX 476,  
MULLAN, ID 83846  
Source: SPRINGS trib. to SINKS  
Priority Date: Jan. 1, 1882

110.00  
1/4

a copy of this notice is posted, and more definitely described as follows.

About 1/4 mile north of Silver King mine and about one mile south of the south fork of the Coeur d'Alene river.

3rd: The purpose for which said water is intended to be used is for concentrating and milling. The place of intended use is near mouth of Government gulch and at Empire tunnel.

4th: It is intended to divert said water by means of ditch & flume. The general course of the proposed canal is northerly. The length of the proposed canal is about one mile.

5th: It is intended to have the works for diversion of said water as aforesaid completed within 3 years.

Witness my hand at Government Gulch, this 12th day of June, 1899.

Witness - Harry Johnson. David Rees - Claimant.

\*\*\*\*\*

MICROFILMED

Affidavit of David Rees as to statements contained in said notice and of posting of the same, sworn to June 19, 1899 before J.E. Gyde, a Notary Public, in and for Shoshone Co., State of Idaho. (Seal).

\*\*\*\*\*

Recorded June 20, 1899 in Book "M" of Misc., at page 396 thereof, records of Shoshone Co., Idaho. Horace M. Davenport, County Recorder.

\*\*\*\*\*

MINING DEED.

David Rees, Grantor.  
-to-  
Empire State-Idaho Mining  
& Developing Company, a  
corporation, Grantee.

Duly acknowledged Oct. 7, 1899 before J. E. Gyde, a  
Notary Public, Shoshone County, Idaho. (Seal).

"Grant, bargain, sell and convey".

DESCRIPTION.

Dated, October 7th, 1899.  
Recorded, Oct. 11th, 1899.  
Deed Book "14" PG 633.  
Consideration \$1.00.

By	From	To	Date	Interest	Rec'd	Book	Page
By	David Rees	E.S.I.M&D Co	Oct 7/99	All	Oct 11/99	14 Deeds	633.
By	E.S.I.M&D Co	Federal M&S Co	Sept 1/03	All	Jan 21/04	25 Deeds	564.
By	Federal M&S Co	B H & S M&C Co	Apr 29/10	All	Apr 29/10	40 Deeds	387.

(#)

TRANSFERS

Conveys all Water Rights in Milo Creek and Government Gulch.

(#)

**MICROFILMED**

WATER RIGHT  
 100 Cubic feet per second of the waters of  
 Government Creek, 1/4 mile north of the S11-  
 ver King Mine.

CLAIM , MINING DISTRICT,  
 STATE OF COUNTY,

Form 707 (7-11) - State & Federal Reg. 11,117  
 File No.

LOCATION	Located by David Rees		Date June 12, 1899
DIMENSIONS	Recorded at Wallace, Idaho	Date June 20, 1899	By David Rees Book "M" Misc. Page 396
BOUNDARIES	By Locators ft x ft. x ft. =	ft. =	Acres
SURVEY	NORTH SOUTH EAST WEST		
PATENT	Date of Appn.	Date of Receiver's Receipt	No.
ANNUAL LABOR	Date of Patent	Recorded at	Date Book Page
	Year	Date	By Affdvt. by Rec'd Book Page
TRANSFERS	From	To	Interest
	David Rees	E.S.I. M&D Co	Oct 7/99
	E.S.I. M&D Co	Federal M&S Co	Sept 1/03
	Federal M&S Co	B H & S M&C Co	Apr 29/10
(#)			Oct 11/99 14 Deeds 633. Jan 21/04 25 Deeds 564. Apr 29/10 40 Deeds 387.

RECEIVED  
FEB 10 2016

DEPT. OF WATER RESOURCES

RECEIVED  
FEB 04 2016

DEPT. OF ENVIRONMENTAL QUALITY  
WASTE PROGRAM

Information to provide a time-line  
for the Buaker Hill Company to document  
its history. Massive amounts of water  
were used to produce its products  
throughout its history. Much of the  
water used came from the Government  
Culch source.

If more information is needed please  
let me know.

Jerry Cobb  
J. Cobb  
2/30/16

94-4217

94-4244

Taken from the  
Human Health Risk  
Assessment Document  
at the Bunker Hill Superfund  
Site

## 2.0 SITE HISTORY

A chronology of events for the Bunker Hill site is presented here. This chronology is provided as a perspective on present and historical activities leading to the preparation of an endangerment assessment for the site.

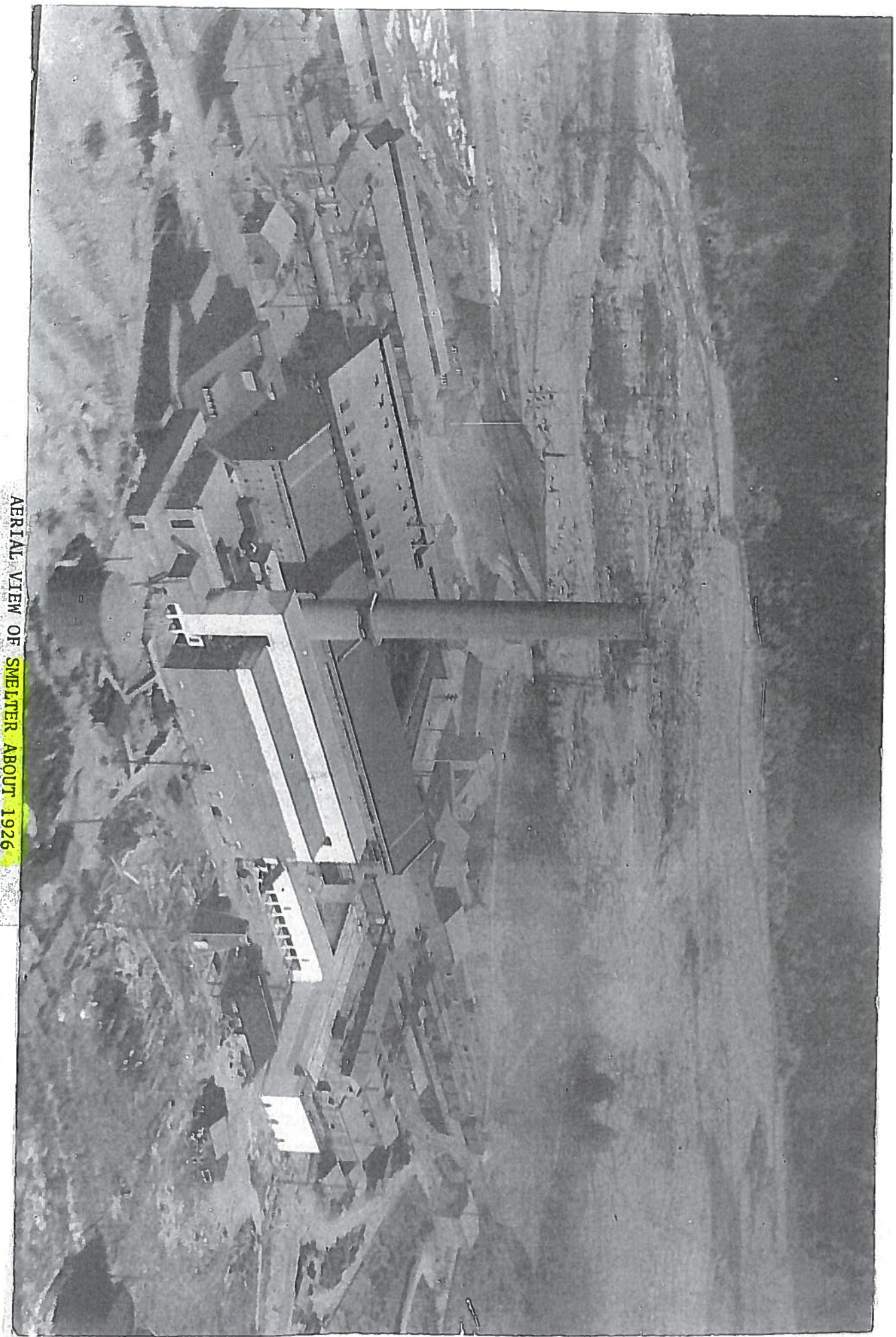
### Chronology of Events (modified from WCC 1986)

- 1886 - First mill built which processed 100 tons per day, June 20.
- 1887 - Bunker Hill and Sullivan Mining Company incorporated.
- 1912 - Present mill constructed.
- 1916 - Lead smelter construction began, May 1.
- 1917 - First blast furnace at lead smelter went on line, July 5.
- 1928 - Electrolytic zinc plant began production, November 6.
- 1928 - Bunker Hill tailings pond constructed at location of existing Central Impoundment Area (CIA).
- 1937 - Zinc plant enlarged to 120 tons per day.
- 1938 - Froth flotation installed at mill.
- 1941-1947 - Continual improvements to increase production.
- 1948 - Zinc plant enlarged to 160 tons per day.
- 1954 - First sulfuric acid plant added to zinc plant.
- 1956 - Bunker Hill and Sullivan Mining Company changed name to Bunker Hill Company.
- 1960 - Phosphoric acid and fertilizer plant constructed.
- 1961 - Cyclone separators installed in mill.
- 1963 - Additional unit added to zinc plant.
- 1965 - CIA started receiving mine drainage water.
- 1966 - Second sulfuric acid plant added to zinc plant.
- 1967 - Zinc plant capacity increased to 310 tons per day.
- 1968 - Sulfuric acid plant added to smelter.
- Smelter complex purchased by Gulf Resources and Chemical Corporation (GRC), June 1.
- 1972 - Blast furnace length extended to accommodate increase in productivity.

94-4217  
94-4244

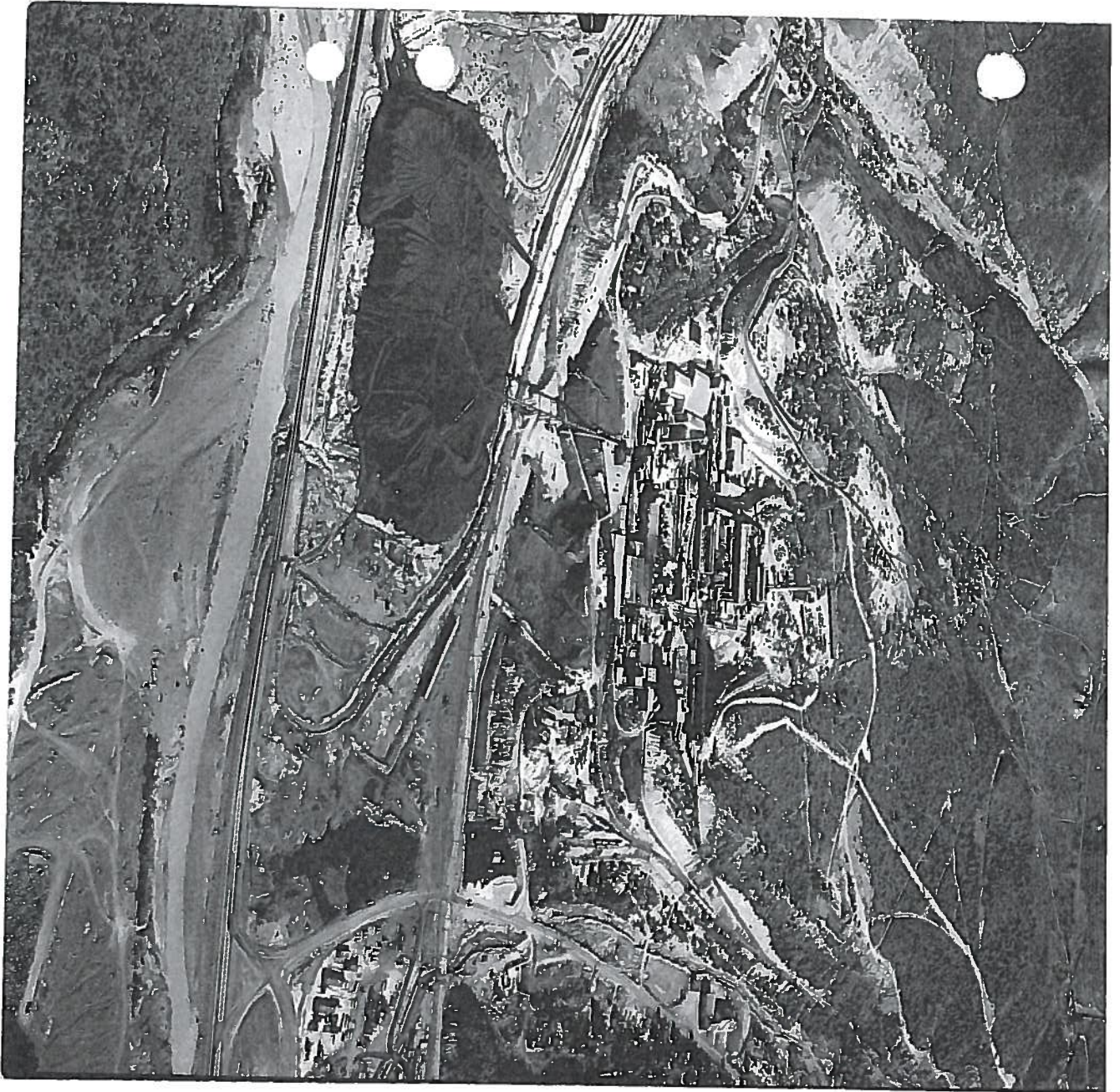
- 1973 - Severe fire in main baghouse.
- Study of lead smelter stack and fugitive emissions conducted by GRC.
- 1974 - Dividing dike constructed across CIA to provide separate area for gypsum discharge.
- Zinc plant and smelter began discharging into CIA.
- Baghouse in lead smelter repaired; extreme atmospheric emissions for a period of approximately six months associated with baghouse malfunction.
- Symptoms of lead poisoning in local children reported and elevated blood levels found by area health authorities, IDHW, PDHD, and CDC.
- Central Treatment Plant (CTP) began operation.
- 1975 - Follow-up lead health study conducted by IDHW, PDHD, and CDC.
- Scrubbers installed at Lurgi sizing building, fuming plant granulating stack, and reverb and electric furnace.
- 1976 - 610-foot stack added to zinc plant.
- 1977 - 715-foot stack added to lead smelter.
- 1981 - Complex operation closed down by GRC.
- 1982 - Some solid waste shipped offsite by GRC, early 1982 through October 1982.
- Waste disposal inspection by U.S. EPA.
- Smelter complex purchased by the Bunker Limited Partnership (BLP), November 1.
- 1983 - Crescent Mine (outside the complex) and Crescent Circuit of mill (within the complex) reopened.
- Bunker Hill Site added to Superfund National Priority List, September 8.
- Third lead health/environmental study conducted by CDC, PDHD, IDHW and U.S. EPA.
- 1984 - U.S. EPA proposed a Federal Implementation Plan (FIP) for lead.
- March - U.S. EPA air inspection for FIP refinement.
- 1985 - May - Silver Valley Superfund Advisory Task Force appointed and first meeting held.
- July - U.S. EPA wastewater discharge permit (NPDES renewal inspection).
- Aerial photography of project area performed by U.S. EPA.

- BLP announced replaceable equipment from smelter complex will be salvaged for resale.
- September - 100th anniversary of the discovery of the Bunker Hill Mine.
- October - BLP auction of replaceable equipment.
- November - EPA/IDHW hazardous waste inspection of smelter records and property.
- 1986 - January - Crescent Mine (outside the complex) and mill workers placed on two weeks on, two weeks off alternating work schedule impacting the Crescent Circuit Mill operations within the site.
- March - Draft Endangerment Assessment submitted to U.S. EPA by TerraGraphics, Inc. for IDHW.
- Crescent Mine (outside the complex) and the Crescent Circuit of the Bunker Hill Mill (within the complex) shut down due to depressed silver prices, May 30.
- June - U.S. EPA/IDHW removal of lead-contaminated soils in public areas where children are most likely to play in Kellogg, Smelterville, and Wardner, May 27 through June 24.
- July - U.S. EPA/IDHW/Panhandle District Health Department (PDHD) CDC-CEH (Centers for Disease Control - Center for Environmental Health) Childhood Blood Lead and Environmental Status Report submitted to U.S. EPA.
- On-going BLP smelter complex salvage activities continue.
- Woodward Clyde Consultants (WCC) Interim Site Characterization Report submitted to U.S. EPA.
- 1987 - April - GRC's Proposed Bunker Hill Site Remedial Investigation/Feasibility Study Work Plan for Unpopulated Areas submitted to U.S. EPA by Tetra Tech, Inc./Morrison-Knudsen Engineers, Inc.
- 1988 - September - Draft Human Health Risk Assessment Protocol for the Populated Areas of the Bunker Hill Superfund Site submitted to U.S. EPA by Jacobs Engineering Group, ICAIR Life Systems and TerraGraphics.
- Blood lead survey conducted by CDC, IDHW and PDHD.
- 1989 - February - Engineering Evaluation for Phased Cleanup - 1989, submitted to IDHW by CH<sub>2</sub>M Hill.
- June - Residential areas soil removal as a phased cleanup conducted by U.S. EPA and IDHW.



AERIAL VIEW OF SMELTER ABOUT 1926

*Bunker Hill Lead Smelter*



Bunker Hill Lead  
Same Area

8/14/1959

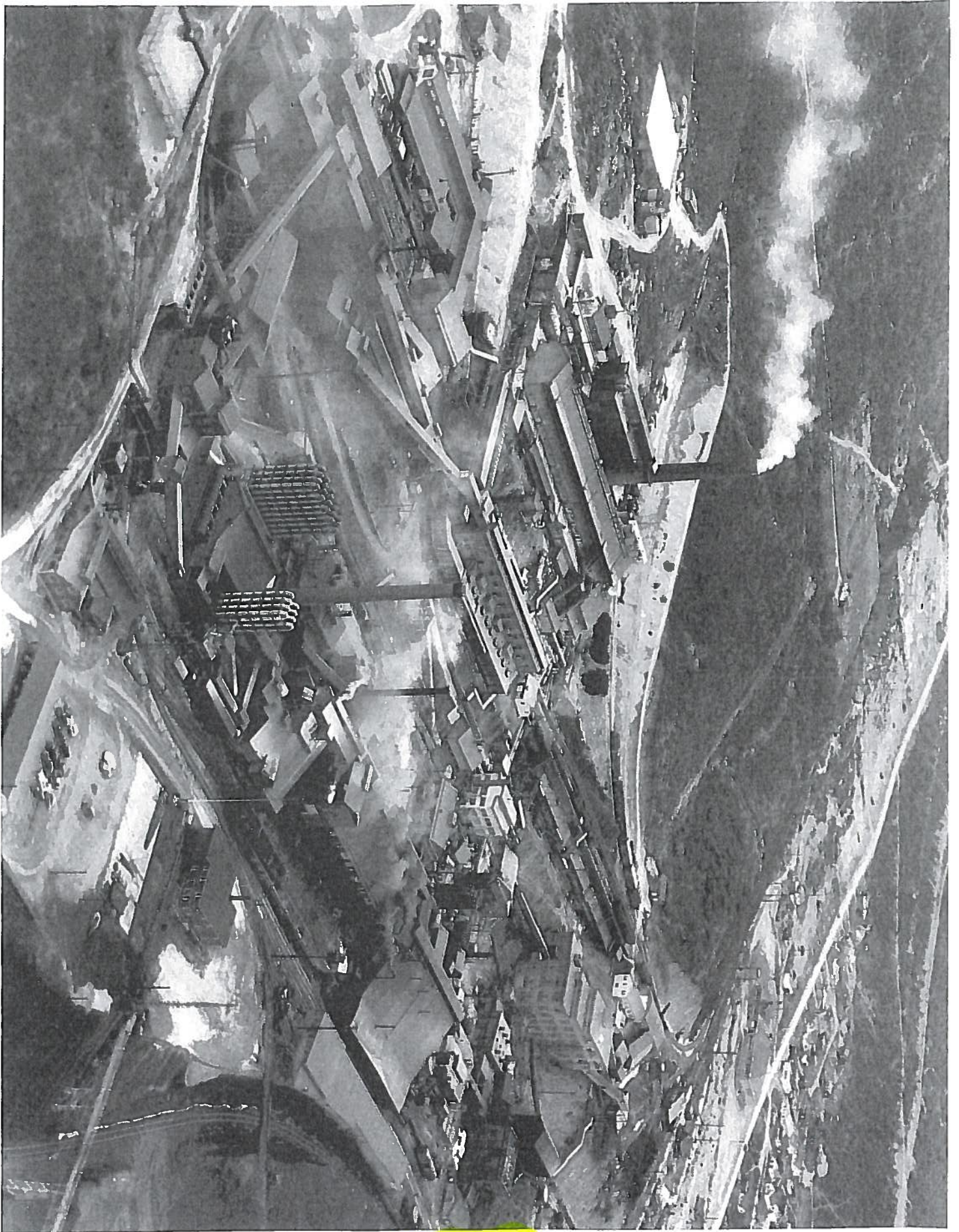


9-14-66

PROOF FOR FILE USE

Bunke Hill Lead Smelter

Bunker Hill Lead Smelter



7-25-68

Zinc Plant  
Georgetown Gu Fk



FEL086

9-23-59-02

# “UNCLE BUNKER”

*Memories in Words and Pictures*

Ray Chapman



94-4217  
94-4294

## INTRODUCTION

"Uncle Bunker" was a nickname, or moniker, for a Kellogg company that was Idaho's largest employer through much of the Twentieth Century. This was not a name that everyone used to speak about The Bunker Hill Company. Nevertheless, it was a name used frequently after World War II - sometimes with a favorable connotation, other times with a less than favorable intention.

"Uncle Bunker," like "Uncle Sam" on a larger scale, was a collection of people, once reaching a number totaling nearly 2700 in the mid-1950s. Without people there wouldn't have been an "Uncle Bunker."

Many types of people worked at Bunker Hill. For much of its history most of these people worked underground in a variety of jobs. Some mined, some placed timbers, operated pumps or worked on hoists. Others operated ore trains taking the ore to the surface. Then there were those who were supervisors and still others with engineering or geology degrees who directed the type of mining employed and who supervised the search for more ore.

On the surface there were even more people, especially after 1917 when the first surface smelting plant went into operation. The mills also were the location of numerous operators of the equipment used to concentrate the mine ores. The machine shops, there were three of them, were staffed with craftsmen capable of performing any type of work



ings (on right) - 1891

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Employing about 2100 people in the Kellogg area, the annual Bunker Hill payroll was nearly \$50 million in 1980. Property taxes paid to county, city, school and other taxing districts totaled about \$1.5 million yearly, thus creating hundreds of additional jobs in Shoshone County. The Federal and State governments also were ample recipients of Bunker tax monies when a company profit was obtained, which was most of the time until later years.

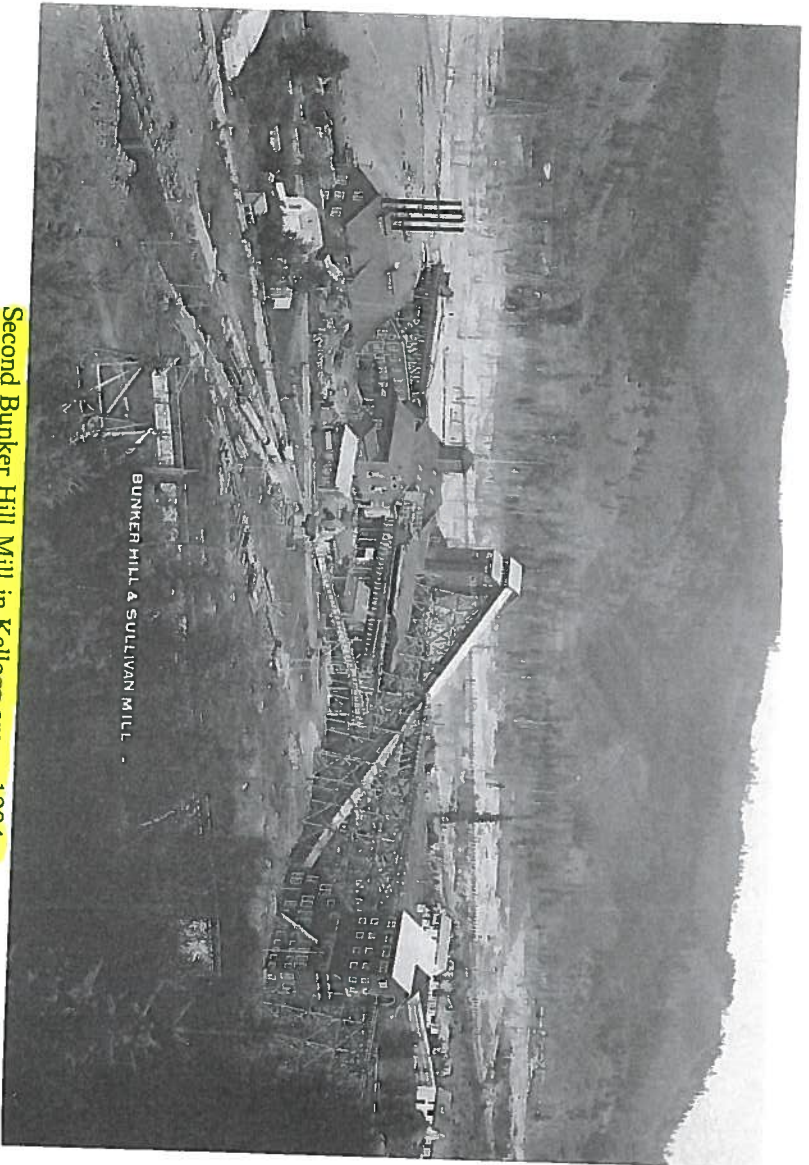
"Uncle Bunker" was also the largest rate payer to the Union Pacific Railroad, with the 1980 freight bill, for hauling in concentrates and moving out finished metal products, amounting to \$13 million. This meant more jobs.

In addition, nearly \$2 million annually was paid to Washington Water Power Company for natural gas and electricity, that company's largest customer, providing for still more local jobs.

One could go on and on listing items which made "Uncle Bunker" a valuable asset, so read on.



Wreckage of Bunker Hill Mill blown up by union miners from Burke, Wallace & Mullan area -1899



Second Bunker Hill Mill in Kellogg area - 1904

There were, nevertheless, many instances when the nickname could have been applicable in a favorable light. In early times, miners, and the communities they lived in, were greatly dependent upon the mining companies.

Thus, Bunker Hill purchased and operated the first electric power plant in Wardner, providing the residents with their first electric lights. The company continued to provide electric power to both Wardner and Kellogg until 1956.

For many years the company also provided the water system for both communities, and this dependence on "Uncle Bunker" for domestic water lasted until after World War II.

In 1894 the company constructed the first hospital in the town of Wardner. It built a second hospital, this time in Kellogg, in 1908, and it was also given the name of "Wardner Hospital." The area's third hospital, currently known as Shoshone Medical Center, was constructed in 1957-58 on ground donated by "Uncle Bunker" with the -water system also a gift of the Company.

The first school house in the area was constructed by the Company and deeded to the community. The second one, erected in Kellogg on McKinley Avenue, and later known as the Lincoln School, was built on company land which was leased to the school district for 100 years. Later this leased property was given outright to the school

One of the most generous of early day Bunker Hill contributions to the community was the construction in 1910 of the Kellogg Y.M.C.A. This fine facility was to operate for 70 years with "Uncle Bunker" providing from 25 to 50 percent of its operating costs throughout its many years of community service. The company also provided payroll

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Mine through its Hecla Mine surface plant in Burke, and Bunker Hill would manage a new zinc metallurgical plant to be constructed close to the Lead Smelter. By 1925 Bunker Hill's electrolytic zinc recovery research had been satisfactorily tested in pilot plant work and in 1926 Sullivan Mining Company commenced construction of what was to become known as the Electrolytic Zinc Plant

This new metallurgical operation started production in November of 1928, producing a "Bunker Hill" brand zinc metal of 99.99+% purity, a first achievement of such purity in the world. The development of this super purity zinc metal led the zinc industry to classify the metal as "Special High Grade." Other grades of zinc, being of different purities, were classed as "High Grade" and "Prime Western." Each grade of zinc had different applications in manufacturing products utilizing zinc metal. Of interest here, the production of Special High Grade zinc at the Sullivan Mining Company Zinc Plant led to the creation of the zinc die casting business which was to become one of the largest consumers of this metal in the U.S.

Also as a side line, Mr. Woolf, who managed the Zinc Plant for nearly 30 years, retiring in 1960 as a Bunker Hill vice president, lived to be 100 years old. This amazing longevity was achieved despite living and working in what many thought to be a hostile atmospheric environment for much of his life. His office was adjacent to the plant, which he toured daily, and he raised his family in a home constructed across the street from his office within the plant complex.

Turning back to 1920, Bunker Hill purchased a 50% interest in the Northwest Lead Company of Seattle. This company turned out fabricated lead products such as pipes of

various sizes from lead producer In 19 property in silver mine 1942 due wasn't reo 1200 level The 17,000-foot progressiv escapeway the crossc minerals towered u Retu zinc furni zinc that oxide rec products- against p

day strike. During this long 1960 work stoppage, a Phosphoric Acid Plant, a previously planned project, was constructed by an outside contractor but not placed in operation until early 1961. This facility took some of the sulfuric acid produced at the Zinc Plant, mixed it with purchased phosphate rock, to produce phosphoric acid (P2O5), with gypsum as a waste product.

Phosphoric acid was marketed to fertilizer producers such as Stauffer Chemical Company. The gypsum was stockpiled behind nearby earthen dams in the event some future use could be found for this waste product.

Stauffer then proposed, in 1965, to build a pelleted ammonium-phosphate fertilizer facility beside the Phos Plant and thus become a 50-50 partner with Bunker Hill in this new venture. This arrangement was consummated and operated thusly until the Bunker Hill closure.

When Bunker Hill decided to expand the Zinc Plant in 1966, a second sulfuric acid unit was constructed and placed in operation. At the same time a new central research and analytical lab was built to consolidate and replace separate labs operated previously at the Mine, Lead Smelter and Zinc Plant.

Meanwhile, the biggest change in Bunker Hill's 81-year history took place in 1968 when the Company's 7,700 shareholders were replaced with one owner--Gulf Resources & Chemical Corporation of Houston, Texas.

It came about somewhat in this manner. Robert H. Allen, President of Gulf Resources, a company with one-tenth the 1967 sales of Bunker Hill, convinced New York bankers that his company could manage Bunker Hill more efficiently than its

acid Plant, a previously not placed in operation at the Zinc Plant, sulfuric acid (P2O5), with as Stauffer Chemicals in the event some m-phosphate fertilizer with Bunker Hill in this until the Bunker a second sulfuric acid new central research s operated previously took place in 1968 mer--Gulf Resources 2, President of Gulf Hill, convinced New e efficiently than its

present management! He thus was able to borrow nearly \$40 million for a take over attempt!

Gulf at this time was a company engaged in sulfur mining in Mexico. It had just acquired a company producing lithium in North Carolina, and was also a controlling joint-venture partner in a plan to capture various chemicals through solar evaporation of salt water from the Great Salt Lake.

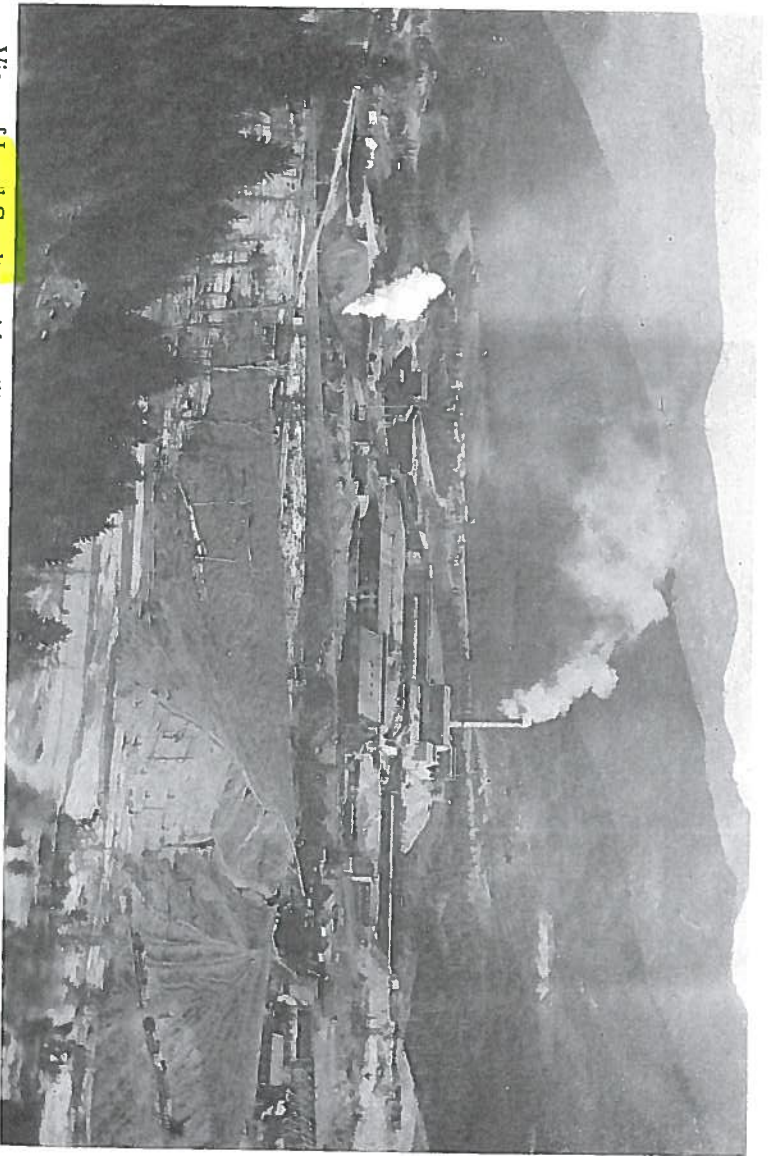
Allen's aim, it was soon learned, was to create a large natural resource based corporation and Bunker Hill's lead-silver-zinc operations became his next target to achieve this goal.

Thus, with his borrowed money assured, Allen made a Tender Offer to purchase 700,000 shares of Bunker Hill common stock for \$56 a share. The stock was then selling on the New York Stock Exchange for \$44/share. A tidy profit potential for Bunker shareholders.

The Directors of Bunker Hill, not wishing to be taken over in this fashion by a small company, immediately set out to find a merger partner that would raise the bid price of Bunker Hill stock above Allen's offer of \$56.

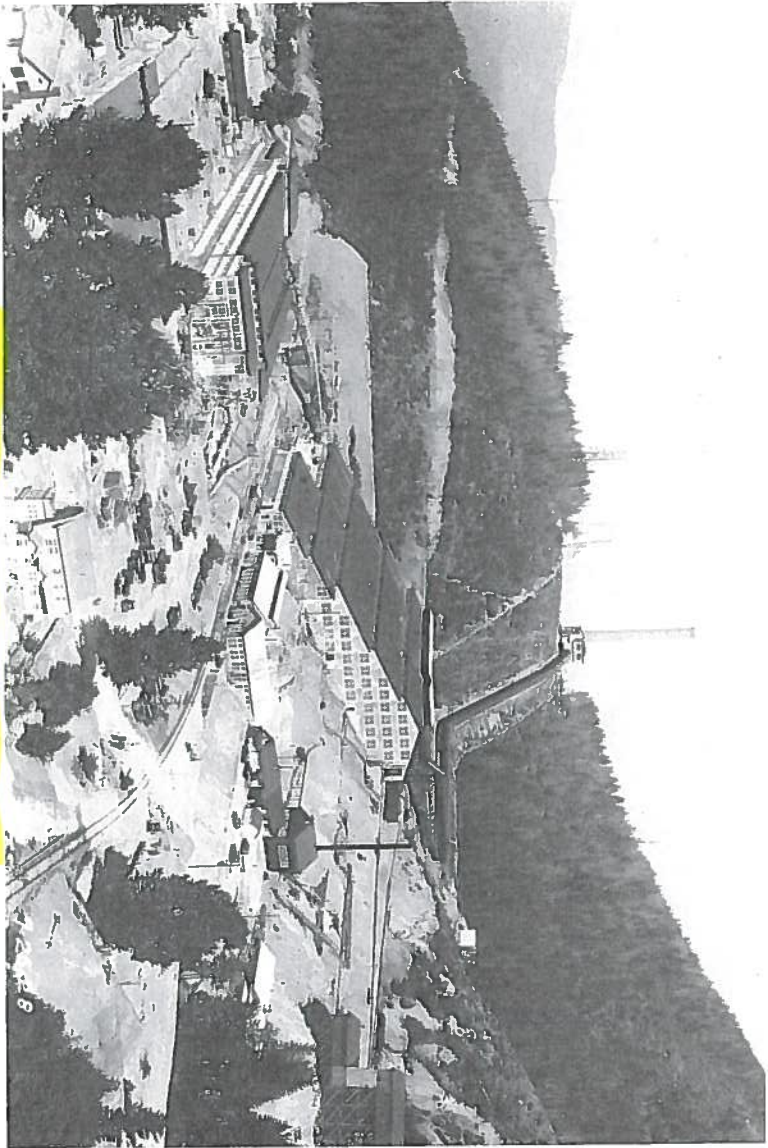
The first deal struck was with Homestake Mining Company of San Francisco. Homestake was basically a gold mining company, started at Lead, South Dakota, and operating the nation's largest underground gold mine. Homestake also had extensive other investments at the time of the proposed merger.

This merger proposal, however, was unsuccessful in that it failed to interest the investing public sufficiently to move the price of Bunker Hill stock above Allen's

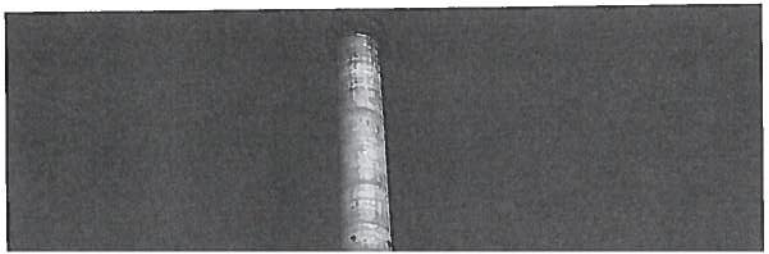


View of Lead Smelter with tailings pile from Last Chance Mine's Sweeny Mill in foreground.





Electrolytic Zinc Plant under construction - 1928



**BUNKER HILL MINE PRODUCTION**

<b>YEAR</b>	<b>TONS</b>	<b>% LEAD</b>	<b>% ZINC</b>	<b>oz SILVER Per TON</b>
1887	26,855	15.20	1.80	8.70
1888	33,907	15.06	1.84	8.55
1889	37,784	16.26	2.32	6.23
1890	22,041	13.50	2.18	6.87
1891	17,092	11.28	2.67	5.66
1892	52,114	12.26	2.45	6.51
1893	65,481	9.84	2.49	5.40
1894	147,506	12.76	2.27	6.47
1895	127,860	12.12	1.51	5.94
1896	164,182	11.83	1.43	5.69
1897	185,312	10.77	1.37	5.66
1898	203,678	11.23	1.25	5.33
1899	143,398	11.46	1.25	5.44
1900	204,910	11.88	1.78	6.57
1901	274,170	11.20	2.03	6.14
1902	276,446	12.21	2.26	5.45
1903	268,455	11.13	2.20	4.87
1904	317,721	11.62	2.35	5.30
1905	337,043	12.01	2.37	5.37



it - 1966

**BUNKER HILL MINE PRODUCTION**

<b>YEAR</b>	<b>TONS</b>	<b>% LEAD</b>	<b>% ZINC</b>	<b>oz SILVER Per TON</b>
1906	349,753	13.02	2.44	6.11
1907	313,040	13.46	2.68	6.18
1908	358,190	13.94	3.11	6.13
1909	341,420	13.99	3.37	6.02
1910	425,140	12.77	2.91	5.55
1911	464,750	13.06	3.06	5.70
1912	427,740	12.82	2.91	5.55
1913	436,060	12.92	2.86	5.80
1914	440,819	12.53	2.62	5.76
1915	455,205	12.42	2.52	5.79
1916	475,784	12.02	2.40	5.70
1917	493,030	12.27	2.42	6.00
1918	389,027	12.40	2.71	5.95
1919	393,698	12.63	2.67	5.90
1920	409,986	12.39	2.67	5.66
1921	426,530	12.20	2.70	5.42
1922	421,532	11.98	2.71	5.26
1923	425,817	12.36	2.66	5.29
1924	422,907	12.46	2.72	5.27
1925	453,412	12.03	2.99	5.15

**BUNKER HILL MINE PRODUCTION**

<b>YEAR</b>	<b>TONS</b>	<b>% LEAD</b>	<b>% ZINC</b>	<b>oz SILVER Per TON</b>
1926	459,761	11.37	3.32	4.96
1927	456,134	11.25	3.42	4.93
1928	452,345	10.73	4.09	4.80
1929	453,603	10.03	4.70	4.54
1930	455,475	9.44	4.33	4.25
1931	460,366	10.32	5.00	4.84
1932	429,880	10.08	5.08	4.52
1933	458,565	9.98	5.87	4.52
1934	362,388	9.11	6.29	4.07
1935	353,259	8.87	6.79	3.80
1936	347,603	8.52	6.90	3.65
1937	386,576	8.94	7.11	4.00
1938	347,315	9.35	6.37	4.16
1939	342,623	10.43	6.72	5.36
1940	383,324	10.85	6.93	5.89
1941	384,940	10.99	6.55	5.63
1942	408,549	10.42	6.65	5.65
1943	360,908	10.77	6.13	6.20
1944	251,062	8.63	7.51	5.24
1945	151,256	10.18	4.97	6.26

**BUNKER HILL MINE PRODUCTION**

<b>YEAR</b>	<b>TONS</b>	<b>% LEAD</b>	<b>% ZINC</b>	<b>oz SILVER Per TON</b>
1946	161,378	9.23	4.53	6.56
1947	246,601	7.22	2.54	4.50
1948	329,360	9.25	3.13	6.03
1949	299,005	8.40	3.18	5.83
1950	508,258	8.84	2.67	5.86
1951	624,938	5.79	2.56	4.12
1952	669,453	4.60	2.18	3.09
1953	407,112	8.34	2.79	5.43
1954	411,900	9.27	2.50	6.54
1955	528,833	8.70	2.78	4.64
1956	531,334	7.42	3.11	4.90
1957	521,041	8.26	2.94	4.43
1958	352,575	7.95	3.14	4.97
1959	445,369	7.85	3.26	4.73
1960	162,160	7.05	3.07	4.39
1961	475,991	6.88	3.36	4.01
1962	521,914	7.44	3.69	4.36
1963	450,903	7.50	4.03	4.38
1964	454,326	6.53	3.83	3.78
1965	366,837	6.41	4.68	3.94

**BUNKER HILL MINE PRODUCTION**

<b>YEAR</b>	<b>TONS</b>	<b>% LEAD</b>	<b>% ZINC</b>	<b>oz SILVER Per TON</b>
1966	383,630	5.67	5.04	3.20
1967	366,025	5.69	5.03	3.24
1968	387,941	5.88	6.04	3.22
1969	427,172	5.54	5.50	2.90
1970	425,954	5.97	4.64	3.67
1971	479,409	4.83	5.33	3.16
1972	489,645	4.88	4.27	3.30
1973	573,005	4.08	4.32	2.80
1974	691,849	3.05	3.25	2.18
1975	711,130	2.88	3.18	1.92
1976	780,502	2.51	3.39	1.67
1977	452,137	2.92	3.11	1.99
1978	545,593	3.37	3.24	2.40
1979	530,796	2.96	2.88	2.04
1980	535,051	3.08	2.91	1.95
1981	601,351	3.02	3.56	1.86

**ZINC PLANT PRODUCTION**

<b>YEAR</b>	<b>ZINC (TONS)</b>	<b>CADMIUM (TONS)</b>
1928	1,939	NA
1929	18,520	NA
1930	9,509	NA
1931	8,466	NA
1932	5,955	NA
1933	7,685	NA
1934	9,934	NA
1935	12,448	NA
1936	21,223	180
1937	22,831	97
1938	15,634	NA
1939	18,427	NA
1940	37,477	NA
1941	39,285	NA
1942	39,916	NA
1943	41,124	NA
1944	36,562	NA
1945	33,110	NA
1946	34,833	NA

**ZINC PLANT PRODUCTION**

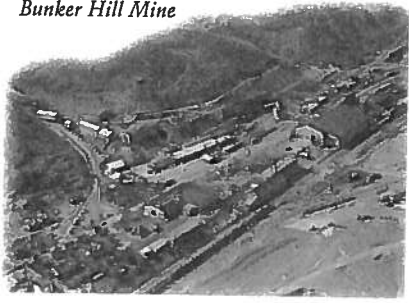
<b>YEAR</b>	<b>ZINC (TONS)</b>	<b>CADMIIUM (TONS)</b>	<b>SULFURIC ACID (000 TONS)</b>
1947	41,801	194	NA
1948	42,067	207	NA
1949	41,853	203	NA
1950	53,922	295	NA
1951	54,468	272	NA
1952	54,340	274	NA
1953	54,037	261	NA
1954	47,404	195	9.7
1955	56,625	232	46.4
1956	57,799	233	45.9
1957	68,832	300	96.0
1958	55,454	377	96.7
1959	61,191	413	98.6
1960	26,449	168	41.3
1961	74,735	371	97.0
1962	76,756	413	81.4
1963	81,296	529	110.0
1964	91,760	594	108.7
1965	90,990	477	111.5

**ZINC PLANT PRODUCTION**

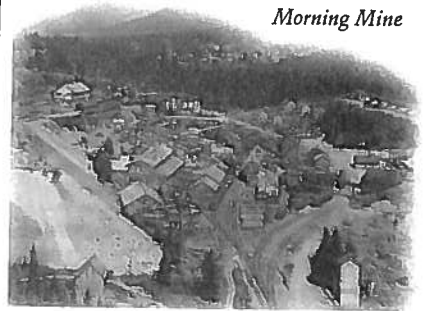
<b>YEAR</b>	<b>ZINC (TONS)</b>	<b>CADMIIUM (TONS)</b>	<b>SULFRUIC ACID (000 TONS)</b>
1966	90,000	436	118.1
1967	92,134	477	136.0
1968	102,946	580	151.5
1969	105,700	637	157.6
1970	95,637	597	119.7
1971	94,012	531	112.6
1972	101,743	540	141.0
1973	104,074	577	151.1
1974	92,702	395	142.6
1975	93,301	383	145.6
1976	100,398	387	163.8
1977	52,160	239	90.7
1978	83,966	341	146.0
1979	81,403	297	147.9
1980	76,580	242	136.6
1981	70,937	330	107.4

# History of Idaho's SILVER VALLEY 1878-2000

*Bunker Hill Mine*



*Morning Mine*



*Hecla Mine*



*Sunshine Mine*

*Ray Chapman*

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The mine owners also formed a coalition in 1889 to be known as the Mine Owners Association. This was done to present a united front against the unions and also to act jointly for improving freight rates once the railroads started doing business in the district.



1899 view of early Bunker Hill mine surface workings above Wardner that in 100 years would have 150 miles of underground tunnels and shafts from 3,536 feet above sea level to 1,800 feet below sea level.

containing this mineral except where zinc was the only mineral present to be mined.

When the U.S. entered the war in early 1917, the District Central Employment office, created following the 1899 demolition of the Bunker Hill mill, was discontinued. By 1918 the mines were short of labor after hitting a peak with 5300 mine workers early in the decade. Some of these workers were also involved in the construction of the new Bunker Hill Smelter in 1916 and 1917.

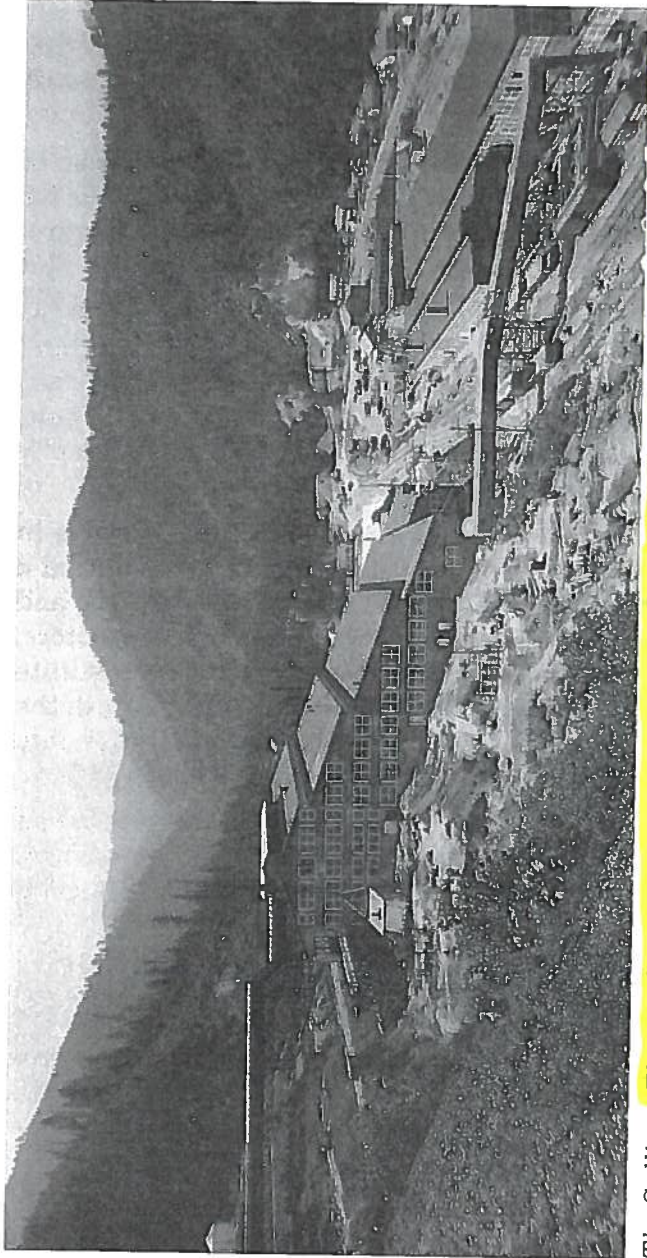
The Bunker Hill Lead Smelter commenced production in mid-1917, amid much applause in the District, as well as the Spokane area, as this meant more jobs. This also enabled several District mines to save considerably on ore haulage costs due to the availability of a nearby smelting operation. Bunker Hill, however, was involved in a law suit with Asarco (American Smelting and Refining Co.) over a 25-year smelting contract for Bunker Hill mine ore, which had been negotiated in 1903. The compromised settlement of this suit made one-half of the production from the Bunker Hill mine assigned to Asarco smelters through 1932, opening up additional Bunker Hill smelting capacity available for processing ores from other District mines.

By 1918, the mines of the District were experiencing extreme shortages of workers as more and more men were being taken into the army and navy.

At this same time, unionization returned to the District, after nearly two decades of absence. The International Union of Mine, Mill and Smelter Workers organized an 800 man march in the Wallace City Park to show their strength. Following this march, a strike was called at the Morning and Gold Hunter mines in Mullan over Portal to Portal pay, i.e., the payment of wages for time spent going into and leaving the mine workings. This short strike ended on Oct. 9, 1919, but without the Portal to Portal provision at that time.

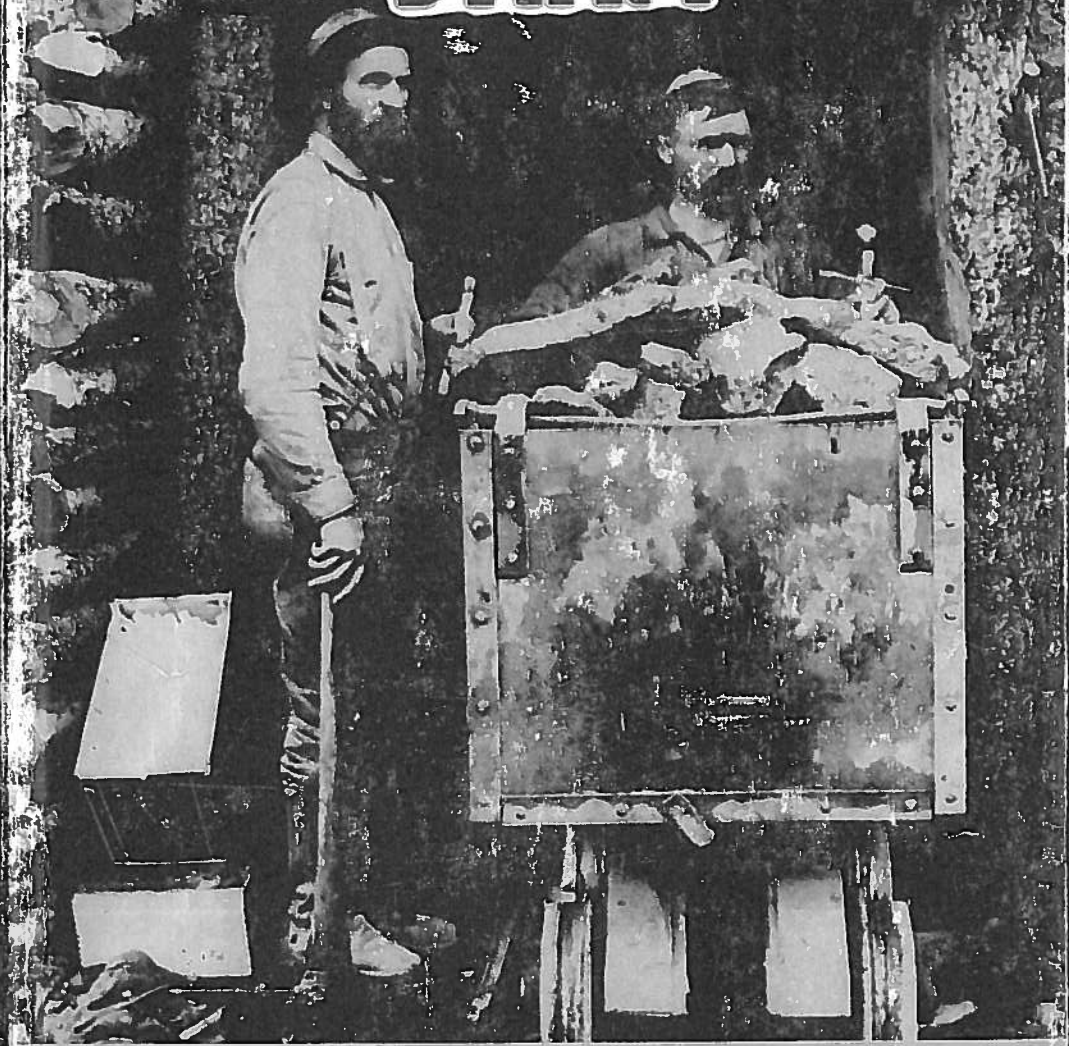


The Bunker Hill Smelter, pictured here in 1920s, operated for 64 years producing refined lead and silver, as well as recovering zinc, copper, cadmium, antimony and gold, all contained in the lead ores processed from Bunker Hill and other mines. Sulfuric acid was produced from waste gases the last eleven years.



*The Sullivan Electrolytic Zinc Plant, pictured here in 1928, operated 53 years producing refined zinc, zinc alloys, cadmium, and also captured lead, silver, gold, copper and other impurities contained in the zinc ores received from Bunker Hill and other mines. Bunker Hill operated this plant throughout the life of the facility and owned it outright after 1956. Sulfuric acid was also produced from waste gases commencing in 1954.*

# COEUR D'ALENE DIARY



*The First Ten Years of  
Hardrock Mining in North Idaho*

By

**Richard G. Magnuson**

## CHAPTER 11

### AUGUST THROUGH DECEMBER — 1888

The last five months of 1888 passed in very orderly fashion. Payrolls were ever increasing throughout the district, and in August, the Bunker Hill & Sullivan announced that its profit for the prior 12 months was \$400,000. At the time, the price of lead was \$4.32½ per hundred. Each newspaper carried news of ore shipments from the district, most particularly from the Tiger, Poorman and Granite Mines. At the west end of the county, the Bunker Hill Mine and the Sierra Nevada Mine of Wardner were also shipping.

The question of moving the county seat to the South Fork drainage arose, but the opinion was generally held in Wallace that the County could not afford to move the county seat. It is interesting to note that this opinion was held at a time when Shoshone County could afford to support 94 saloons.

A large number of Italians landed at the Mission in mid-August to work on the railroad line to the east end of the mining district.

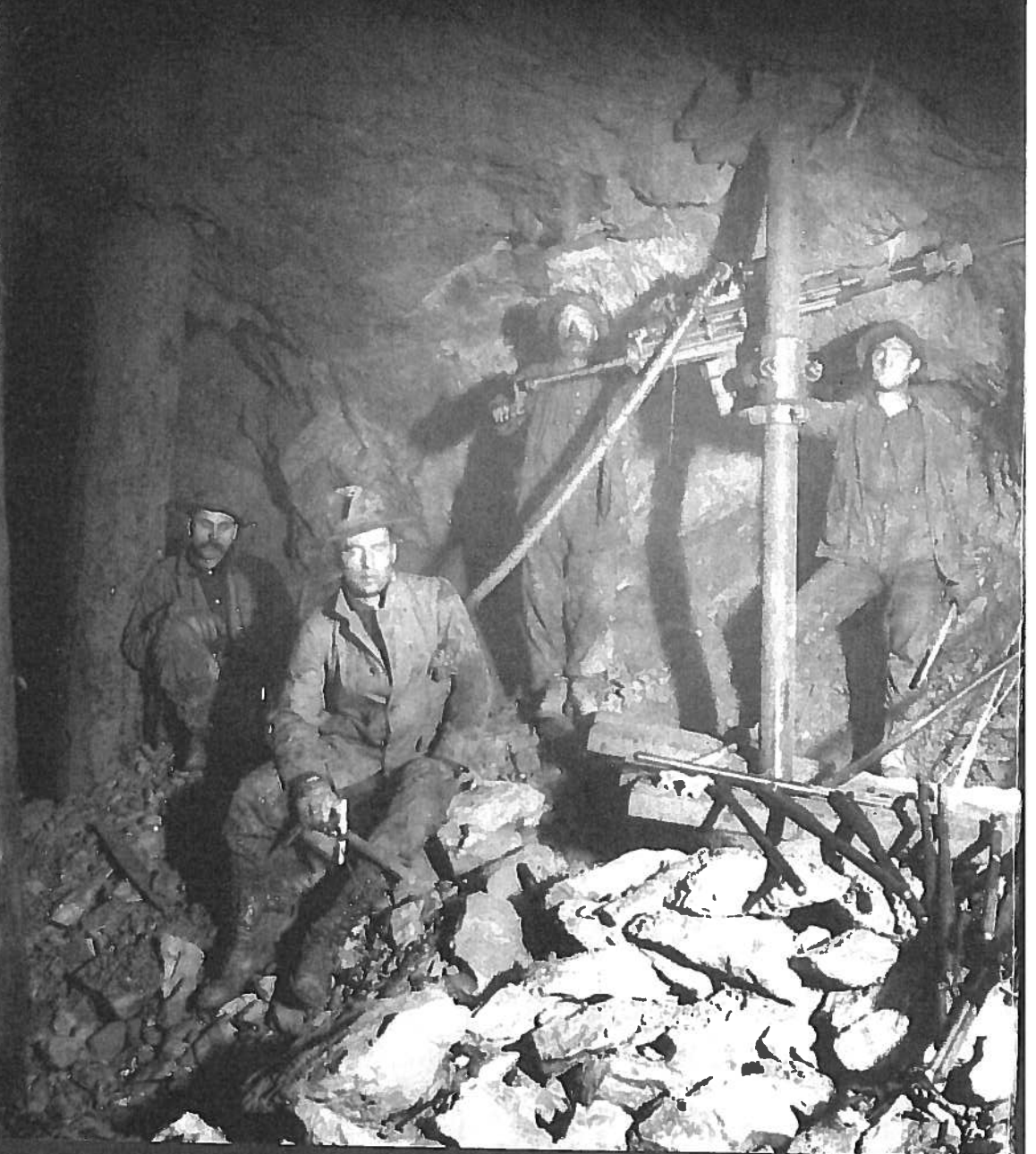
The County Commissioners accepted the five miles of road built up Nine Mile on October 1. - - - A meeting was held in Osburn, backed by Wardner and Milo people, which advocated the moving of the county seat from Murray to their area.

November of 1888 brought the election season. Two co-owners bet each other a 1/6th interest in the Bob Lee, a claim which was an extension of the Maud S. mining claim, on the outcome of the Hawley-Dubois election race for Congressional delegate.

KATHERINE G. AIKEN

# IDAHO'S BUNKER HILL

THE RISE AND FALL OF  
A GREAT MINING COMPANY, 1885-1981



*Review* boasted that the new smelter would be "one of the most modern and perfect in its equipment in the world," and the *Spokane Daily Chronicle* deemed it "the most sensational development in the present struggle among smelting and mining interests for the control of the metal output of the Coeur d'Alenes."

The general public was no less enthusiastic. When the Industrial Union and Spokane Board of Trade held a picnic the next summer, conversation focused on the smelter, and the Coeur d'Alene city band and a number of citizens were guests. The *Coeur d'Alene Press* reported that visitors were greeted with yells of "What are you here for?" and the "acceptable" reply was, "To build the smelter—let 'er smelt!" Clearly, residents, as well as businesspeople, were keenly aware of the smelter's importance to the area.<sup>122</sup>

The Guggenheim interests believed that talk of a smelter in Kellogg was all a bluff that Bradley hoped to use in his campaign for a more favorable smelting rate. However, by late 1915, Bunker Hill had succeeded in obtaining a commitment from the Washington Water Power Company to provide inexpensive electrical power. In August 1916, with construction of the new plant well under way, Bunker Hill began screening and interviewing potential smelter supervisors. Town sites in Smeltonville (the location of the new plant) sold out quickly.<sup>123</sup>

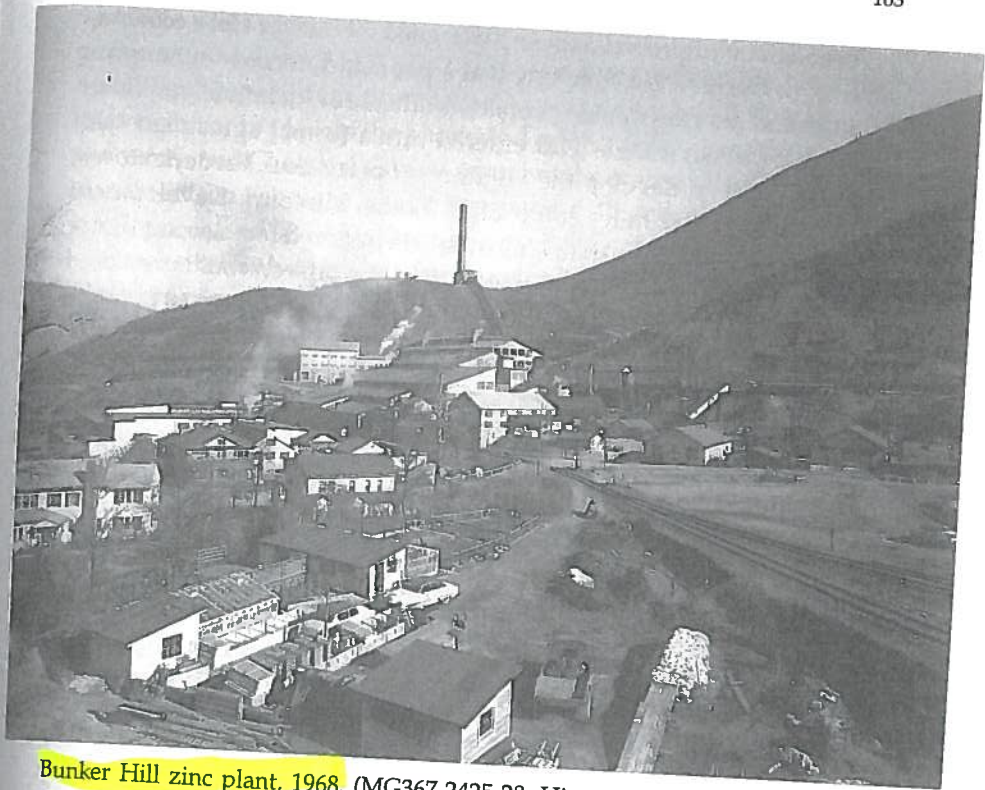
In April 1917, in anticipation of the beginning of Kellogg operations, shipments of Bunker Hill ore concentrates above 75 percent lead ceased, and the smelter began operation on a partial basis July 5, 1917. By July 16, Easton informed Bradley, "I am inclined to think by fall we will be able to split all Bunker Hill product almost entirely into the two classifications—one above 75% and the other below 30%. Our present yield already puts the bulk of our lead and silver produced into those classes." In response to new rumors of a Guggenheim takeover, Bradley had sent a special telegram to the *Engineering and Mining Journal* reiterating that a sale was "neither contemplated nor pending."<sup>124</sup>

Frederick Bradley and Stanly Easton had accomplished a great deal in the fourteen years from 1903 to 1917. They defeated challenges to Bunker Hill ownership of the ore body and possessed unquestioned claim to it. Although ill feelings toward the company on the part of miners and their families continued to simmer, the two men weathered the Steunenberg assassination, the WFM trials, and the accompanying labor agitation, while continuing to foster the Wardner Industrial Union. Bradley and Easton's ingenuity had allowed the company to develop new production

blic awareness of environmen-  
pany stepped up expenditures  
penditures reached \$8 million.  
ll in light of later developments.  
eputation as a model corporate  
order to improve the Kellogg

improve. In the first place, the  
strike year, 1960, allowed it to  
though the company reported  
like, it was debt free by October  
any paid a fifty-cent-per-share  
nd in 1958. By 1964 the Bunker  
onomy and improved profits.<sup>123</sup>  
llion, although many analysts  
ion. This turnaround was in no  
ssive mechanization that had  
rom its payroll, reducing it to

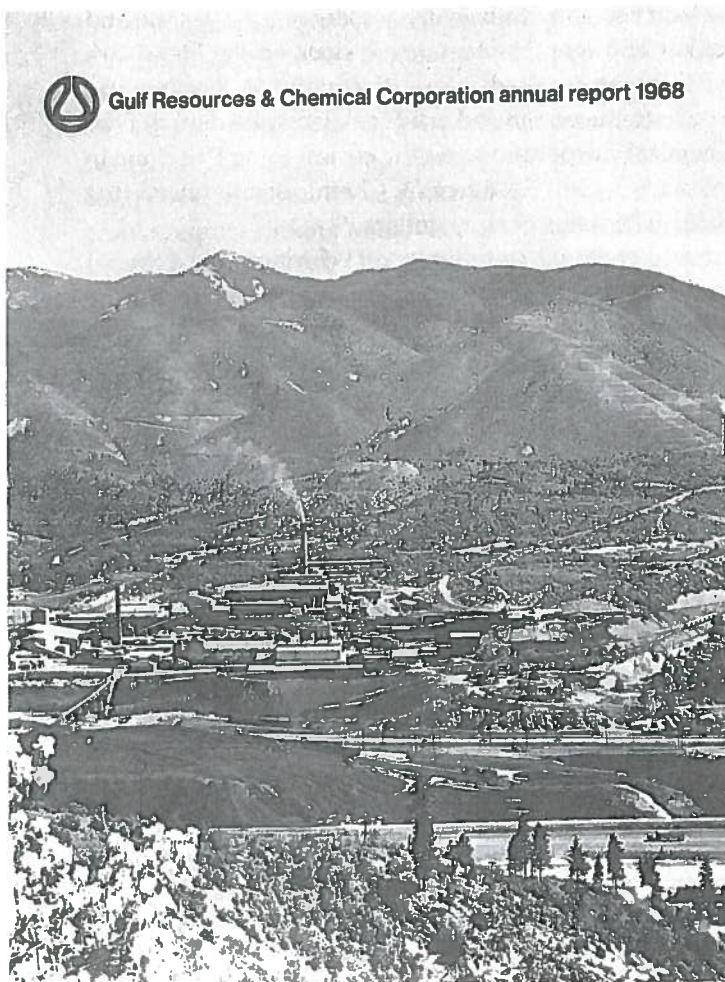
developments, the Bunker Hill  
of appearing on the New York  
chased the first one hundred  
5; the initial offering involved  
was twenty-five and a half.<sup>126</sup>  
he history of the company."<sup>127</sup>  
Bunker Hill zinc production that  
aplated a massive zinc plant  
ed to devise a plan to mecha-  
larly stripping.<sup>128</sup> During 1966  
end \$13 million on zinc plant  
Hill history, but necessary to  
and sulfuric acid.<sup>129</sup> Charles  
of Commerce on February 16,  
nouncement he had "looked  
at the "long hoped for elimi-  
ions will become a reality by  
ould expand its sulfuric acid  
gram that would increase the  
om 1 percent to 7 percent and



Bunker Hill zinc plant, 1968. (MG367-2425-28, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)

would also triple storage capacities in the event that markets were not available.<sup>130</sup>

The company was able to ensure some degree of ore supply through terrific and extensive discoveries in the Crescent.<sup>131</sup> Bunker Hill won its bid against ASARCO's East Helena smelter for Hecla's Lucky Friday ore from August 1966 to August 1971.<sup>132</sup> Bunker Hill also made production from its own mine much more efficient. The bulk mining method and mine pillar stoping allowed the company to mine low-grade ore that was previously unprofitable.<sup>133</sup> At the same time, the company was able to decrease manpower in the mine by 30 percent between the last quarter of 1965 and the last quarter of 1966 while increasing the tons per stoping shift by 57 percent.<sup>134</sup> The 1966 net earnings per share were the highest in sixteen years.<sup>135</sup>



Lead  
Smelter

Cover of Gulf Resources & Chemical Corporation annual report, 1968. (MG367-2496, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)

Hill as an independent company. Stockholders got one share of Gulf preferred stock and .76 of a share of Gulf for each share of Bunker Hill Stock. In addition, they were to receive a dividend of approximately twenty-five cents a share if the merger was completed by May 31.<sup>155</sup> Bunker Hill was removed from the New York Stock Exchange listings and replaced with Gulf Resources Corporation.<sup>156</sup>

Following the stockholder vote, Charles Schwab announced he was resigning his position. He had been with Bunker Hill since 1944 and had

always been able to  
s—either through  
tar mine. The com-  
technology to both  
ndous Bunker Hill  
owed the company  
ese previous strate-  
he closure resulted.  
anging political and

## Conclusion

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At the time of its closure, the Bunker Hill Company boasted the only single-site facility in the United States that possessed the integrated capacity to produce base precious metals—primarily lead, zinc, and silver, but also cadmium and antimonial lead. Company plants included the lead smelter, the zinc plant, and the silver refinery, along with sulfuric acid and fertilizer plants. Bunker Hill accounted for about 17 percent of U.S. primary lead production, 15 percent of refined slab zinc production, and 15 percent of refined silver production.<sup>1</sup> Bunker Hill operated the largest lead smelter in the world. The shutdown of such a major producer sent shock waves through the nonferrous industry, and the economic impact on Idaho was dramatic. Threats of closure had been a part of the Bunker Hill business climate for so long that most Kellogg residents viewed the situation with disbelief and felt certain that it would only be a matter of time before the Bunker Hill would reopen. They were mistaken, and more than twenty years later, the Kellogg economy has yet to recover. On May 26, 1996, explosions blasted the tall stacks at the zinc plant and lead smelter, symbolizing the finality of the plant closure and the end of Bunker Hill's dominance of the Silver Valley. Thousands witnessed this final act and mourned the demise of a local landmark and the industry it represented.<sup>2</sup>

Silver Valley residents remain divided when it comes to assessing the legacy of the Bunker Hill Company. Opinions among former company employees range from the positive and defensive—"No credit is ever given to the Company for the thousands of good paying jobs that this

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LEADED WATERS:  
A HISTORY OF MINING POLLUTION ON THE COEUR D'ALENE RIVER IN  
IDAHO  
1900-1950

by  
NICHOLAS A. CASNER

A thesis  
submitted in partial fulfillment  
of the requirements for the degree of  
Master of Arts  
Boise State University

May, 1989

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## Abstract

This study examines the first half-century of mining pollution on the Coeur d'Alene River in Idaho, from approximately 1900 to 1950. Four aspects of the issue are explored: pollution lawsuits (1903-1930) inaugurated by valley ranchers against the mines, a political controversy and scientific investigations in the 1930s, and the district's relationship with the growing federal authority concerning public health.

The Coeur d'Alene mine operators considered pollution abatement an unnecessary cost and only reacted to threats posed by legal action, public opinion, or government regulation. The industry flushed the residue of metal recovery down a tributary of the state's second largest lake--a practice considered an unfortunate but necessary function of business. Despite strict pollution controls in the 1960s and 70s, the Environmental Protection Agency estimated that 9,500 pounds of zinc, 540 pounds of lead, 125 pounds of arsenic, and 23,000 pounds of suspended solids entered the South Fork of the Coeur d'Alene River on a daily basis. In 1983 the EPA designated twenty-one square miles surrounding the Bunker Hill Mine as a Superfund cleanup site. With that designation, this problem, long considered a local nuisance, became a national priority.

## Introduction

Approximately 72 million tons of mining debris have been dumped into the Coeur d'Alene River in Idaho. This material, much of it containing heavy metal and toxic chemicals, has converted a flourishing river into a biological desert where few organisms survive. Environmental degradation in the state's famed Silver Valley has long been considered a price of economic development. Though their pollution was recognized as a problem by 1890, the mining companies through the years insisted that it was a local problem, best dealt with on a local level free of state and federal regulations. This idea of local authority proved tragically wrong and now serves as a grim illustration of the failure of corporate self-regulation.

Mining is a prominent aspect of north Idaho's overall economy, which is based almost entirely on natural resources. The region has a rich landscape. It contains some of the most productive farmland, forest resources, and mineral deposits in the United States. The development of these resources has played a major role in the economic development of the state and has made a significant contribution to the industrial progress of the nation. Though worked hard for its varied wealth, much of the area retains a natural beauty that captures the image of the

Pacific Northwest. There are rugged, tree covered mountains teeming with wildlife, streams alive with trout, and a terrain dotted with numerous lakes. These images have spurred development of the state's fastest growing industry, tourism. Each in its way--agriculture, logging, mining, and recreation--have taken a heavy toll on the region's ecosystem.

In terms of environmental destruction, mining is the most devastating. Since 1886, operations have extracted ore--primarily lead, silver, and zinc--processed it through concentration, refined via smelting, and used the Coeur d'Alene River for waste disposal. Each step has unleashed destructive forces that have dangerously altered the landscape. Extraction has left hundreds of miles of shafts, many refilled with tailings that contaminate leaching groundwater. Concentration of valuable minerals has produced millions of tons of tailings from the size of gravel to fine powder (slimes). This refuse has inundated and altered the river channel and released large amounts of heavy metals and other substances that are toxic to animal and vegetable life. In addition a thick layer of this sediment covers the bottom of Lake Coeur d'Alene. Smelting has released not only heavy doses of metals, but sulfuric acid that helped denude area mountainsides surrounding the Bunker Hill complex at Kellogg. In 1983 the Environmental Protection Agency designated twenty-one square miles

BUNKER HILL'S CONTRIBUTION TO THE  
IDAHO ECONOMY AND THE IMPACT  
OF ITS CLOSING

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SPECIAL REPORT PREPARED FOR THE

Idaho Mining Association

MARCH, 1982

94-4217  
94-4244

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## Section 1

### SUMMARY

The Bunker Hill Company has traditionally played a key economic role, not only in Shoshone County, but also in the state of Idaho and in the nation. Thus, the closing of the company's operations will have far-reaching consequences. This report examines Bunker Hill's role in the supply of mine output and refined metals, assesses the contributions the company has made to local and state economies, and considers some of the consequences of the closing of the Bunker Hill operations in Idaho.

### PRODUCTION AND PERFORMANCE

Bunker Hill has long been one of this country's foremost producers of lead, zinc, and silver. Within the state of Idaho its leadership position has been even more apparent. The share figures for 1980 presented in Table 1 illustrate that the company has been an important supplier of both mine output and refined metals. Some specific results relating to Bunker Hill's performance and its industry position follow.

- In recent years Bunker Hill's mines have contributed more than 50% of Idaho's lead production, about 80% of its zinc production, and about 16% of its silver production. Considering total United States production, in 1980 Bunker Hill ranked fifth among domestic companies in mine production of lead and fifth in mine production of zinc; its three major mines ranked twelfth, fourteenth, and sixteenth in silver production in the United States.

- Bunker Hill has been Idaho's only producer of refined lead, zinc, and silver; and it has been a major factor in total domestic supply of these refined metals, as well as cadmium. In 1980 its production represented 26% of refined silver, 21% of primary refined lead, 21% of primary slab zinc, and 15% of the cadmium produced in the United States. In recent years about 75% of the lead concentrates and 60% of the zinc concentrates processed at Bunker Hill's plants have been obtained from other companies.
- Bunker Hill's sales reached \$335 million in 1980, nearly quadrupling since 1971. Lead, zinc, and silver represented more than 85% of 1980 sales, with zinc oxide, sulfuric acid, fertilizers, and cadmium accounting for the remainder. Earnings have shown wide fluctuations, generally paralleling price movements for the company's major products. Losses were incurred in 1971, 1977, 1978, and 1981.

#### ECONOMIC CONTRIBUTION

An estimate of the direct contribution of the Bunker Hill Company to the Idaho economy in any given year can be made by adding up (i) the company's gross wages and fringe benefits; (ii) the value of its in-state purchases of supplies and consumables, plant and equipment, and energy; (iii) its local and state tax payments. For the years 1971-1980 estimates of these quantities are presented in Table 2. Bunker Hill's direct contribution grew from \$30 million in 1971 to \$106 million in 1980. The last column of the table shows Bunker Hill's estimated share of the contribution of the total Idaho mining and minerals processing industry. This share has remained relatively stable, between 21% and 27% in the 1971-1980 decade. Figure 1 illustrates the relative magnitudes of Bunker Hill's contribution to the Idaho economy and the

TABLE 2 BUNKER HILL'S DIRECT CONTRIBUTION TO THE IDAHO ECONOMY

	Gross Wages & Fringe Benefits (Mill \$)	In-State Purchases <sup>1</sup> (Mill \$)	Local Taxes (Mill \$)	State Taxes (Mill \$)	Total	
					Contribution (Mill \$)	% of Industry Total Contribution
1971	21.9	7.0	1.3	0.2	30.4	25%
1972	23.4	14.5	1.2	0.1	39.2	27
1973	25.3	17.2	1.1	0.1	43.7	26
1974	31.4	21.3	1.0	0.7	54.4	25
1975	34.8	22.7	1.3	2.3	61.1	24
1976	38.3	29.1	0.9	1.4	69.7	26
1977	32.7	24.1	1.6	1.0	59.4	21
1978	49.0	30.7	1.2	0.1	81.0	25
1979	56.7	32.1	1.0	0.1	89.9	24
1980	62.5	40.4	1.6	1.3	105.8	22

<sup>1</sup>Includes purchases of supplies and consumables, contract services, plant and equipment and energy.

Sources: Gross fringe benefits, in-state purchases, and some state taxes have been estimated using data contained in Fox & Company's Survey of Companies Engaged in Mining and Related Activities in Idaho, (September 30, 1981). Idaho corporate income taxes are based on information contained in Gulf Resources & Chemical Corporation's Annual Reports. Wages are based on Annual Wages in Idaho, issued by the Idaho Department of Employment. Local tax payments have been obtained from the records of the Shoshone County Tax Collector.

total industry's contribution. Some specific economic contributions by Bunker Hill are summarized below and in Figure 2.

- With 2,000 to 2,300 workers, Bunker Hill has been the largest employer in Shoshone County and the largest employer in the Idaho mining and minerals processing industry. Its payroll was about \$51 million in 1980, about 38% of total Shoshone payrolls. The average wage of Bunker Hill employees was an estimated \$22,867 in 1980, more than \$10,000 over the statewide average wage.
- Between 1971 and 1980, Bunker Hill's capital expenditures totaled \$48 million. A significant portion of this capital spending has been for the purchase of pollution control equipment, including stacks for its lead and zinc plants and a secondary water treatment plant. The company's purchases of capital equipment, supplies and consumables, and energy from Idaho suppliers represent one of its most significant contributions to the state's economy. Such purchases increased from an estimated \$7 million in 1971 to \$40 million in 1980.
- Bunker Hill's property tax payments have represented an important source of revenue for the support of school districts and town and county services in Shoshone County. Between 1971 and 1980, the company's taxes represented about 26% of total real and personal property taxes paid in the county. Bunker Hill's annual tax payments at the state level have, over this period, ranged between an estimated \$0.1 million and \$2.3 million, fluctuating widely with company profitability.

#### THE IMPACT OF CLOSING

Two primary types of impacts resulting from Bunker Hill's closing can be distinguished. First, it will mean the size and scope of the Idaho mining and minerals

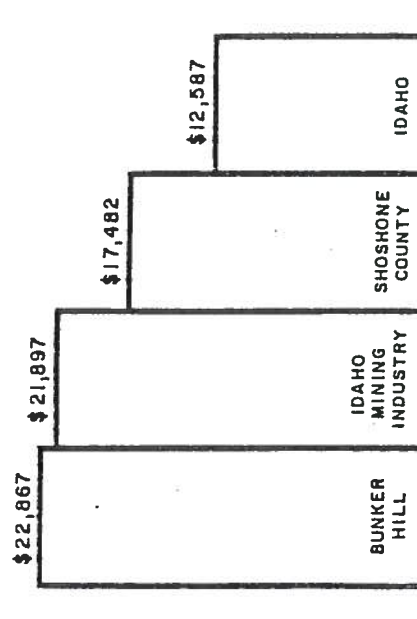
FIGURE 2 SOME MAJOR ECONOMIC CONTRIBUTIONS

Bunker Hill has been the largest employer in the Idaho mining and minerals processing industry. Between 1971 and 1980 the company contributed....

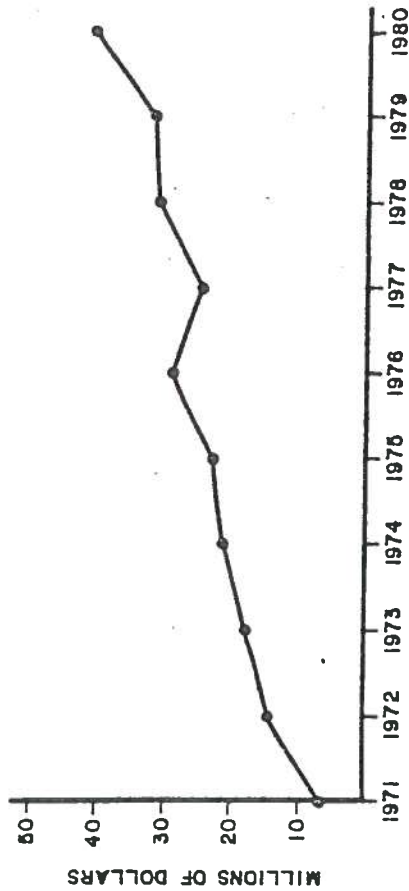
- 29% of Shoshone County employment
- 31% of employment in the Idaho mining and minerals processing industry
- 54% of employment in the Idaho metals sector

The company has paid above-average wages, contributing 38% of Shoshone County payrolls in 1980....

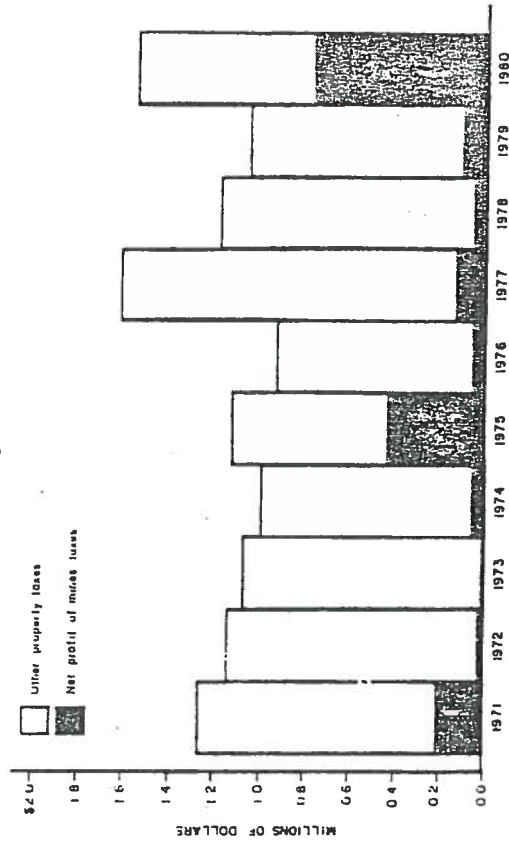
AVERAGE ANNUAL WAGES - 1980



Bunker Hill's in-state purchases of supplies and consumables, plant and equipment, and energy have increased dramatically....



In the past decade Bunker Hill has paid an average of \$1.2 million per year in local taxes, or about 26% of Shoshone County property taxes....



processing industry is reduced significantly. Bunker Hill has been the largest employer in the industry and, for some types of processing activities, has had the only operation in Idaho. Other impacts relate to the economic consequences of closing. Jobs and wages are lost, and tax revenues at both the local and state levels are reduced. Because of multiplier effects and the dependence of various types of supporting services on the existence of a large operation like Bunker Hill's, the effects on employment, payrolls, and output are certainly not limited to the direct effects on Bunker Hill alone. Some specific consequences of closing are described below.

- The overall Idaho mining and minerals processing industry will lose more than 25% of its workers. The state's metals processing industry will essentially be eliminated, with all concentrates having to go out-of-state for processing. Bunker Hill's zinc refinery is the second largest in the United States, and its lead smelter the third largest in this country in terms of capacity. Closing of these plants and the company's silver refinery will result in the loss of 22% of domestic zinc refining capacity, 17% of primary lead smelting capacity, and 9% of primary and secondary silver refining capacity. Even assuming that the Star Mine continues to operate, about 45% of the state's mine production of zinc and 35% of its lead production will be lost. Two of its eight largest silver mines will close.
- Through a multiplier effect a loss of 2,100 jobs at Bunker Hill will translate into a total loss of about 4,100 Idaho jobs, including nearly 2,000 jobs in supporting services. These lost jobs correspond to annual payrolls totaling about \$90 million. Unemployment in Shoshone County will increase sharply. The Bunker Hill Company has been the county's largest employer with nearly 30% of total county employment. The county's property tax base will shrink by about 25%. The state of Idaho will lose tax revenues, not only because of the

direct loss of Bunker Hill tax payments but, more importantly, because of reduced individual income tax payments.

- The closing will delay economic recovery in Idaho. Total employment in the state declined in 1980 and again in 1981, and the Bunker Hill closing will contribute to a third consecutive year of employment losses. The loss of high-paying Bunker Hill jobs is also an important factor in a projected decrease of 4.8% in per-capita real personal income in Idaho in 1982.

## Section 2

### INTRODUCTION

In August, 1981, Gulf Resources & Chemical Corporation announced that it was closing the facilities of the Bunker Hill Company in Idaho. Among the major factors contributing to this decision were the weakness of major markets for lead and zinc; the sharp drop in silver prices; significant increases in production costs, particularly labor and energy costs; worldwide excess capacity for lead and zinc production and a serious shortage of concentrates; and uncertainty in complying with future Federal environmental regulations regarding wastewater discharge, control of particulate matter, and lead emissions.

Bunker Hill has been the largest employer in the Idaho mining and minerals processing industry, and the question naturally arises as to the impact that its closing will have on the industry itself and on state and local economies. The primary objectives of this study are to examine Bunker Hill's position within the industry, to assess the various types of contributions it has made, and finally, to consider the impact of closing. The report was requested by the Idaho Mining Association in the Fall of 1981 and serves as a supplement to the report, Economic Analysis of the Idaho Mining and Minerals Processing Industry: 1971-1980, presented by Whitney & Whitney, Inc., to the Association in November, 1981.

The earlier report has served as the primary source of data for the analysis presented here. Other key sources of information have been the Annual Reports of Gulf Resources & Chemical Corporation, the records of the Shoshone County Treasurer's Office, and various publications

of the U.S. Bureau of Mines and the Idaho Department of  
Employment.

### Section 3

#### DESCRIPTION OF OPERATIONS

The primary operations of the Bunker Hill Company have been the mining of ores and the smelting and refining of precious and base metals, including silver, lead, zinc and cadmium. Most of the concentrates smelted and refined by Bunker Hill have been purchased from or tolled for others, with the remainder coming from mines wholly or partly owned by Bunker Hill. The lead and zinc concentrates obtained from others have come chiefly from mines located in the United States, Canada and Peru. For the 1978-1980 period 26% of the lead concentrates and 40% of the zinc concentrates processed at Bunker Hill's smelters and refineries were supplied by mines controlled by the company.

Bunker Hill's principal metal mining operations are located at the Bunker Hill and Crescent mines at Kellogg, Idaho, and at the Star Unit Area at Burke, Idaho. All three mines lie within the Coeur d'Alene Mining District. The Bunker Hill and Crescent mines are owned and operated by Bunker Hill. The Star Unit Area is a joint venture between Bunker Hill and the Hecla Mining Company. Prior to May 1, 1981, Bunker Hill owned 70% of the Star Unit Area and Hecla, which operates the mine, owned 30%. As of May 1, 1981, Bunker Hill and Hecla have each had a 50% interest in the venture.

The Bunker Hill Mine, which has been mined since 1885, was initially mined exclusively for lead and silver. Zinc production commenced in 1929. Ores taken from this mine have been concentrated at a flotation mill, which has a capacity of approximately 2,400 tons per day. This mill has typically produced a lead concentrate containing about

64% lead and 40 ounces of silver per ton, and a zinc concentrate containing about 55% zinc. The concentrates are transported to the company's lead smelter and zinc plant by an interplant railway system.

Production from the Crescent Mine has averaged approximately 135 tons of ore per day. This ore is transported by truck about six miles to the company's Kellogg concentrator for processing.

During 1980, production from the Star Mine averaged about 5,500 tons of ore per week. This ore has been concentrated at a flotation mill on the property, with a capacity milling rate of about 1,100 tons per day.

Bunker Hill's lead smelter consists of a lead concentrate sintering plant, blast furnaces, zinc fuming facilities, a lead refinery, a plant for the production of sulfuric acid from sinter plant off-gases, and an electrolytic silver refinery. At the lead smelter the concentrates are sampled, blended with flux and other recycled materials, and pelletized. The pellets are roasted in a sintering machine to produce a porous clinker. Sulfur dioxide off-gas is converted to sulfuric acid. Broken sinter is mixed with coke in a 9:1 ratio and charged into a blast furnace. An oxygen-enriched air blast reacts with the coke to reduce the sinter to lead bullion and slag. The slag is further processed by fuming and condensation to recover zinc oxide before being transported to a dump. The zinc oxide is sold to outside customers. Lead bullion is purified through a series of refining kettles - copper, antimony, and arsenic are removed first, and then silver and gold.

The capacity of Bunker Hill's silver refinery was recently increased from 10 million ounces per year to 15 million ounces per year, at a cost of \$1.3 million. The

plan was to use the increased capacity principally for the recovery of silver from secondary sources such as silver coins and scrap sterling silver. The expanded refinery has also been designed to refine about 12,000 ounces of gold annually.

Bunker Hill's zinc plant is made up chiefly of flash roasters, leaching and purification facilities, an electrolytic cell complex, and facilities for the production of cadmium metal and zinc alloys. In addition, there are two plants that produce sulfuric acid from roaster off-gases. Zinc concentrates are roasted to remove sulfur, and the roasted calcine is leached with sulfuric acid in agitator tanks to form a zinc sulfate solution. The leached slurry is then pumped to filters, where insoluble residues containing lead, silver, and gold are removed. Copper, cadmium, cobalt, nickel, antimony, and arsenic are removed as the pregnant solution is purified. After purification, the zinc sulfate electrolyte is drawn to the zinc tank-house, where the zinc is deposited on aluminum cathode plates. The zinc is periodically stripped from the aluminum starter plates, melted down, and cast in marketable forms. The cadmium residue is re-leached; and, after purification, 99.9% cadmium cathodes are electrowon from the pregnant liquor.

Under the terms of a joint venture agreement with Stauffer Chemical Company, Bunker Hill produces superphosphoric acid and dry ammonium phosphates at a fertilizer plant located adjacent to the zinc plant. The fertilizer plant consumes a large portion of the sulfuric acid produced as a by-product at the lead and zinc plants.

TABLE 3 BUNKER HILL'S MINE PRODUCTION IN IDAHO: 1976-1980

		<u>LEAD</u> (metric tons)	<u>ZINC</u> (metric tons)	<u>SILVER</u> (troy ounces)
Bunker Hill Mine	1976	16,288	22,145	1,185,174
	1977	10,713	11,458	804,519
	1978	15,115	14,807	1,180,442
	1979	13,192	12,505	960,254
	1980	13,462	12,886	916,996
Star Unit Area (Bunker Hill 70% Share)	1976	9,530	10,445	548,083
	1977	9,591	11,079	519,286
	1978	9,591	10,925	573,043
	1979	8,506	11,200	527,871
	1980	7,696	10,529	474,379
Crescent Mine	1976	-	-	371,168
	1977	-	-	250,615
	1978	-	-	567,197
	1979	-	-	847,666
	1980	-	-	788,088
Bunker Hill's Total Idaho Production	1976	25,818	32,590	2,104,425
	1977	20,304	22,537	1,574,420
	1978	24,706	25,732	2,320,682
	1979	21,698	23,705	2,335,791
	1980	21,158	23,415	2,179,363
Share of Idaho Production	1976	53%	77%	18%
	1977	47%	80%	10%
	1978	55%	80%	13%
	1979	51%	80%	14%
	1980	55%	84%	16%

Sources: American Bureau of Metal Statistics, Inc. Non-Ferrous Metal Data, 1980  
 U.S. Bureau of Mines, miscellaneous publications

PROSPECTUS DATED APRIL 12, 1988

THIS PROSPECTUS CONSTITUTES A PUBLIC OFFERING OF THESE SECURITIES ONLY IN THOSE JURISDICTIONS WHERE THEY MAY BE LAWFULLY OFFERED FOR SALE AND THEREIN ONLY BY PERSONS PERMITTED TO SELL SUCH SECURITIES. NO SECURITIES COMMISSION OR SIMILAR AUTHORITY IN CANADA HAS IN ANY WAY PASSED UPON THE MERITS OF THE SECURITIES OFFERED HEREUNDER AND ANY REPRESENTATION TO THE CONTRARY IS AN OFFENCE. THIS PROSPECTUS IS NOT, AND UNDER NO CIRCUMSTANCES IS TO BE CONSTRUED AS, AN OFFERING OF ANY SECURITIES FOR SALE IN THE UNITED STATES OR ANY TERRITORY OR POSSESSION THEREOF. THE SECURITIES OFFERED HEREBY HAVE NOT BEEN REGISTERED UNDER THE UNITED STATES SECURITIES ACT OF 1933 OR UNDER THE SECURITIES LAWS OF ANY STATE OF THE UNITED STATES, OR ANY AREA SUBJECT TO THE JURISDICTION OF THE UNITED STATES AND MAY NOT BE OFFERED OR SOLD, DIRECTLY OR INDIRECTLY, OR DELIVERED IN THE UNITED STATES.

# BUNKER HILL MINING COMPANY INC.

**\$8,550,000**

**3,000,000 COMMON SHARES**

(Price: \$2.85 per Share)

	Price to Public	Commission <sup>(2)</sup>	Net Proceeds <sup>(3)</sup>
Per Share .....	\$2.85 <sup>(1)</sup>	\$0.285	\$2.565
Total .....	\$8,550,000	\$855,000 <sup>(2)</sup>	\$7,695,000

- (1) The price per share was arrived at by negotiations between the Issuer and the Agent.
- (2) The Agent has been granted a Compensation Warrant which entitles the Agent to purchase 1,100,000 Common Shares at a price of \$3.00 per share over a one-year period from the Effective Date.
- (3) Before deduction of the costs of the issue estimated to be \$75,000. The Agent has been granted a Greenshoe Option pursuant to which it may over allot up to 450,000 shares of the Issuer and acquire, for a period of 30 trading days from the Offering Day, such number of shares from the Issuer at a price of \$2.565 per share.

A purchase of the securities offered by this Prospectus must be considered as speculative. There is no market through which these securities may be sold. Though the Issuer owns properties with proven reserves and mining infrastructure for two mines which have past operating histories, such mines are currently shut down and the proposed reactivation of the mines depends in part on the maintenance of current metal prices which are out of the control of the Issuer. **THE ISSUER WILL, AT SUCH TIME AS IT RESUMES MINING OPERATIONS AT THE BUNKER HILL PROPERTY, BE SUBJECT TO THE NORMAL RISKS OF MINING, FLUCTUATIONS IN METAL PRICES AND GOVERNMENTAL REGULATION.** Certain of the properties of the Issuer have not been surveyed and therefore in accordance with the laws of the jurisdiction in which the properties are located, their existence and area could be in doubt. See headings "Environmental Regulation" on page 15, "Risk Factors" on page 20 and "Other Material Facts" on page 40.

Upon completion of this Offering this Issue will represent 21% of the shares then outstanding as compared to 63.9% that will then be owned by substantial security holders, promoters, directors and officers of the Issuer and associates of Underwriters. Refer to the heading "Principal Holders of Shares" on page 36. **THE PURCHASE PRICE OF EACH COMMON SHARE FORMING PART OF THIS OFFERING EXCEEDS THE NET TANGIBLE BOOK VALUE THEREOF AS AT DECEMBER 31, 1987 by \$1.19 or 42%.**

Certain employees of Underwriters, as defined in Local Policy 3-30 of the British Columbia Securities Commission, and their associates have purchased shares of the Issuer at the non-reporting stage. Reference is made to the section captioned "Escrowed and Pooled Shares" on page 29.

One or more of the directors of the Issuer has an interest, direct or indirect, in other natural resource companies. Reference should be made to the heading "Management" on page 32 herein for a comment as to the resolution of possible conflicts of interest.

No person is authorized by the Issuer to provide any information or to make any representation other than those contained in this Prospectus in connection with the issue and sale of the securities offered by the Issuer.

This Prospectus also qualifies the issuance of the Agent's Compensation Warrant. The Agent may sell any of the shares acquired on the exercise of the Compensation Warrant at the market price at the time of sale pursuant to provisions of the Securities Act and Regulations without further qualification. Reference should be made to the heading "Plan of Distribution" on page 25.

The Vancouver Stock Exchange has conditionally listed the securities being offered by this Prospectus. Listing is subject to the Issuer fulfilling all of the listing requirements of the Vancouver Stock Exchange on or before July 18, 1988, including prescribed distribution and financial requirements.

We, as Agents, conditionally offer these securities subject to prior sale, if, as and when issued by the Issuer and accepted by us in accordance with the conditions contained in the Agent Agreement referred to under "Plan of Distribution" on page 25 of this Prospectus and subject to the approval of certain legal matters on behalf of the Issuer by Lawrence & Shaw, Vancouver, British Columbia. Subscriptions will be received subject to rejection or allotment in whole or in part and the right is reserved to close the subscription books at any time without notice.

**CANARIM INVESTMENT CORPORATION LTD.**

#2200-609 Granville Street  
Vancouver, B.C. V7Y 1H2

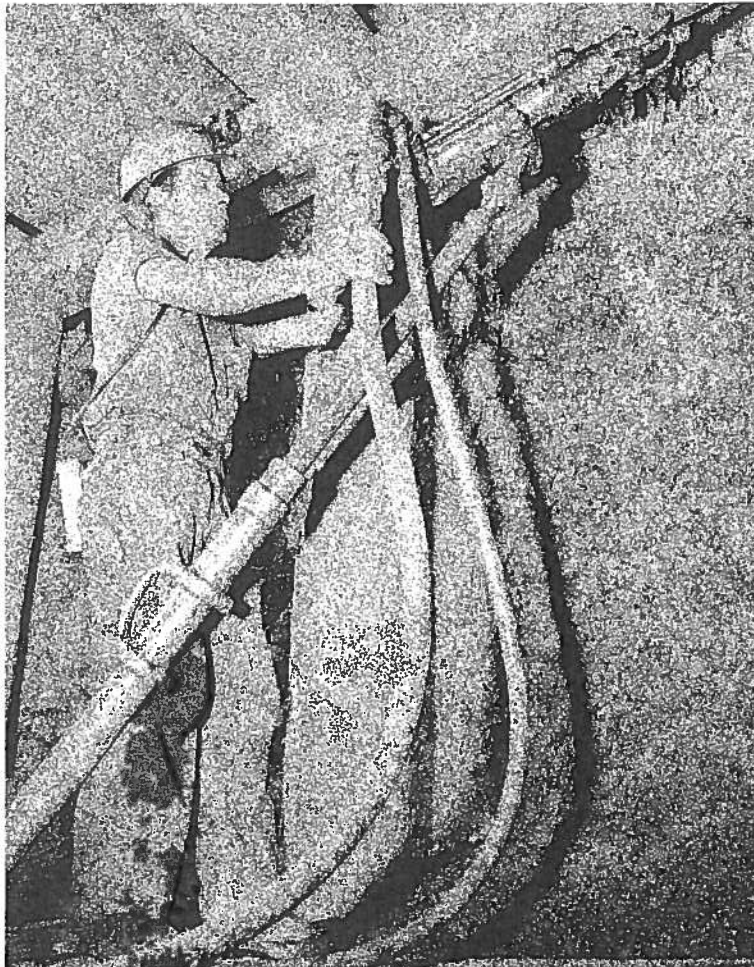
**EFFECTIVE DATE: April 15, 1988**



# BUNKER HILL

# from ore to metals

Cover: Pouring silver  
at the Lead Smelter



Miner sets a jackleg  
drill in a timbered  
stope in the  
Bunker Hill Mine.

The Bunker Hill Company, located in the famous Coeur d'Alene Mining District of North Idaho, is an important supplier to the nation's requirements for lead, zinc, silver and cadmium.

The Company's Kellogg operations annually produce approximately 125,000 tons of refined lead, 100,000 tons of metallic zinc, eight million troy ounces of silver, over one million pounds of refined cadmium and a variety of by-products. A wholly-owned subsidiary of Gulf Resources & Chemical Corporation, Bunker Hill employs 2,200 people in North Idaho and Eastern Washington.

The Company was founded following the discovery of the Bunker Hill Mine, a discovery which has grown to one of the world's largest underground lead-zinc-silver mines. The Mine is composed of over 130 miles of tunnels, crosscuts and drifts extending from approximately 3,600 feet above

sea level to nearly 2,000 feet below sea level. Since the Mine's discovery in 1885, over 35,000,000 tons of ore have been extracted.

Bunker Hill also operates the Pend Oreille Mine at Metaline Falls, Washington, and has a 70 percent ownership in the Star-Morning Mine located at Burke, Idaho. In addition, the Company also owns the Crescent Mine, a silver property located near Kellogg.

The daily production of the Bunker Hill Mine, together with lesser amounts of purchased ore, are processed through a 2400 ton per day Concentrator. This operation separates the metal values from the waste rock (tailings) producing a lead concentrate (approximately 64 percent lead and 40 ounces of silver per ton) and a zinc concentrate (approximately 55 percent zinc). The tailings are either pumped back underground to fill mined out areas or impounded in a 160 acre disposal area.

From the Concentrator, the lead concentrates are transported to the Lead Smelter and the zinc concentrates to the Zinc Plant. Both plants are custom smelters, that is they process purchased and toll concentrates in addition to Bunker Hill concentrates. Company-controlled mines supply approximately 50 percent of the Zinc Plant feed and 30 percent of the required lead concentrates. The remaining requirements are purchased from mines in Canada, South America and Australia, as well as the United States.

Once at the Lead Smelter, the concentrates are sampled, then blended with other feed materials and pelletized. This pelletized mixture is conveyed to the sinter machine where it is roasted to remove sulfur. This operation produces a porous material called sinter and a by-product gas, sulfur dioxide, which is captured and converted to sulfuric acid.

The sinter is mixed with coke and delivered to the blast furnace. As the coke burns in the furnace, it furnishes the heat necessary to reduce the sinter to two molten materials, a lead bullion and a waste product called slag. The slag is further processed to produce a zinc oxide fume before being stockpiled.

The lead bullion is next purified through a series of refining kettles. Copper, antimony and arsenic are first removed, followed by silver and gold. The silver skim is further refined to a 999+ fine product which is cast in 1000 troy ounce bars for marketing. The gold is marketed in a silver-gold alloy called dore.

With the last traces of impurities removed, the 99.97 percent pure lead is cast in marketable forms. The Bunker Hill Lead Smelter currently produces approximately 16 percent of the United States primary lead output.

Meanwhile, zinc concentrates are processed at the Zinc Plant. Here again, the concentrates are blended for the correct metallurgical balance, then dried and roasted for the removal of sulfur. The remaining product, called calcine, is mixed with sulfuric acid in large leach tanks, forming a neutral zinc sulfate solution.

The zinc sulfate solution is then pumped to the Burt filters where insolubles such as lead, silver and gold are removed. The purification section is next, where copper, cadmium, cobalt, nickel, antimony and arsenic are removed from the solution. The cadmium residue is further processed and a 99.99 percent pure cadmium metal is electrolytically recovered.

From purification, the zinc sulfate solution is drawn to the cell room. Here, by the process of electrolysis, zinc is removed from solution and deposited on aluminum cathodes in the cell boxes. The zinc deposit is periodically stripped off the cathodes, melted down and cast in marketable forms. The spent electrolyte is then returned to the leach department to be recycled. In addition to the 99.99+ percent pure special high grade zinc produced in the cell room, Bunker Hill also produces a series of zinc alloys.

The Bunker Hill Zinc Plant, which pioneered many electrolytic techniques in the 1920s, presently produces about 14 percent of the nation's special high grade zinc.

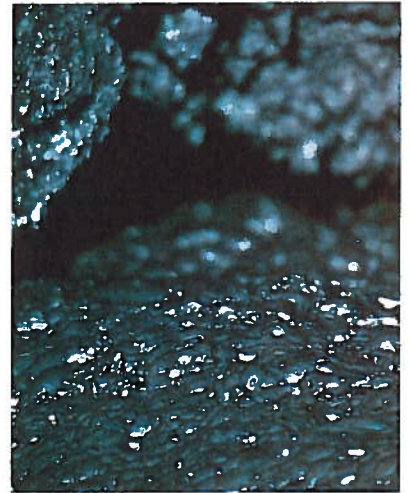
Bunker Hill also produces phosphoric acid and dry ammonium phosphate fertilizer through the North Idaho Phosphate Company, a joint venture with Stauffer Chemical Company. This plant utilizes approximately 85,000 tons of sulfuric acid each year in the production of fertilizer.



Above: Stripper replaces aluminum cathodes in the Zinc Plant cell room after zinc deposit has been removed.

Right: Lead concentrates are separated from wastes on large bubbles by a process called flotation.

Below: Operator taps the Smelter blast furnace to permit molten slag to flow from the furnace.



# **THE BUNKER HILL COMPANY**



A SUBSIDIARY OF GULF RESOURCES & CHEMICAL CORPORATION

**P.O. BOX 29**

**KELLOGG, IDAHO 83837**

**(208) 784-1261**

# environment **II**



Syringa blooming near Bunker Hill lead smelter

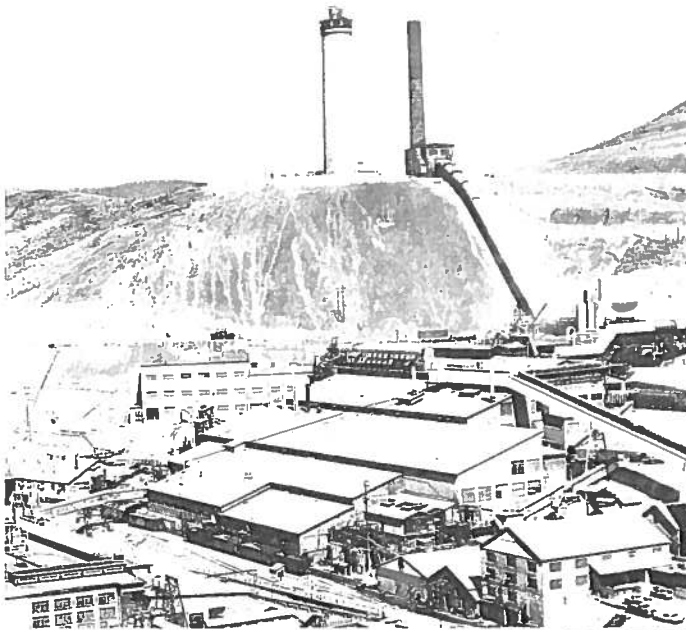
Not long ago, a smoking chimney was a sign of prosperity. Rivers and lakes served as a convenient way to dispose of industrial and community wastes. And the earth supplied what was deemed to be an inexhaustible supply of natural resources.

Today, our views are changing. Clean air, pure water and conservation are the new social standards.

The Bunker Hill Company at Kellogg, Idaho embarked on an environmental program in 1954—a program which has been expensive and is not yet complete.

During the past two decades, over \$25 million has been spent to reduce air and water pollution in Kellogg. This has required diverting funds from normal growth and replacement projects and redirecting those funds to environmental control programs, which, almost without exception, offer no return on investment.

During 1976 and 1977, for example, nearly 60 percent of Bunker Hill's capital expenditures will be allocated to environmental priorities, with only 20 percent programmed toward maintaining and 20 percent to improving plant operations.

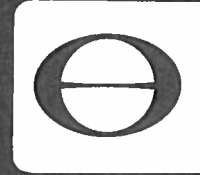
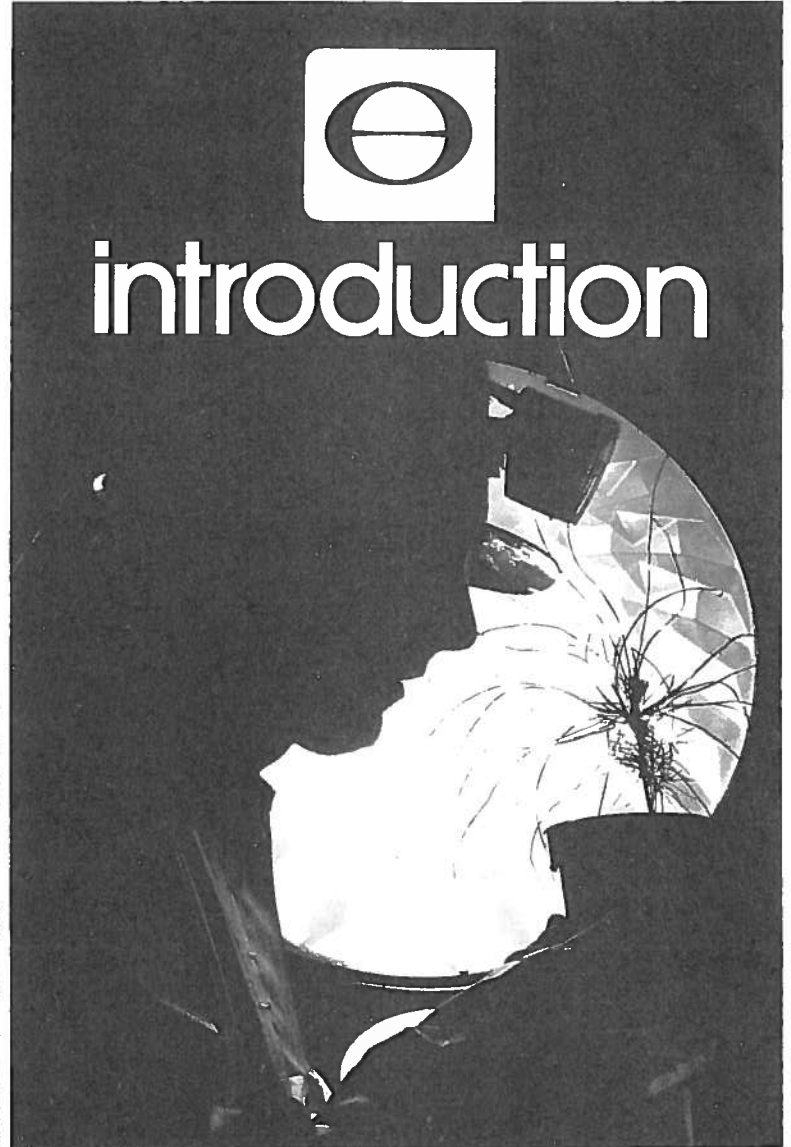


**Above left:** Construction proceeding on the new tall stack column at the zinc plant. The new stack, located adjacent to the old chimney, will be complete in mid-1977.

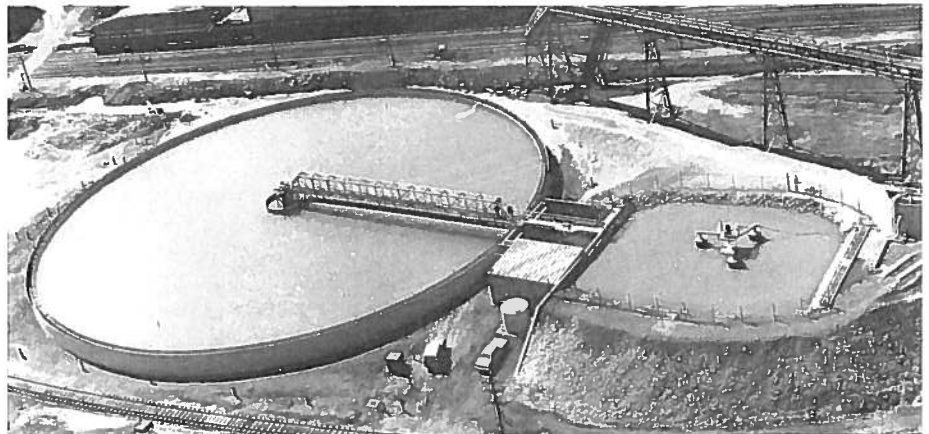
**Above right:** Revegetation engineer inspects seedling in the Company's underground greenhouse.

**Lower right:** An aerial view of the central water treatment plant completed in 1974 at a cost of \$1.3 million.

**Opposite page:** Mine safety engineer Ed Holbert places a "0" on the safety board signifying an accident free month.



# introduction





Environmental costs do not stop when the new control facility is complete. Take as an example the secondary water treatment plant completed in 1974. Each day this plant cleanses nearly six million gallons of water, consuming ten to fifteen tons of quicklime in the process. The annual cost of operating this facility is nearly \$500,000. Another example is the lead smelter acid plant. This installation consumes a constant power load sufficient to operate 461 average residential dwellings and uses enough natural gas each year to heat 824 homes—all while cleansing sinter machine exhaust of sulfur dioxide.

*Environment II* is the second in a series of annual publications documenting the continuing progress of The Bunker Hill Company toward meeting its environmental goals.

The past year has been a time of significant progress in the Company's environmental control program. Construction began on two tall stacks. Six in-plant projects were completed to reduce particulate emissions. The Shoshone Project revealed no adverse effects in area children who had displayed elevated blood levels. Safety performance improved dramatically during the year. And the valley near Kellogg is greener as another 100,000 trees were planted in the continuing revegetation program.

Although legal differences between the Environmental Protection Agency and Bunker Hill on water and sulfur dioxide remain unresolved, we are working hard in these areas and are confident that these problems can also be successfully solved.

Bunker Hill has made significant progress in meeting the new social standards. The resourcefulness and dedication of our people assure that those problems which remain will be corrected as the technology is developed and equipment becomes economically available to do the job.

## -glossary of terms-

**AIR**—So-called pure air is a mixture of gases containing about 78 percent nitrogen, 21 percent oxygen, less than one percent of carbon dioxide, argon and other inert gases and varying amounts of water vapors.

**AIR MONITORING**—The continuous sampling for and measuring of pollutants in the atmosphere.

**AIR QUALITY CONTROL REGION**—An area where two or more communities, either in the same or different states, share a common air shed.

**AMBIENT AIR LEVEL**—Amount of particulate matter or foreign gas in the surrounding air.

**CONTAMINATION**—The introduction of an undesirable substance into a medium which would not be present were it not for man's activities.

**ECOLOGY**—The science of the relationships between living organisms and their environments.

**EFFLUENT**—Generally something that flows forth, like a stream flowing out of a lake. In terms of pollution, an outflow of a sewer, storage tank, canal or other channel.

**EMISSIONS STANDARDS**—The maximum amount of a pollutant permitted to be discharged from a single source.

**LOST TIME ACCIDENT**—An injury which prevents an employee from reporting to work on his or her next regularly scheduled shift. Also called a disabling accident.

**PARTICULATE**—A particle of solid or liquid matter.

**SULFUR DIOXIDE—SULFUR OXIDES**—Pungent, colorless gases formed primarily by the combustion of fossil fuels containing sulfur. Are considered major air pollutants.

**VARIANCE**—Permission granted by regulatory agencies to continue emissions for a limited period of time, usually while corrective measures are being taken.

# **THE BUNKER HILL COMPANY**



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# BUNKER HILL



# SUPERFUND

**A Field Guide to the Bunker Hill Superfund Site  
Kellogg, Idaho**

prepared for the

Pacific Northwest Metals Conference, Spokane, Washington  
April 9, 1994

by

Earl H. Bennett  
John A. Riley

April, 1994

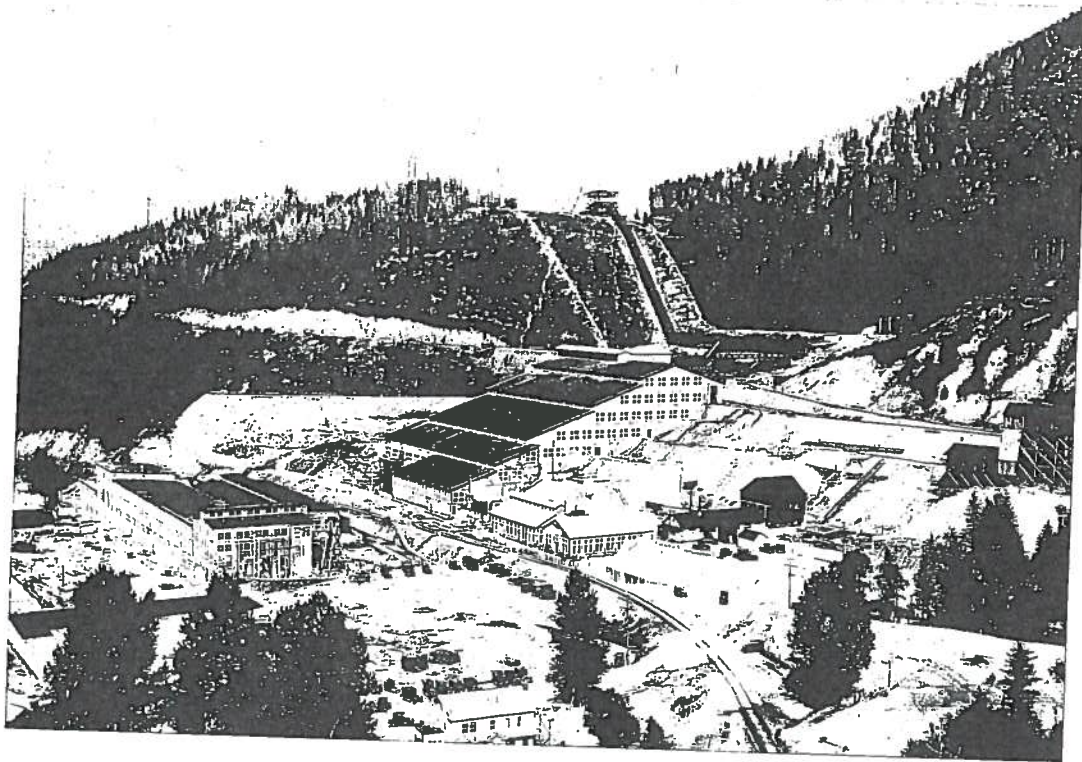


Figure 8. The first electrolytic zinc plant in the United States constructed in Government Gulch by Bunker Hill in 1928. Notice the tree cover behind the plant.

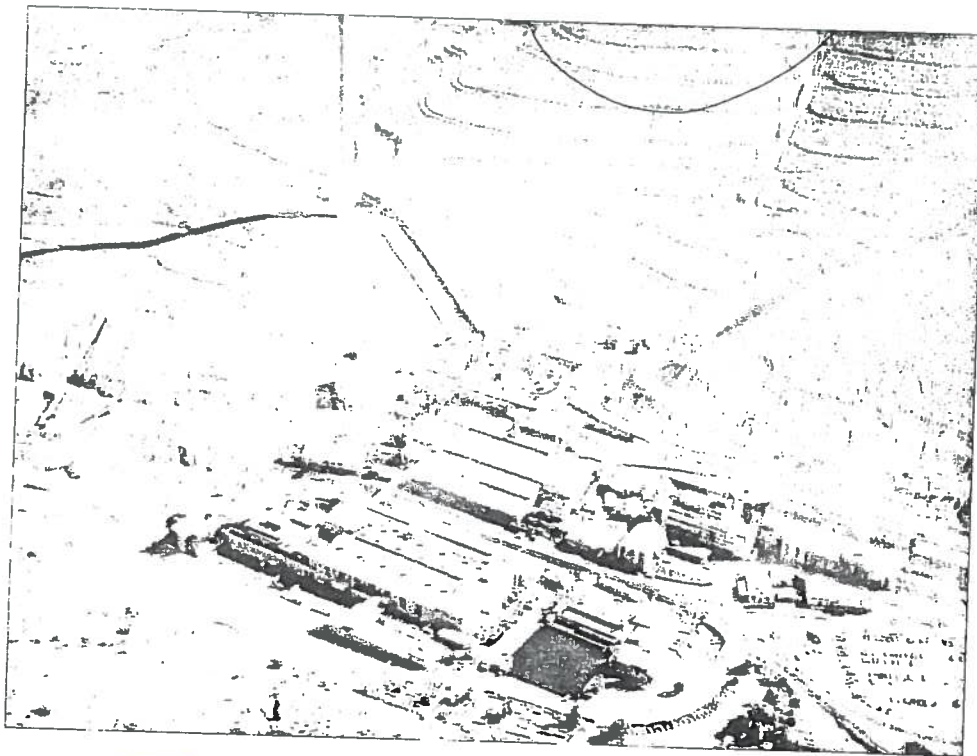


Figure 9. The zinc plant in 1981. The smoke stack is 610 feet high. Notice the lack of trees compared to Figure 8. The barren hillsides here and behind the smelter are a result of fire and sulfur dioxide emissions from the plant's smoke stacks. A key objective, and one of the most visible successes, of Superfund and earlier cleanup efforts is the revegetation of these hillsides.



# Cleanup of the Bunker Hill Superfund Site:

## An Overview



# What's Been Done to Address the Problems?

## Response to High Lead Levels in Blood

In 1974, one year after the fire at the smelter, extremely high levels of lead were found in a sick child's blood in the area. The child's doctor requested that the Panhandle Health District conduct an investigation. Samples were taken that indicated the child was exposed to elevated levels of lead in yard soils, the house dust and the air.

In response, the Idaho Department of Health and Welfare (IDHW), Centers for Disease Control and Prevention (CDC), and the Panhandle Health District conducted a surveillance program to determine how widespread the problem was in the community. The results showed that many of the local children had blood lead levels above 40 micrograms of lead per deciliter of blood (known as µg/dl), the level at which medical intervention

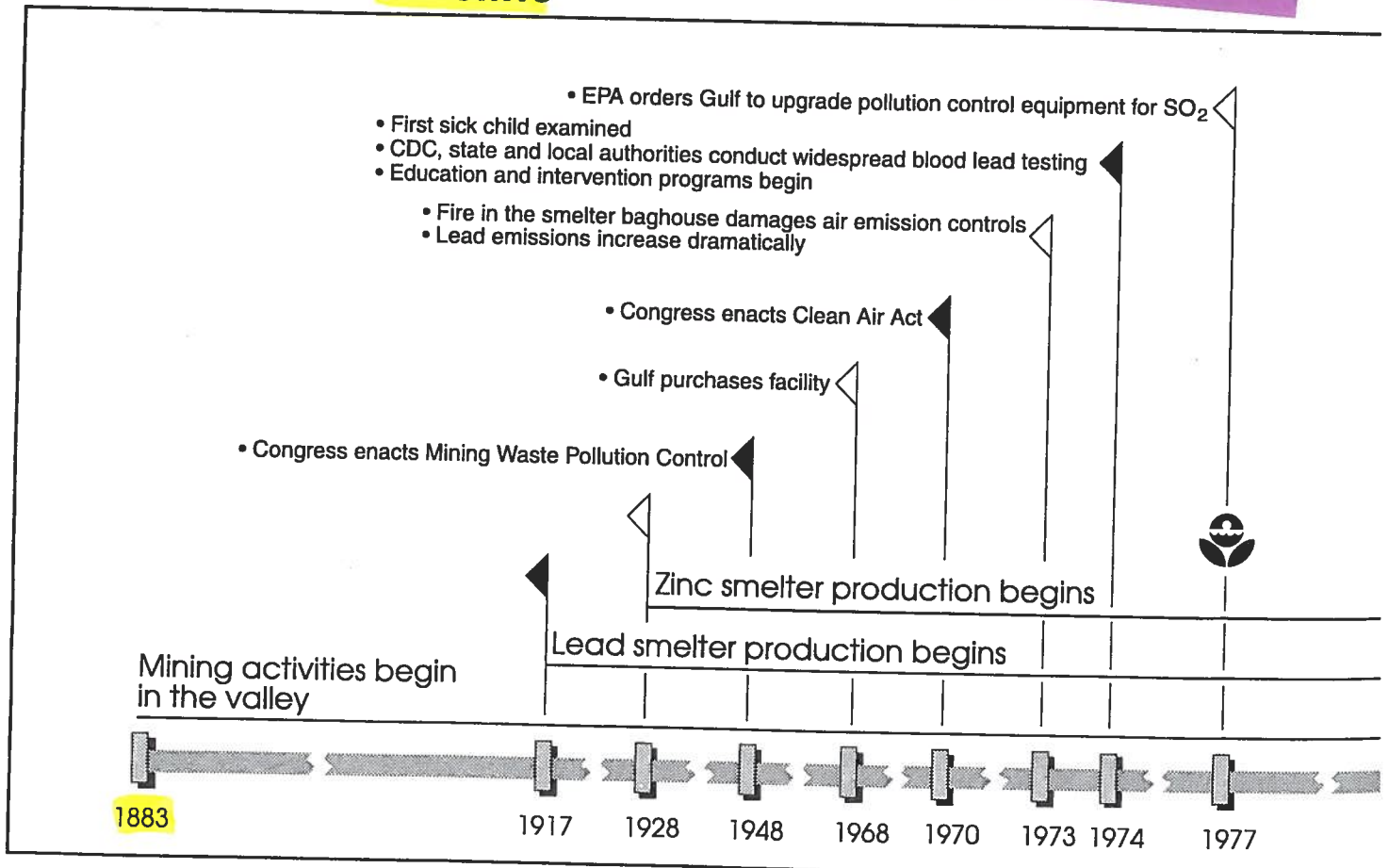
was recommended at the time. The study showed the need to reduce the public's, especially children's, exposure to lead.

With funding from the CDC, a health intervention and education program was implemented by the IDHW Division of Health and the Panhandle Health District to prevent further exposure to lead. This program included regular blood lead testing and outreach to citizens to inform them of what to do to reduce their exposure to lead.

## Levels of Lead in Blood Decrease

Due to cleanup and education activities, there has been a large decrease in the lead levels in children's blood throughout the Silver Valley. At the same time, new information has been discovered showing that lead has more severe effects on the human body than previously thought. In 1985, as a result of the new

## Bunker Hill Site **Timeline**

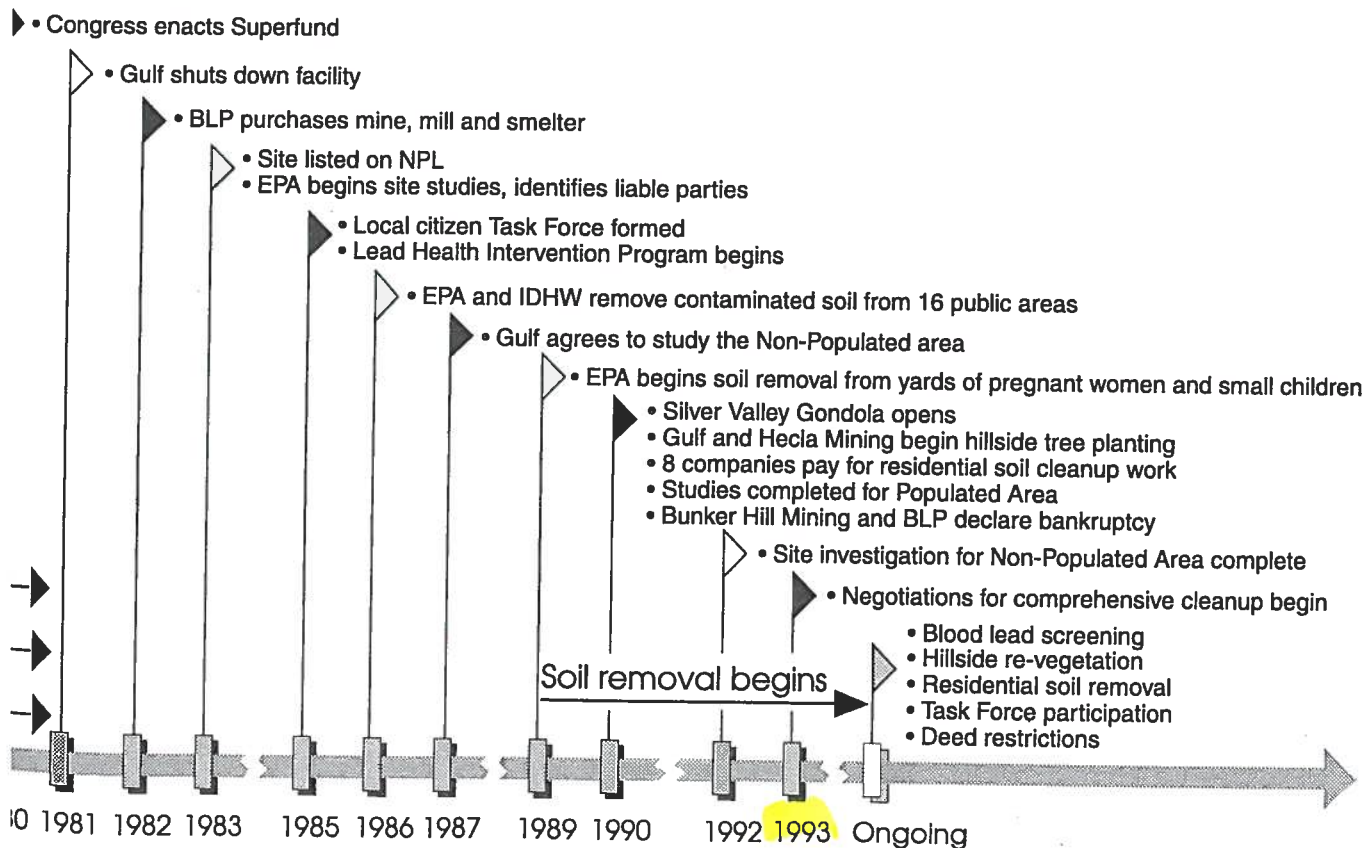


information, the CDC changed the "level of concern" from 40 µg/dl to 25 µg/dl, making it more conservative. A study done in 1983 showed that approximately 25% of the children in the valley had blood lead levels above 25 µg/dl. Since 1985, there has been regular, voluntary blood lead screening available for the children in Wardner, Page, Smeltonville and Kellogg. Based on more information on the effects of lead on children, the CDC lowered the "level of concern" again in 1991 from 25 µg/dl to 10 µg/dl. While the last study conducted in 1993 showed that 18% of children had blood lead levels equal to or above 10 µg/dl, the current average blood level is less than 7 µg/dl. Cleanup and education activities at the Bunker Hill site are working toward reducing and keeping the lead levels in blood below 10 µg/dl.

## Bunker Hill Becomes a Superfund Site

Bunker Hill was added to the National Priorities List (NPL) in 1983, and EPA and the IDHW began to investigate the nature and extent of the contamination in order to determine what type of cleanup was needed. EPA and IDHW divided the studies into two parts: the "Populated Area" and the "Non-Populated Area". The "Populated Area", which includes the residential communities, was addressed first because of the high risks to human health from the lead contamination. The "Non-Populated Area" includes the smelter complex, tailings impoundments, surrounding hills, ground water, sediments and surface water, dust and adjacent commercial properties.

The Agency for Toxic Substances and Disease Registry (ATSDR) was created by the Superfund law and it has been the primary federal agency for providing funding for annual blood lead screening and the health intervention program at the Bunker Hill site.





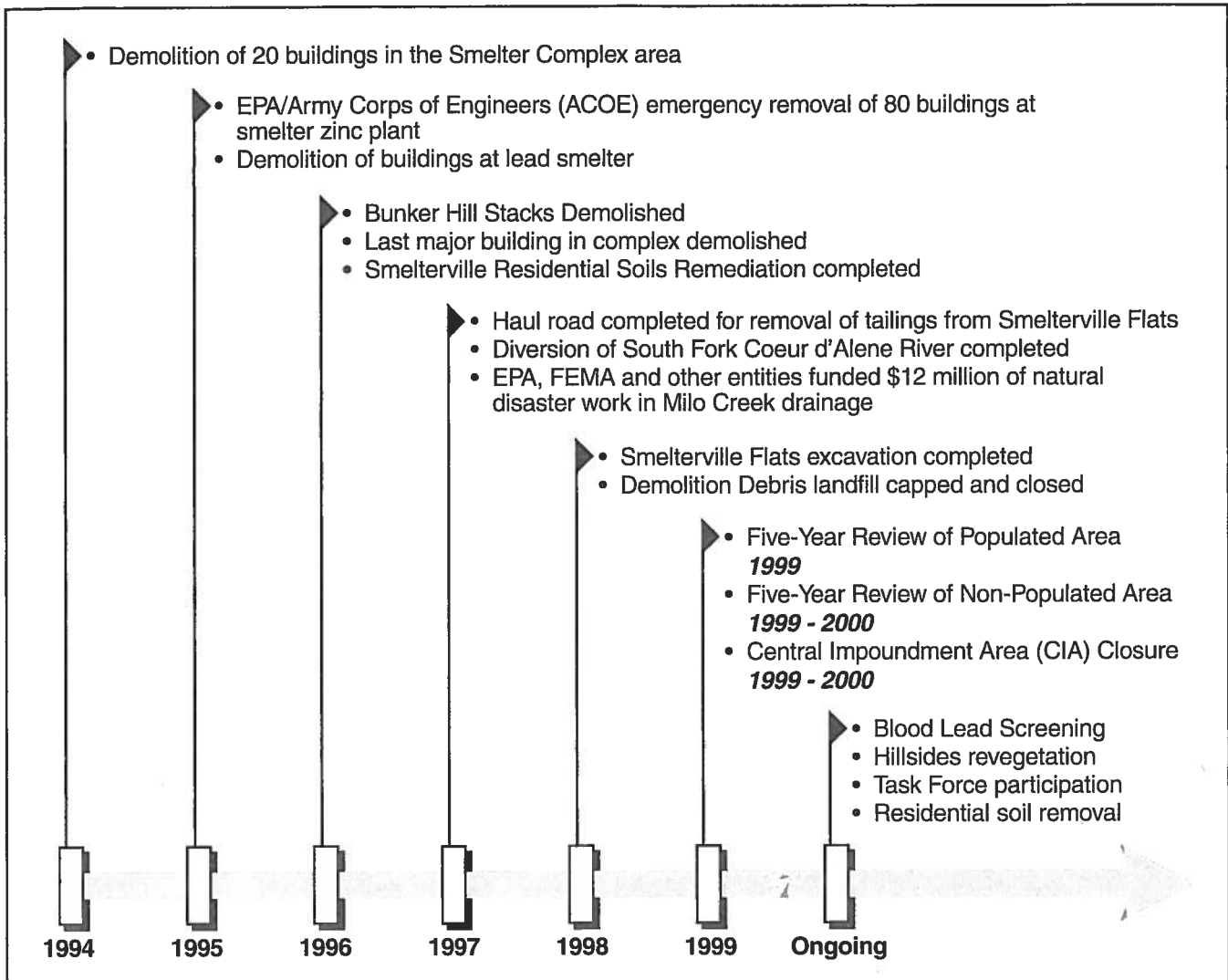
# Superfund Cleanup at Bunker Hill:

## An Overview



*Aerial Hydroseeding of Bunker Hill Hillsides, September 1998*

# Bunker Hill Timeline



*This timeline covers the major cleanup activities at Bunker Hill since 1994.*

## ***Non-Populated Area Cleanup***

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### ***What Other Work Has Been Done?***

#### ***Hillsides Project Update***

Planting trees and other vegetation on hillsides is an important part of the cleanup at Bunker Hill. Planting reduces erosion, helps prevent contaminated sediments from moving down the hillsides into residential yards and the river, and is part of the EPA/IDEQ chosen remedy.

In September 1998, crews used helicopters and hydroseeding equipment to begin hillside revegetation. The hillsides targeted for 1998's efforts were the east and west slopes of Government Gulch and hillsides near Deadwood Gulch. Because many of the hillsides were inaccessible by land-based equipment, a Sikorski sky crane helicopter was used to apply some of the revegetation materials. In this first phase of a three-year project, approximately 200 acres were revegetated. In the spring of 1999, EPA plans to

*Helicopter Hydroseeding Bunker Hill Hillsides, Fall 1998.*



*Bunker Hill Hillsides.*

lime soils on other hillsides, and do more revegetation work in the fall of 1999.

#### ***Hillsides Project Background***

In the late 1970's, Gulf Resources planted over one million trees which have had a 90% growth success rate. These trees are flourishing today and have greatly helped to reduce erosion.

In 1990, EPA, Pintlar Corporation, and Hecla Mining Company signed an agreement to revegetate and stabilize hillsides within the Bunker Hill Study Area. Approximately 1.75 million seedlings had been planted on Bunker Hill hillsides before EPA began its hillsides work. By December 1994, nearly a million additional trees were planted and over 50 miles of terraces constructed.

In 1995, EPA and IDEQ worked with the City of Smelterville to address hillside sloughing problems, and ordered seedlings, grasses, and shrubbery which were planted in the spring of 1996. In 1997, EPA oversaw the planting and monitoring of test plots to collect data that assisted with developing a design for full-scale revegetation.



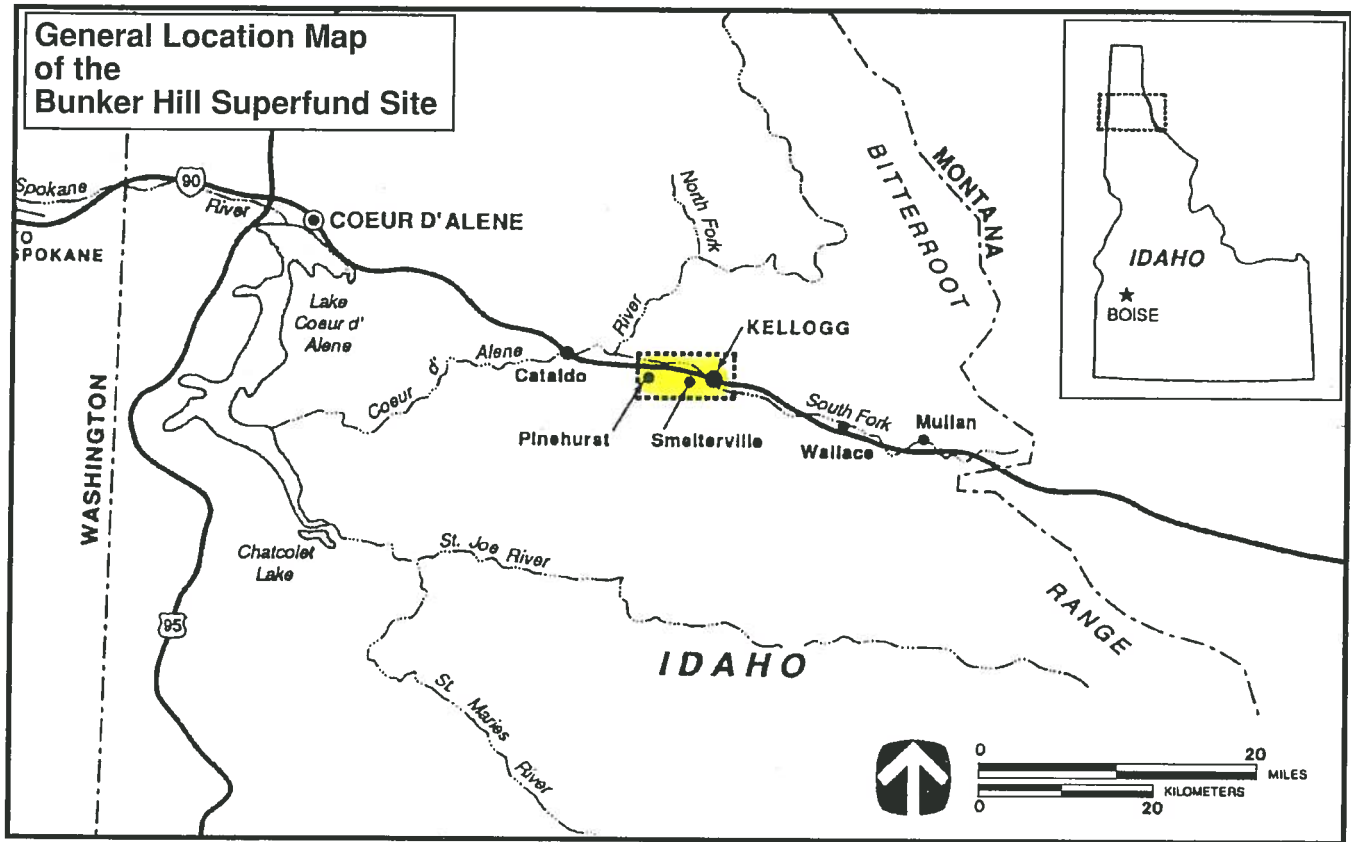
# The Bunker Hill Superfund Project:

## *A Brief Overview*



# The Bunker Hill Superfund Project

One of the oldest Superfund sites in the nation, the Bunker Hill project is also one of the most complex. The site covers 21 square miles, affects three incorporated communities, and approximately 5,000 people. Lead contamination is widespread in the soils and water.



The Bunker Hill Superfund Project is one of the largest cleanups being undertaken by the U.S. Environmental Protection Agency in Region 10. This brochure is designed to give you a quick overview of the history of the site, work that has gone on since May 1985, and the work planned for the summer of 1989.

*This Document Produced by:*

**The U.S. Environmental Protection Agency**  
in cooperation with  
**The Idaho Department of Health and Welfare**  
and  
**The Panhandle Health District**



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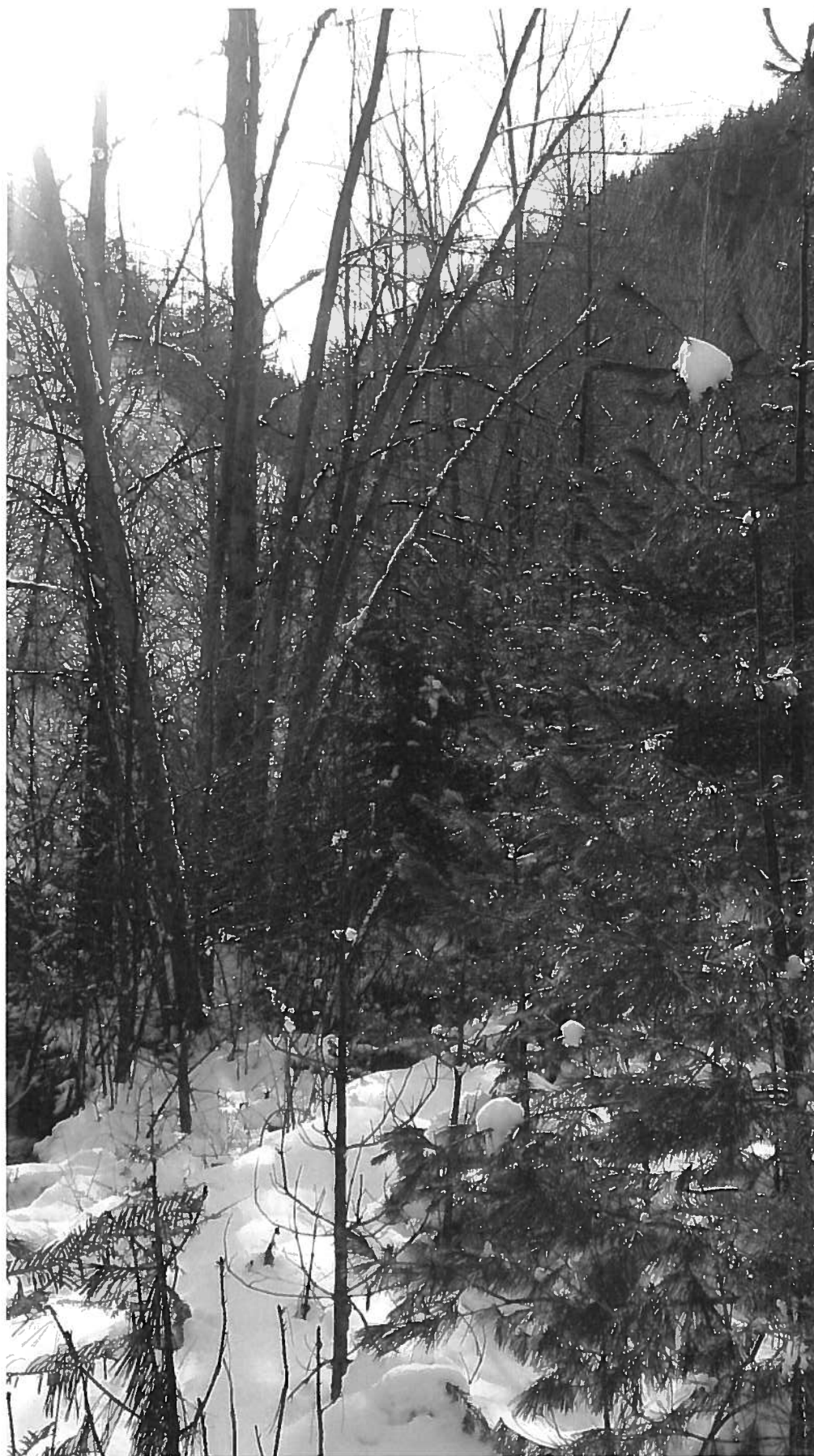










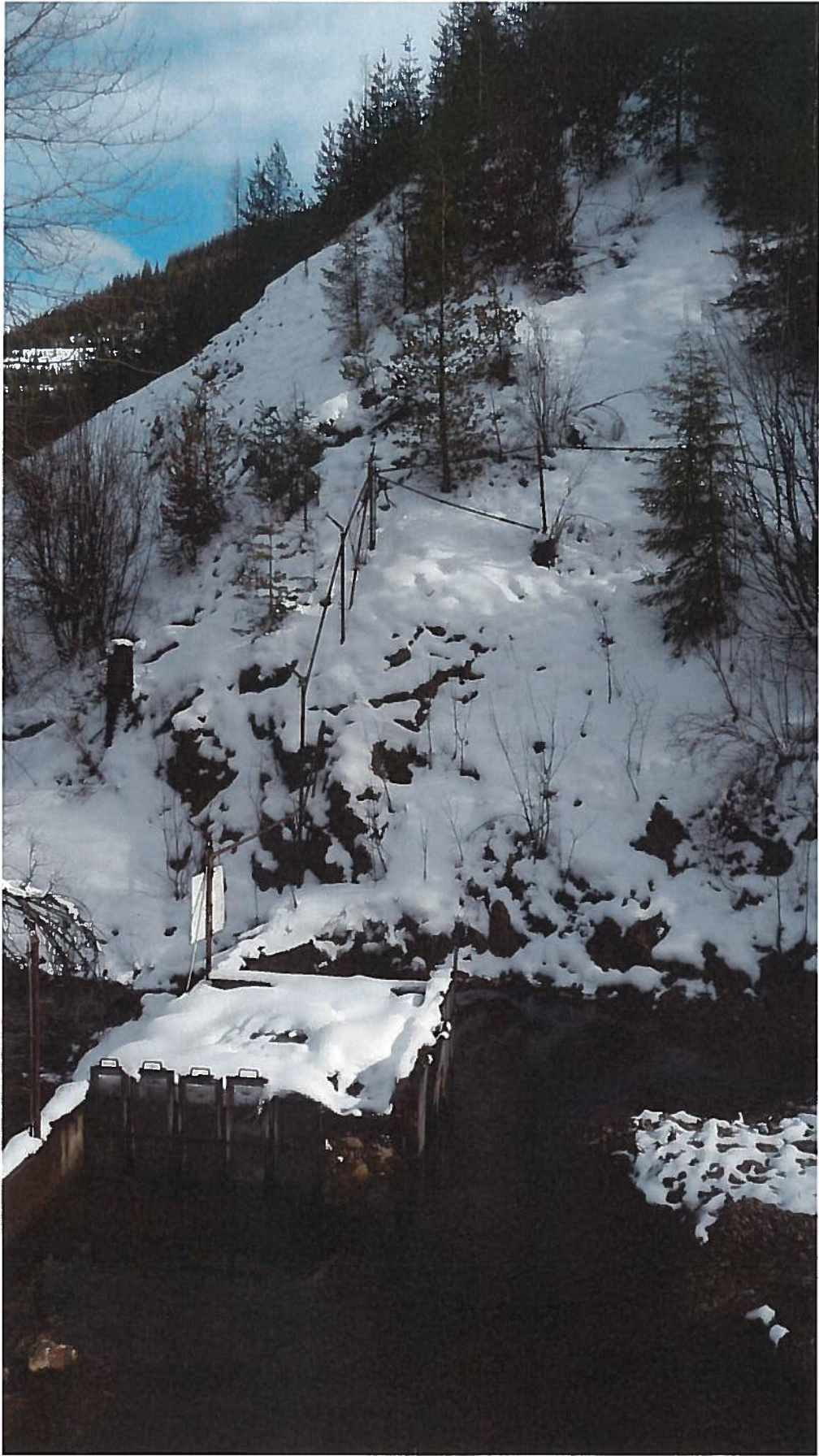












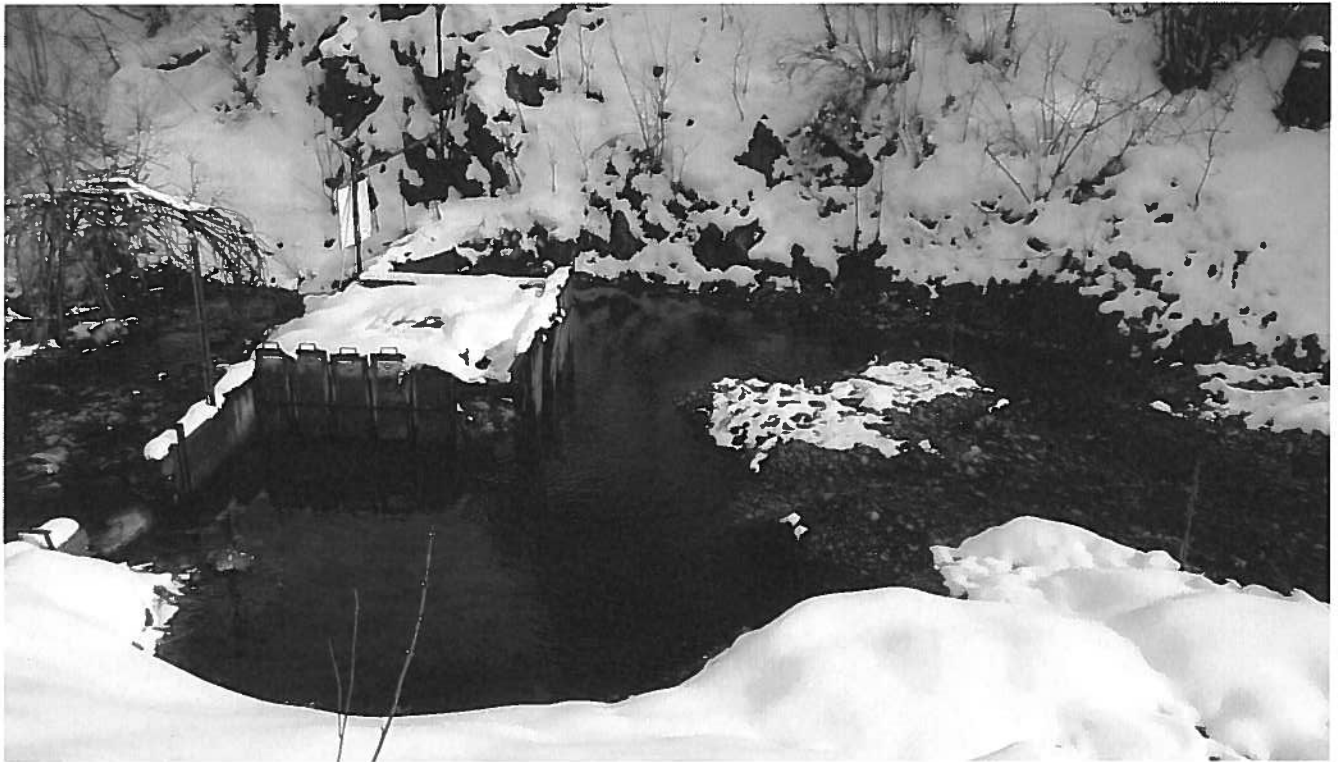


























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Government Gulch

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Western Photo

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Even Rice Hill

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