ENVIRONMENTAL INFORMATION

CABOT CORPORATION
KBI DIVISION
BOYERTOWN, PA

AUGUST 3, 1982

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SECTION I

COMPANY BACKGROUND INFORMATION

1-1 Company Background

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1-3 Raw Materials

Background Information

The principal products of the KBI Division are aluminum-based master alloys and refractory metals. Aluminum master alloys are marketed to the primary and secondary aluminum producers as grain refining and hardening agents. These are alloys that have been pre-alloyed or pre-mixed with pure aluminum in precise quantities. They are available in a variety of forms; waffles, slabs, shot, flake, and coiled rod - each designed to make final alloying in the furnace proceed faster, more uniformly, and more predictably than if the pure elements or salts were added directly to the melt.

The refractory metals, tantalum and columbium and their alloys, are produced in wrought forms for non-electronic applications such as chemical process equipment, various industrial, aerospace and medical applications and the production of high-temperature alloys. Electronic-grade tantalum is produced as powder, foil and wire for electrolytic capacitors. Other electronic materials include columbium, cesium and germanium.

In addition to the Boyertown plant, KBI products are manufactured in three other plants in the United States and in three jointly owned plants located in The Netherlands, England and Japan.

RAW MATERIALS

Review of Radioactivity in Raw Materials and Wastes Associated with the Production of Tantalum and Columbium:

A. Raw Materials:

Uranium and Thorium are present in varying concentrations (0.05 to 15%) in Tantalum-bearing slags and ores as unwanted contaminants. The following types of raw materials are essential to the production of Ta and Cb:

1. Slags

Eastern Tin Slags - contain natural Uranium and Thorium in the form of silicate glasses. The U and Th are uniformly distributed in the black glass-like slag that is imported from Malaysia. Typical concentrations of 0.11% U and 0.35% Th can produce gamma radiation levels of about 1.2 mR/hr at contact.

Thaisarco Tin Slags - are similar to the above and can contain 0.09% U and 0.21% Th which may result in radiation levels of 1.2 mR/hr at contact.

2. Ores

KBI is a division of Cabot Corporation which is engaged in the production of metals, alloys and chemicals. Two of the principle products are Tantalum and Columbium metals, alloys and chemicals.

The starting raw materials for these products currently being used are ores, concentrates, slags and residues. These materials contain unwanted small quantities of natural Uranium and Thorium. Some of the typical materials are listed below along with their Uranium and Thorium concentrations and the radioactivity measurements on contact.

Type of Material	% U	% Th	Contact Radiation mR/H
* Tin Slag (Malayan)	.11	.35	1.2
TaCb concentrates	.02 .019	.04 .2 .024	0.1
Tantalite	.04 .07	.05 .30	1.5

Type of Material	% U	% Th	Contact Radiation mR/H
Pyrochlore	.55	.88	1.5
	.09	2.04	
Tanco Ore	.06	.12	1-4
	.52	.05	
	.088	.024	
	.12	.10	
Columbite	.06	.25	.2
	.2	1.2	
Thairsarco Tin Slag	.09	.21	1.2

* Type of material which was prccessed at Reading Tulpehocken St.

Since some of these materials contain in excess 1/20th of 1% Uranium and Thorium separately or combined, they are required to have a Source Material License under Title 10 Part 40 of the Code of Federal Regulations.

While processing and extraction are proprietary, these materials are ground and digested in Hydrofluoric acid. The Ta & Cb are solubilized in the form of fluotantalic acid (H_2TaF_7) and fluocolumbic acid (H_2CbF_7) and processed into the company's products. The unwanted Uranium and Thorium precipitate along with some of the gangue in the digestion sludge. This sludge is about 40% moisture. The average percent U & Th is 1% and typical radiation on point of contact is 2 mR/H. This sludge is stored in concrete buildings on our property.

We asked our geologist, Richard V. Gaines, how the Thorium and Uranium occur in the ore we process and a copy of his letter dated April 30, 1982 is attached. (Attachment 1) In the past our work has shown that all of the Uranium and Thorium portion of the ores is extremely insoluble in the hydrofluoric acid digestion. These elements remain insoluble as UF_4 and ThF_4 in the sludge. X-ray diffraction of our sludge material shows it to be a mixture of $CaAlF_5$; $KMgAlF_6$; CaF_2; $CaMg_2AlF_{12}$ with smaller amounts of SiO_2 and SnO_2 which describes the solid portion of our waste.

To our knowledge no gaseous waste material is generated or released to unrestricted areas. The waste solution remaining after the Tantalum and Columbium extraction is treated in our waste plant with lime. The major constituent of these solutions being fluoride and sulfate we get a precipitate of CaF_2 + $CaSO_4$ and the resultant filtrate is transferred after clarification to a lagoon previous to discharge. Our lagoon waste is always well below the MPC for U and Th. (See attachment 2, Lagoon #6 uCi/ml data.)

CABOT MINERAL RESOURCES

April 30, 1982

F. T. Coyle
KBI
Division of Cabot
County Line Road
Boyertown, PA 19512

Dear Frank:

In reply to your query about the node of occurrence of uranium and thorium in tantalum-bearing slags and ores, I can say the following:

1. Slags - U and Th are in the form of silicate glasses. Hence they are uniformly distributed in the slag.

2. Ores:

   A. Tantalite - columbite ores. Here the uranium may be in discrete grains of uraninite mixed with the tantalite/columbite, as a constituent in such complex oxide minerals as samarskite, euxenite, or fergusonite; as minute blebs of the forgoing minerals within tantalite/columbite crystals; and it is thought by some that U and Th can enter into the crystal lattice of columbite/tantalite, although I am not sure that such a mode of occurrence has ever been proven.

   B. Samarskite - euxenite - fergusonite etc. ores: These minerals are always high in U and/or Th. However, because of their complexity and the problems of processing, they are not normally used as ores of Ta and Nb.

      Concentrates of columbite tantalite which also contain monozite, zircon or xenotime will also contain a little U or Th which can enter into the lattice of these minerals.

   C. Microlite or microlite-containing ores: In some regions microlite constitutes an important source of tantalum (and pyrochlore of niobium). Both microlite and phrochlore can take substantial amounts of U and Th into their lattices, and it is rare to find microlite or pyrochlore completely free of radioactive elements.

(More) . . .

220 EAST FORTY SECOND STREET, NEW YORK, N.Y. 10017, U.S.A. TEL. (212) 949-0888, TELEX: 645 757 CABMIN-NYK

D. "Tanco" Ores: The Tanco concentrates invariably contain several percent, up to 20% or more, of microlite, and it is believed that this mineral accounts for most of the radioactivity associated with these concentrates.

Richard V. Gaines

Richard V. Gaines
Geologist

RVG/dja

cc: RABrumwell
RBGrabowski
MJIan

EFFLUENT #6 LAGOON

Date	µCi/ml
3-30-77	$(0.0 \pm 6.9) \times 10^{-9}$
5-17-77	$(0.0 \pm 2.5) \times 10^{-10}$
7-13-77	$(0.0 \pm 6.3) \times 10^{-10}$
10-20-77	$(0.0 \pm 2.8) \times 10^{-10}$
3-28-78	$(3 \pm 6.9) \times 10^{-10}$
7-23-78	$(0.0 \pm 4.6) \times 10^{-10}$
2-2-79	$(0.0 \pm 6.7) \times 10^{-13}$
5-4-79	$(0.0 \pm 7.94) \times 10^{-10}$
8-5-80	3.6×20^{-10}
6-2-81	$(0.0 \pm 3.1) \times 10^{-10}$
10-21-81	$(0.0 \pm 3.1) \times 10^{-10}$
1-15-82	1.505×10^{-9}

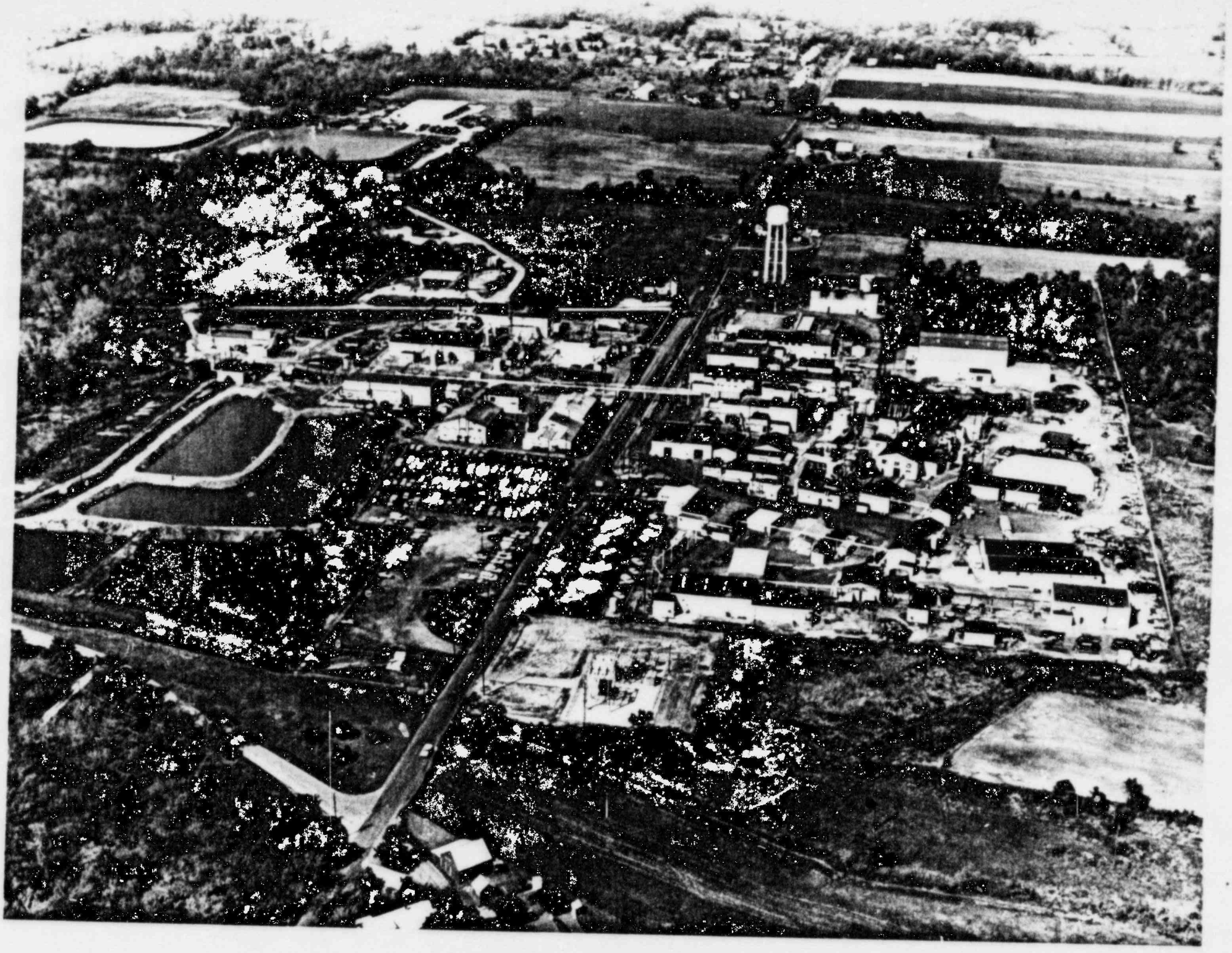
SECTION II

SITE INFORMATION

2-1 Plant Photograph

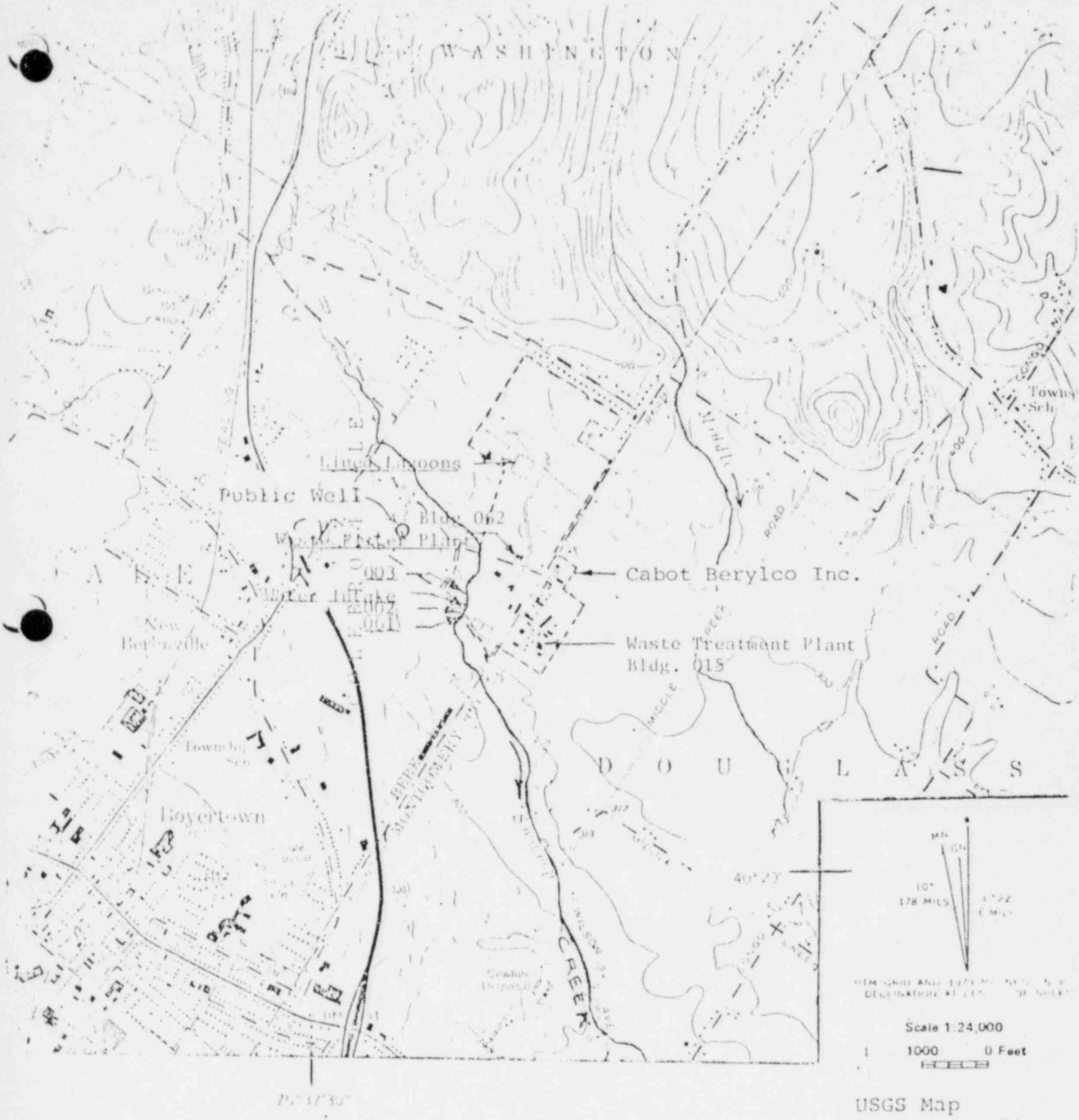
2-2 Plant Location Plan

2-3 Regional Description



SITE INFORMATION

1	Columbium and Tantalum Ore Digestion (Bldg. 073)
2	Columbium and Tantalum Extraction (Bldg. 074)
3	Cb_2O_5 Kiln
4	Mausoleums
5	Wastewater Neutralization Plant
6	Wastewater Filtration Plant
7	Treated Wastewater Storage Lagoons
8	Emergency Containment Basins
9	Pit Ambient Air Sampling Station
10	Engineering Ambient Air Sampling Station
11	Boilerhouse Ambient Air Sampling Station
12	Swamp Ambient Air Sampling Station



USGS Map
Boyertown, PA
Sassamansville, PA

Location Map
Cabot Berylco Inc.
Douglass Township
Montgomery County, Pennsylvania

Site Information

KBI's Boyertown plant is located on County Line Road and is situated in Colebrookdale Township, Berks County and Douglass Township, Montgomery County

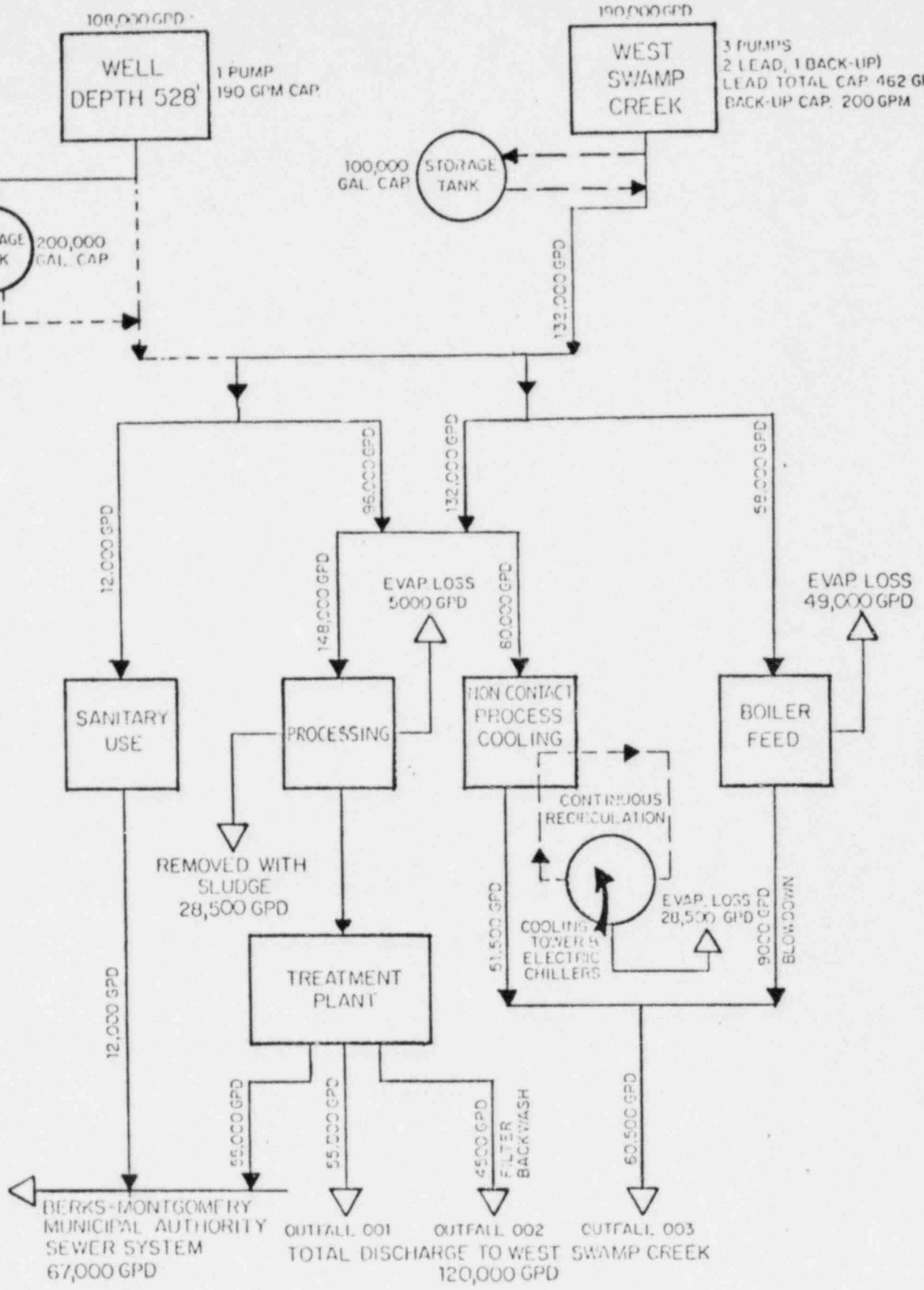
The plant owns approximately 160 acres of land. The area around the plant is mostly rural with come commercial and industrial development to the west of the plant.

SECTION III

PLANT WATER USE

3-1 Water Use Schematic

3-2 Wastewater Treatment Plant Operation



WATER USE DIAGRAM

KBI DIVISION CABOT CORP.

BOYERTOWN, PENNSYLVANIA

WASTE PLANT OPERATING MANUAL

WASTE PLANT

BOYERTOWN PLANT OF KBI

I. INTRODUCTION

This operating procedure is primarily designed to insolubulize fluoride via lime treatment. Important secondary benefits, however, include precipitation of heavy metals and sulfates and elimination of acidity. The procedures and equipment are designed to reduce total liquor phase fluoride to <30 mg/l in the waste filtrate tank and will insure smooth and consistent treatment operations.

II. METHOD FOR CHANGING OPERATING PROCEDURE

A. Development Changes:

In order to achieve this objective, a large number of procedural modifications will be necessary. All such test modifications will be in writing, will be signed by R&D and the Production Supervisor and posted at the Waste Plant. Copies of the proposed test modification will be sent to the distribution list for the TOP; except for emergencies, this distribution will take place in advance of each change to allow for comment.

B. Permanent Changes:

This operating procedure has been developed to reduce F^- in the wastes currently produced at the Boyertown plant. As new production processes are started or old processes modified, changes to the TOP must be made. All permanent changes to the TOP must be formally written and submitted for the same approval and acceptance as the initial procedure.

C. Emergency Changes:

From time to time emergencies will occur and production supervision will determine that it is necessary to deviate from

the TOP. The exact nature of each deviation must be reflected in the run sheets and the production supervisor or foreman must approve the change by his signature.

III. WASTE SEGREGATION AND TREATMENT EQUIPMENT

The major tankage and controls utilized by the waste treatment department are summarized in Figures 1 and 2. The schedule for waste segregation is summarized in tank Legend following Figure 1. Any changes or additions to the segregation schedule must be formally approved by those approving the TOP as well as any process changes which will alter the constituents or concentrations of the waste streams.

SEGREGATION TANKS

S-1 Ta Powder waste Segregation

Location: Building 046

Capacity: 46,000 Gal.

Pumped to: T-1, T-2, T-3, T-6, T-7

Pumping Controls: Manual ON/OFF at Control Board - Auto Off when Tank S-1 is empty

Material: FRP-At LAC 382

Raw Waste Inputs

1. Ta Powder Wastes from Buildings 046, 032, 047, 053
2. Leach waters-Bldg. 047
3. Reactor Washings-Bldg. 042
4. Acid Washes-Bldg. 047 Sump

S-2 Non-Complexed & Complexed Liq. Liq. Segregation

Location: Tank Pad Bldg. 019

Capacity: 24,000 Gal.

Pumped to: T-1, T-2, T-3, T-4, T-5, T-8

Pumping Controls: Manual ON/OFF at Control Board - Auto Off when tank S-2 is empty

Material: FRP-J & H 497 F

Raw Waste Inputs

1. From Bldgs. 073 & 074
   a. Floor washings
   b. Scrubber Blowdown
   c. Press cake pad water
2. From Bldg. 055 (non-ammonia)
   a. Sump-acid wastes
   b. Scrubber water + blowdown
   c. Pad water accumulation
3. From Bldg. 019
   a. Scrubber blowdown

SEGREGATION TANKS (Cont'd)

S-3A Weak Water Waste Segregation

Location: Tank Pad Bldg. 019

Capacity: 26,000 Gal.

Pumped to: L-1, L-2, T-3, T-4

Pumping Controls: Manual ON/OFF at Control Board - Auto Off when Tank S-3A is empty

Material: Wood-Fir, Insert Liner

Raw Waste Inputs

1. Water from Tank S-3B
2. Boiler blowdown
3. Foundry Sump Water from casting cooling

S-6 Weak Water Waste Segregation and Transfer Tank

Location: Bldg. 019

Capacity: 15,000 Gal.

Pumped to: Tank S-3A

Pumping Control: Auto ON/OFF at Tank

Material: Fiberglass

Raw Waste Inputs

1. Water from Tank S-3C
2. Bldg. 019, 023 & 024 Sumps
3. Steam condensate
4. DI Regeneration Waste

S-3C Weak Water Waste Segregation

Location: Bldg. 030

Capacity: 10,000 Gal.

Pumped to: Tank S-6

Pumping Controls: Manual ON at Base of Tank. Auto OFF when S-3B is full Auto OFF when S-6 is empty

Raw Waste Inputs

1. Bldg. 030, 050, 058 Scrubber bleed off and sumps

SEGREGATION TANKS (Cont'd)

S-4 TiZr/K_2TaF_7 Waste Segregation

Location: Tank Pad - Bldg. 019

Capacity: 36,000 Gal.

Pumped to: T-1, T-2, T-3, T-7

Pumping Controls: Manual ON/OFF at Control Board Auto Off when Tank S-4 is empty

Material: FRP-At LAC 388

Raw Waste Inputs

1. Ti Liquor, Ti Washes
2. Zr Liquor
3. K_2TaF_7 Mother Liquor

17-C Complexed Liq. Liq. Segregation

Location: Bldg. 074

Capacity: 16,000 Gal.

Pumped to: S-2

Pumping Controls: Manual ON at Bldg. 074. Auto OFF at Tank S-5B with back-up OFF

Material: Fiberglass

Raw Waste Inputs

1. Cb Raffinate
2. Ta Raffinate
3. 24 inch press wash
4. ODS pump flush
5. Tank 17-A back-up for 17-C

LIME SLURRY TANKS

L-1 Lime Slurry Makeup Tank

Location: Bldg. 015 (Waste Plant)

Capacity: 35,000 Gal.

Pumped to: L-2 and L-3

Pumping Controls: Manual ON/OFF at Bldg. 015 (Waste Plant)

Input

1. Weak Water Waste from S-3A
2. Fresh Water from Bldg. 015
3. Bulk Lime Delivery
4. Condensor Cooling Water

L-2 Lime Slurry Hold Tank

Location: Tank Pad - Bldg. 019

Capacity: 45,000 Gal.

Pumped to: L-3, NH_3 Stripper

Pumping Controls: Manual ON/OFF at Bldg. 015 (Waste Plant)

Input

1. Weak Water Waste from S-3A
2. Well Water
3. Bulk Lime Delivery

L-3 Lime Slurry Metering Tank

Location: Bldg. 015 (Waste Plant)

Capacity: 7,700 Gal.

Pumped to: T-1, T-2, T-3, T-4, T-5, T-6 T-7, T-8

Pumping Controls: Manual ON/OFF at Bldg. 015

Input

1. Slurry from L-1, L-2

TREATMENT TANKS*

Location: Bldg. 015 Waste Plant

Capacities:	T-1	8,300 Gal.	T-4	9,050 Gal.	T-7	20,000 Gal.
	T-2	8,400 Gal.	T-5	11,050 Gal.	T-8	20,000 Gal.
	T-3	8,400 Gal.	T-6	3,500 Gal.		

Agitation: Mechanical agitation

Heat: Live steam sparge

* For specific use of treatment tanks for major segregated wastes see the specific segregation tank. Miscellaneous waste solids to be treated in T-6; Foundry scrubber waste liquor in T-4 and/or T-5.

IV. RESPONSIBILITIES OF WASTE PLANT OPERATOR

For purposes of generalization, the operator's duties can be broken down into three major divisions:

A. Raw Waste Transfer

B. Waste Treatment

C. Treated Waste Transfer

A. Raw Waste Transfer

The Waste Plant receives raw waste from segregation tanks at the control of the Waste Plant operator. Each segregation tank has an inventory light bank on the control board at 015 (Waste Plant). These lights consist of 5 lights (bottom light is empty then quarter, half, three-quarter, full) for each segregation tank.

The control board is the command center for the Waste Plant. As was mentioned above, the board has an inventory display for each major waste (schematically shown in Figure 2). The purpose of this display is to provide a means for the operator to make scheduling decisions.

Also on the control board are located the raw waste transfer pump switches and run lights which indicate if the pump is running.

The first operator after off shifts is responsible for opening the following raw waste valves:

Bldg. 019 1. Seg Tank 2 - Liq. Liq.

Bldg. 019 2. Seg Tank 3 - Blower Blowdown

Bldg. 019 3. Seg Tank 4 - $TiZr/K_2TaF_7$

The last operator before an "off shift" is responsible for closing these valves.

Each waste can be pumped to several different treatment tanks so before transfer is started the valve to the desired treatment tank must be opened and the valves to the remaining tanks must be closed.

Procedures for handling wastes such as Foundry scrubbers, miscellaneous solids, etc. can be found in the treatment procedures for that specific waste.

Winter Operating Conditions

During winter months special caution must be used to avoid freezing in the raw waste transfer lines. Freezing can be avoided by opening all valves in a line after that line has transferred waste.

B. Waste Treatment

Detailed treatment procedures are provided in later sections; however, several operations are common to all wastes.

A log book has also been provided. This log is to provide a short summary of treated waste and lime usage; it is to be filled out at the end of the shift.

pH Measurement

In several of the waste treatment procedures a pH measurement is required. Two different pH indicating papers have been provided for specific tests; each treatment will specify the proper paper. The following general procedure should be used for all readings:

1. Dip the long handled sampling dipper ~2-3 feet below the surface of the waste (if possible).
2. Withdraw the dipper and dump the sample back into the tank.
3. Dip out another sample as in Step 1.

4. Tear a 1 inch piece of pH paper from the dispenser and dip half of the paper into the sample.
5. Hold the wetted paper next to the color comparitor and match the color to determine the pH.
6. Dump the sample and record the measurement.

Volume Measurements

1. Volumes in the treatment tanks are measured as outage. Outage is measurement of space not in use in a specific tank which is then converted to the volume or gallons in use via the appropriate calibration table.
2. Outage is measured from the top of the tank to the liquid level with a folding rule in the locked position. At the Waste Plant, outage can be measured in treatment tanks 1 through 5, 7 and 8 from the bottom of the platform frame which rests on the top of the tank. This means the bottom face of the frame or the side which touches the tank top. Tank #6 is measured from the top of the grating recessed in the tank.
3. Lime slurry additions are measured in the slurry transfer tank. If slurry has been added to a waste, space is provided in the log sheets for volume changes. Obviously these volume changes must be measured as outage in the specific treatment tank.

C. Treated Waste Transfer

Frequently after treatment is completed, a sample of the treated waste will be taken to evaluate the effectiveness of the treatment. The procedure for taking a treated waste sample is as follows:

a. Dip the sampling dipper into the tank to be sampled and rinse it with the treated waste.

b. Take a sample of the waste by dipping ~ 2-3 ft. below the surface (if possible).

c. Pour the sample into a clean bottle. Mark the bottle with the date, type waste and treatment number. Record the sample number data in the treatment tank waste log under the appropriate column.

The frequency of taking the treated waste samples will be variable and dependent upon the supervisor's instructions.

Once the appropriate information has been recorded and the treatment is completed, the valve at the bottom of tank can be opened and the waste pumped to the filter house via the waste transfer tank outside Building 098.

V. RESPONSIBILITY OF DEPARTMENT SUPERVISOR

The department supervisor's responsibilities include but are not limited to:

A. On a daily basis the supervisor shall ascertain that all equipment is in good operating order. In particular, agitator operation and the lime slurry density should be checked.

B. A monthly department report shall be prepared that will include but not be limited to:

1. A listing of all emergency deviations from the operating procedure.
2. A volumetric summary of each raw waste treated.
3. A graph showing pH and F^- levels in the waste filtrate each day; explanations for each F^- level in excess of 30 mg/l.

VI. GUARD'S RESPONSIBILITIES

When the Guard is "flagged" that an emergency situation exists, he shall notify the proper supervisor and keep a written log including the time of each notification.

VII. LIME SLURRY SYSTEM

The lime slurry system is comprised of two slurry tanks (L-1 and L-2), a slurry metering tank (L-3) and three weak water waste hold tanks. In order to reduce use of excess lime, simplify treatments and insure treatment reproducibility, the following procedure has been developed to produce a consistent lime slurry density of 1.16 cc. For every 0.01 g/cc lower than 1.16 g/cc, 7% additional slurry must be added over and above that specified in the procedures.

The Lime Slurry Makeup Tank L-1 is equipped with an ultrasonic level measurement device. The following procedure is to be used:

1. To prepare the tank for a lime delivery stop the agitator. Press the level measurement switch. Record the reading and equivalent gallons from the meter calibration table. The agitator can remain off during the initial water input. This will allow level monitoring during the water addition which should eliminate tank overfill.
2. To measure the tank level after a delivery the agitator should be shut off for one minute, the reading taken and the agitator restarted.

A. Make-Up Procedure

1. Under normal operating conditions the lime slurry is to be made in the 35,000 gal. tank located at the Waste Plant (Bldg. 015). (Tank L-1).

2. To start the makeup tank should be as empty as possible and can be emptied by transferring slurry to L-2. If necessary, a small heel can remain provided it is less than 8,000 gallons.

3. Record in the lime slurry log sheet the initial volume of the tank from the level indicator.

4. Add 19,000 gal. (124 inches) of Weak Water Waste* by pumping the waste from #3 Segregation Tank to the makeup tank.

5. As the lime is being delivered, obtain the delivered weight from the delivery driver's invoice.

6. Round the delivered weight to the nearest 1,000 lbs.

7. From the slurry makeup chart, read the gallons of additional weak water waste required that corresponds with the delivered weight. Add this amount after the lime has been added via the following steps:

   a. Read tank volume and record on the worksheet.

   b. Add the additional water.

   c. Record the new volume.

---

* NOTE: If a lime slurry batch must be made and insufficient weak water waste is available the only acceptable alternative for makeup water is well or condensate water. No other waste is to be used for makeup. Fresh water is available from the Waste Plant (Bldg. 015).

8. After lime has been added and proper amount of water agitate for a minimum of 2 hours.

9. Weigh the special 1000 ml measuring cylinder to the nearest 1 g and record the weight in the slurry worksheet.

10. Fill the weighed cylinder with slurry from the metering tank feed line after it has recycled for at least 5 minutes within the line. Fill the cylinder and allow excess sample to drain off the top.

11. Clean excess slurry from the outside of the cylinder and weigh the sample. Record the weight in the slurry worksheet.

12. Subtract the cylinder weight from the sample weight. The result will be a number between 1160 and 1200. Place a decimal point after the first digit and drop the last. This is the slurry density. Record the density. 1.16 - 1.20.

13. Repeat the procedure and average the two densities. If the two densities differ by more than 0.01, call supervisor for help.

14. Record the average slurry density on the log sheet.

B. Lime Slurry Storage and Transfer

The slurry metering tank (L-3, 10,000 gal. located in Bldg. 015) is to be filled from L-1 or L-2 tanks.

Table I

Lime Slurry Makeup Tank (L-1)

Meter Level Calibration

Note: Will be inserted when the level measuring device has been received.

TABLE II

Lime Slurry Make-Up Chart

Lime Delivery	1st Water Addition
40,000 pounds	-0- Gallons
41,000 "	190 Gallons
42,000 "	660 Gallons
43,000 "	1130 Gallons
44,000 "	1500 Gallons
45,000 "	2000 Gallons
46,000 "	2540 Gallons
47,000 "	3000 Gallons
48,000 "	3940 Gallons
50,000 "	4400 Gallons
51,000 "	4870 Gallons
52,000 "	5340 Gallons
53,000 "	5810 Gallons

Final Weak Water Waste Addition
to Lime Slurry

Slurry Density	Multiplication Factor
1.17	0.059
1.18	0.107
1.19	0.156

*Multiply times the total volume in the make-up tank

VIII. OPERATION OF WEAK WATER WASTE SYSTEM FOR LIME SLURRY MAKE-UP

Building 019 Collection - Transfer Tank - 15,000 Gallon

This tank will automatically keep Segregation Tank #3 at 23,000 gallons if it contains more than 3,000 gallons.

Segregation Tank #3 Weak Water Waste

If the top light is lit for the Segregation #3 tank or if no slurry is to be made during the shift the excess weak water waste will have to be treated.

A. Weak Water Waste Treatment

1. To treat weak water waste the valve directing the waste to the Waste Plant must be opened (located at S-3 site). The valve directing the water to the slurry tank must be closed.
2. Open the valve to either treatment tank #3 or #4.
3. Pump 5600 to 7000 gallons to the desired treatment tank. Record the volume of raw waste in the log.
4. Add 5" lime slurry to a pH of 11.0 using Hydrion Vivid Paper 9.0 - 13.0 as pH indicator. Record the amount of slurry.
5. Mix the waste, check the pH and pump to the filter house.

IX. LIQUID LIQUID WASTE TREATMENT

Complexed Liq. Liq. Segregation Tank (074) - Tank No. 17-C

Piped to Transfer Tank at 019 Segregation #2

Operation: a) Manual start - Bldg. 074 operator must be told to start pump

b) Auto off.

c) Auto off - if Segregation #2 tank is full, manual restart.

Segregation Tank #2

Piped to Treatment Tanks 1 through 5 and 8

Raw Waste Transfer Operation: Manual start and stop from control board. Minimum waste required for treatment = 1 green light.

A. Into the desired treatment tank pump 50* inches (3500 gallons) of lime slurry measured from L-3 (Metering tank).

B. Into treatment tank #8 pump 110* inches (7700 gallons) of lime slurry measured from L-3 (Metering tank).

C. Open the raw waste line valve into the tank with the slurry. (Check for open valves into other tanks and close).

D. Begin pumping the raw waste into the treatment tank. (Note: If the segregation tank empties during the transfer the pump will automatically shut off).

E. When the level of the tank has reached 24" from the top stop adding raw waste. Wait 10 minutes and check the pH with Hydrion Vivid 9-13 paper. If the pH is less than 11.0 add just enough lime to raise the pH to 11.0. Record the total amount of lime used.

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* Assumes lime slurry density of 1.16 g/ml. For each 0.01 g/ml lower density add 7.0% additional lime.

F. Allow the treatment to mix one hour.

G. Obtain a sample of the treated waste, measure the final pH and pump to the filter house.

X. $TiZr/K_2TaF_7$ - Ta POWDER WASTE TREATMENT

$TiZr/K_2TaF_7$ Segregation Tank S-4 Bldg. 019

Piped to Treatment Tanks 1, 2, 3, and 7

Operation: Manual Start/Stop - From Control Board at 015

Ta Powder Waste Segregation Tank S-1 Bldg. 046

Piped to Treatment Tanks 1, 2, 3, and 7

Operation: Manual Start/Stop - From Control Board at 015

A. Procedure for a 20,000 Tank Treatment - #7 Treatment Tank

1. If at least 2 green level indicators are lit for both $TiZr/K_2TaF_7$ tanks, a large treatment can be made in #7 treatment tank.
2. Into #7 tank pump 40 inches 2800 gallons) of lime slurry* measured from lime slurry metering tank.
3. Open the raw waste valve into #7 tank for the $TiZr/K_2TaF_7$ waste. (Check for open valves into other tanks and close).
4. Begin pumping the raw waste into the tank. Obtain a sample of the raw waste 5 minutes after start of the transfer and deposit in the $TiZr/K_2TaF_7$ composite jug.
5. When the level of the tank has reached 129 inches (5700 total gallons) stop adding waste.

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* Assumes slurry density of 1.16 g/ml. For every 0.01 g/ml less than 1.16 add 7.0% additional lime.

6. Allow to mix for 10 minutes and then check and record pH. If the pH is less than 11.0 (using Hydrion Vivid 9.0 - 13.0 paper) add lime until it is. Record any additional lime; mix 1/2 hour.
7. Open the raw waste valve into the tank from the Ta powder segregation tank (S-1). (Check for open valves into other tanks and close).
8. Begin pumping the raw waste into #7 tank. Obtain a sample of raw waste as in Step 4.
9. When the level of the tank has reached 18 inches outage (18,000 total gallons) stop adding waste.
10. Mix, sample and pump to filter house.

XI. $TiZr/K_2TaF_7$ TREATMENT WITHOUT Ta POWDER WASTE

A. Into treatment tank 1, 2 or 3 pump 35 inches (2500 gallons) of lime slurry.

B. Into treatment tank 7 pump 50 inches (3500 gallons) of lime slurry.

C. Open the raw waste valve into the tank with the slurry from the $TiZr/K_2TaF_7$ tank (S-4). Check for open valves into other tanks and close. Begin pumping the raw waste into the tank.

D. When the level of the tank has reached 12" from the top of the tank stop adding waste.

E. Allow to mix for 10 minutes then check and record the pH. If the pH is less than 11.0 (using Hydrion Vivid 9.0 - 13.0 paper) add lime until it is. Record additional lime.

F. Allow to mix, sample and pump to filter house.

XII. Ta POWDER WASTE TREATMENT

1. Ta powder waste may be treated by the following procedure to avoid possible emergency conditions in Seg. T-1.
2. Pump 10 inches (700 gallons) lime slurry to the desired treatment tank 1, 2 or 3.
3. Pump 30 inches (2100 gallons) lime slurry to the desired treatment tank 7.
4. Add Ta waste to 10" from the top.
5. Agitate, sample and pump to filter house.

XIII. MASTER ALLOY SCRUBBER WASTE TREATMENT

(To be done as scheduled by Production Supervisor).

Raw Waste Transfer

1. Agitate the settling tank to be emptied vigorously with air sparge to slurry up solids.
2. Pump the liquor (with slurried solids) into a treatment tank. The treatment tank agitator should be operating from the start of the transfer.
3. Do not Use Extra Water in transferring waste. None is required with proper settling tank agitation.
4. When transfer is complete measure the outage in the treatment tank and record the volume on the run sheet.

Waste Treatment

1. Take a dip sample from the bottom of the treatment tank using the sampling device provided for this waste. (Push sampler to 1' from bottom and hold to allow sample to completely fill the bottle).

2. Turn steam on full and add 20 inches of lime measured from the lime slurry metering tank.
3. Add the additional slurry.
4. After 5 hours mixing, sample, record volume and pump to equalization tank.

XIV. MISCELLANEOUS SOLIDS (TANCO SOLIDS, BAGHOUSE SOLIDS, FOUNDRY SOLIDS)

1. Identify the solids to be treated and record in #6 treatment tank log.

XV. LIQUID (WIRE MILL ACID WASTE) TREATMENT

1. To #5 treatment tank add 5 inches (350 gallons) of lime slurry.
2. Begin pumping the raw waste into the tank from the transport continue via a suitable acid pump.
3. When all the waste has been added check the pH using Hydrion Vivid 9.0 - 13.0. If the pH is less than 11.0 add lime slurry to raise it to greater than 11.0. Record any additional lime.
4. Mix after all additions are complete, sample and pump to the filter house.

XVI. PENN RARE WASTE

1. Is pumped to treatment tank #3.
2. Pump 25 inches (1750 gallons) lime slurry to the treatment tank.
3. Pump Ta Powder (Seg. #2) waste to fill treatment tank to 10" from top.
4. Agitate for 1/2 hour, check pH and pump to filter house.

XVII. Ti MUD

1. Pump Ti Mud to treatment tank #1.
2. Pump 30 inches (2100 gallons) lime slurry to the treatment tank.
3. Agitate for 1/2 hour, check pH and pump to filter house.

XVIII. NH_3 FROM Ti PLANT

1. Pump NH_3 from Ti Plant to treatment tank #1.
2. Pump 20 inches (1400 gallons) lime slurry to treatment tank. Add steam to the solution.
3. Agitate until all traces of NH_3 are driven off.
4. Check pH and pump to filter plant.

WASTE TREATMENT TANK #1 CALIBRATION

Table In Inches Measured From Top of Tank (Outage)

Calibration: 64.4 gal/inch

IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.
6	8308	34	6504	62	4701	90	2898	118	1095
7	8243	35	6440	63	4637	91	2834	119	1030
8	8179	36	6374	64	4572	92	2769	120	966
9	8114	37	6311	65	4508	93	2705	121	902
10	8050	38	6247	66	4444	94	2640	122	837
11	7986	39	6182	67	4379	95	2576	123	773
12	7921	40	6118	68	4315	96	2512	124	708
13	7857	41	6054	69	4250	97	2447	125	644
14	7792	42	5989	70	4186	98	2383	126	580
15	7728	43	5925	71	4122	99	2318	127	515
16	7664	44	5860	72	4057	100	2254	128	451
17	7599	45	5796	73	3993	101	2190	129	386
18	7535	46	5732	74	3928	102	2125	130	322
19	7470	47	5667	75	3864	103	2061	131	258
20	7406	48	5603	76	3800	104	1996	132	193
21	7342	49	5538	77	3735	105	1932	133	129
22	7277	50	5474	78	3671	106	1867	134	64
23	7213	51	5410	79	3606	107	1803	135	-0-
24	7148	52	5345	80	3542	108	1739		
25	7084	53	5281	81	3478	109	1674		
26	7020	54	5216	82	3413	110	1610		
27	6955	55	5152	83	3349	111	1546		
28	6891	56	5088	84	3284	112	1481		
29	6826	57	5023	85	3220	113	1417		
30	6762	58	4959	86	3156	114	1352		
31	6698	59	4894	87	3091	115	1288		
32	6633	60	4830	88	3027	116	1224		
33	6569	61	4766	89	2962	117	1159		

WASTE TREATMENT TANK #2 CALIBRATION

Table In Inches Measured From Top of Tank (Outage)
Calibration: 65.4 gal/inch

IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.
6	8371	34	6540	62	4709	90	2878	118	1046
7	8306	35	6475	63	4643	91	2812	119	981
8	8240	36	6409	64	4578	92	2747	120	916
9	8175	37	6344	65	4513	93	2681	121	850
10	8110	38	6278	66	4447	94	2616	122	785
11	8044	39	6213	67	4382	95	2551	123	719
12	7979	40	6148	68	4316	96	2485	124	654
13	7913	41	6082	69	4251	97	2420	125	589
14	7848	42	6017	70	4186	98	2354	126	532
15	7783	43	5951	71	4120	99	2289	127	458
16	7717	44	5886	72	4055	100	2224	128	392
17	7652	45	5821	73	3989	101	2158	129	327
18	7586	46	5755	74	3924	102	2093	130	262
19	7521	47	5690	75	3859	103	2027	131	196
20	7456	48	5624	76	3793	104	1962	132	131
21	7390	49	5559	77	3728	105	1897	133	65
22	7325	50	5494	78	3662	106	1831	134	
23	7259	51	5428	79	3597	107	1766	135	
24	7194	52	5363	80	3532	108	1700		
25	7129	53	5297	81	3466	109	1635		
26	7063	54	5232	82	3401	110	1570		
27	6998	55	5167	83	3335	111	1504		
28	6932	56	5101	84	3270	112	1439		
29	6867	57	5036	85	3205	113	1373		
30	6802	58	4970	86	3139	114	1308		
31	6736	59	4905	87	3074	115	1243		
32	6671	60	4840	88	3008	116	1177		
33	6605	61	4774	89	2943	117	1112		

WASTE TREATMENT TANK #3 CALIBRATION

Table In Inches Measured From Top of Tank (Outage)
Calibration: 65.1 gal/inch

IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.
6	8398	34	6575	62	4752	90	2930	118	1107
7	8333	35	6510	63	4687	91	2864	119	1042
8	8268	36	6446	64	4622	92	2799	120	977
9	8203	37	6380	65	4557	93	2734	121	911
10	8136	38	6315	66	4492	94	2669	122	846
11	8072	39	6250	67	4427	95	2604	123	781
12	8007	40	6185	68	4362	96	2539	124	716
13	7942	41	6119	69	4297	97	2474	125	651
14	7877	42	6054	70	4232	98	2408	126	586
15	7812	43	5989	71	4166	99	2344	127	521
16	7747	44	5924	72	4101	100	2278	128	456
17	7682	45	5859	73	4036	101	2213	129	391
18	7617	46	5794	74	3971	102	2148	130	326
19	7552	47	5729	75	3906	103	2083	131	260
20	7487	48	5664	76	3841	104	2018	132	195
21	7421	49	5599	77	3776	105	1953	133	130
22	7356	50	5534	78	3711	106	1888	134	65
23	7291	51	5468	79	3646	107	1823	135	
24	7226	52	5403	80	3581	108	1758		
25	7161	53	5338	81	3515	109	1693		
26	7096	54	5273	82	3450	110	1628		
27	7031	55	5208	83	3385	111	1562		
28	6966	56	5143	84	3320	112	1497		
29	6901	57	5078	85	3255	113	1432		
30	6836	58	5013	86	3190	114	1367		
31	6770	59	4948	87	3125	115	1302		
32	6705	60	4883	88	3060	116	1237		
33	6640	61	4817	89	2995	117	1172		

WASTE TREATMENT TANK #4 CALIBRATION

Table In Inches Measured From Top of Tank (Outage)

Calibration: 68.7 gal/inch

IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.
6	9068	34	7145	62	5221	90	3298	118	1374
7	9000	35	7076	63	5153	91	3229	119	1305
8	8931	36	7007	64	5084	92	3160	120	1237
9	8862	37	6939	65	5015	93	3092	121	1168
10	8794	38	6870	66	4946	94	3023	122	1099
11	8725	39	6801	67	4878	95	2954	123	1031
12	8656	40	6733	68	4809	96	2885	124	962
13	8588	41	6664	69	4740	97	2817	125	893
14	8519	42	6595	70	4672	98	2748	126	824
15	8450	43	6527	71	4603	99	2679	127	756
16	8381	44	6458	72	4534	100	2601	128	687
17	8313	45	6389	73	4466	101	2542	129	618
18	8244	46	6320	74	4397	102	2473	130	550
19	8175	47	6252	75	4328	103	2405	131	481
20	8107	48	6183	76	4259	104	2336	132	412
21	8038	49	6114	77	4191	105	2267	133	343
22	7969	50	6046	78	4122	106	2198	134	275
23	7901	51	5977	79	4053	107	2130	135	206
24	7832	52	5908	80	3985	108	2061	136	137
25	7763	53	5840	81	3916	109	1992	137	69
26	7694	54	5771	82	3847	110	1924		
27	7626	55	5702	83	3778	111	1855		
28	7557	56	5633	84	3710	112	1786		
29	7488	57	5565	85	3641	113	1718		
30	7420	58	5496	86	3572	114	1649		
31	7351	59	5427	87	3504	115	1580		
32	7282	60	5359	88	3435	116	1511		
33	7214	61	5290	89	3366	117	1443		

WASTE TREATMENT TANK #5 CALIBRATION

Table In Inches Measured From Top of Tank (Outage)
Calibration: 81.9 gal/inch

IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.
6	11057	34	8763	62	6388	90	4095	118	1802
7	10975	35	8681	63	6306	91	4013	119	1720
8	10893	36	8600	64	6224	92	3931	120	1638
9	10811	37	8517	65	6143	93	3849	121	1556
10	10729	38	8436	66	6061	94	3767	122	1474
11	10647	39	8354	67	5979	95	3686	123	1392
12	10565	40	8272	68	5897	96	3604	124	1310
13	10483	41	8190	69	5815	97	3522	125	1229
14	10401	42	8108	70	5733	98	3440	126	1147
15	10319	43	8026	71	5651	99	3358	127	1065
16	10238	44	7944	72	5569	100	3276	128	983
17	10156	45	7862	73	5487	101	3194	129	901
18	10074	46	7781	74	5405	102	3112	130	819
19	9992	47	7699	75	5324	103	3030	131	737
20	9910	48	7617	76	5242	104	2948	132	655
21	9828	49	7535	77	5160	105	2867	133	573
22	9746	50	7453	78	5078	106	2785	134	491
23	9664	51	7371	79	4996	107	2703	135	410
24	9582	52	7289	80	4914	108	2621	136	328
25	9500	53	7207	81	4832	109	2539	137	246
26	9419	54	7125	82	4750	110	2457	138	164
27	9337	55	7043	83	4668	111	2375	139	82
28	9255	56	6962	84	4586	112	2293		
29	9173	57	6880	85	4505	113	2211		
30	9091	58	6798	86	4423	114	2129		
31	9009	59	6634	87	4341	115	2048		
32	8727	60	6552	88	4259	116	1966		
33	8845	61	6470	89	4177	117	1884		

TREATMENT TANK #6

45 gal/in

Table Is In Inches From Grating At Top Of Tank To Liquid Level

In.	Gal.	In.	Gal.	In.	Gal.	In.	Gal.
6	3508	26	2608	46	1708	66	808
7	3463	27	2563	47	1663	67	763
8	3418	28	2518	48	1618	68	718
9	3373	29	2473	49	1573	69	673
10	3328	30	2428	50	1528	70	628
11	3283	31	2383	51	1483	71	583
12	3238	32	2338	52	1438	72	538
13	3193	33	2293	53	1393	73	493
14	3148	34	2248	54	1348	74	448
15	3103	35	2203	55	1303	75	403
16	3058	36	2158	56	1258	76	358
17	3013	37	2113	57	1213	77	313
18	2968	38	2068	58	1168	78	268
19	2923	39	2023	59	1123	79	223
20	2878	40	1978	60	1078	80	178
21	2833	41	1933	61	1033	81	133
22	2788	42	1888	62	988	82	88
23	2743	43	1843	63	943	83	43
24	2698	44	1798	64	898		
25	2653	45	1753	65	853		

WASTE TREATMENT TANK #7 CALIBRATION

Table In Inches Measured From Top of Tank (Outage)

Calibration: 112 gal/inch

IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.
11	18827	40	15596	69	12365	98	9135	127	5904	156	267[illegible]
12	18715	41	15485	70	12254	99	9023	128	5793	157	256[illegible]
13	18604	42	15373	71	12143	100	8912	129	5681	158	245[illegible]
14	18492	43	15262	72	12031	101	8800	130	5570	159	233[illegible]
15	18381	44	15150	73	11920	102	8689	131	5459	160	222
16	18270	45	15039	74	11808	103	8578	132	5347	161	211
17	18158	46	14928	75	11697	104	8466	133	5236	162	200[illegible]
18	18047	47	14816	76	11586	105	8355	134	5124	163	188[illegible]
19	17935	48	14705	77	11474	106	8244	135	5013	164	178[illegible]
20	17824	49	14593	78	11362	107	8132	136	4902	165	167[illegible]
21	17712	50	14482	79	11251	108	8021	137	4790	166	156[illegible]
22	17601	51	14371	80	11140	109	7909	138	4679	167	144[illegible]
23	17490	52	14259	81	11028	110	7798	139	4567	168	133[illegible]
24	17378	53	14148	82	10917	111	7687	140	4456	169	122[illegible]
25	17267	54	14036	83	10806	112	7575	141	4345	170	111[illegible]
26	17156	55	13925	84	10694	113	7464	142	4233	171	100[illegible]
27	17044	56	13814	85	10583	114	7352	143	4122	172	89[illegible]
28	16933	57	13702	86	10472	115	7241	144	4010	173	78[illegible]
29	16821	58	13591	87	10360	116	7130	145	3899	174	67[illegible]
30	16710	59	13479	88	10249	117	7018	146	3787	175	55[illegible]
31	16599	60	13368	89	10137	118	6906	147	3636	176	44[illegible]
32	16487	61	13257	90		119	6795	148	3565	177	34[illegible]
33	16376	62	13145	91	9915	120	6684	149	3453	178	22[illegible]
34	16264	63	13033	92	9803	121	6573	150	3342	179	11
35	16153	64	12922	93	9692	122	6461	151	3230	180	-0-
36	16042	65	12811	94	9580	123	6350	152	3119		
37	15930	66	12700	95	9469	124	6238	153	3008		
38	15819	67	12588	96	9358	125	6127	154	2896		
39	15707	68	12477	97	9246	126	6016	155	2785		

WASTE TREATMENT TANK # 8 CALIBRATION

Table In Inches Measured From Top of Tank (Outage)

Calibration: 118 gal/inch

IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.
11	19992	40	16582	69	13171	98	9758	127	6350	156	2940
12	19874	41	16464	70	13054	99	9740	128	6233	157	2822
13	19757	42	16346	71	12818	101	9408	129	6115	158	2705
14	19639	43	16229	72	12818	102	9290	130	5998	159	2587
15	19522	44	16112	73	12701	102	9290	131	5880	160	2470
16	19404	45	15994	74	12583	103	9172	132	5762	161	2352
17	19286	46	15876	75	12466	104	9055	133	5645	162	2234
18	19169	47	15758	76	12348	105	8938	134	5527	163	2117
19	19051	48	15641	77	12230	106	8820	135	5410	164	1999
20	18934	49	15523	78	12113	107	8702	136	5292	165	1882
21	18816	50	15406	79	11995	108	8585	137	5174	166	1764
22	18698	51	15238	80	11878	109	8467	138	5056	167	1646
23	18581	52	15170	81	11760	110	8350	139	4939	168	1529
24	18463	53	15053	82	11642	111	8232	140	4822	169	1411
25	18346	54	14935	83	11525	112	8114	141	4704	170	1293
26	18228	55	14818	84	11407	113	7997	142	4586	171	1176
27	18110	56	14700	85	11290	114	7879	143	4469	172	1058
28	17993	57	14582	86	11172	115	7762	144	4351	173	940
29	17875	58	14465	87	11054	116	7644	145	4234	174	823
30	17758	59	14347	88	10937	117	7526	146	4116	175	705
31	17640	60	14230	89	10819	118	7409	147	3998	176	587
32	17522	61	14112	90	10702	119	7291	148	3881	177	470
33	17405	62	13994	91	10584	120	7174	149	3763	178	352
34	17287	63	13877	92	10466	121	7056	150	3646	179	235
35	17170	64	13759	93	10349	122	6938	151	3528	180	118
36	17052	65	13642	94	10231	123	6821	152	3410	181	-0
37	16934	66	13524	95	10114	124	6703	153	3293		
38	16817	67	13406	96	9996	125	6586	154	3175		
39	16699	68	13289	97	9878	126	6468	155	3058		

LIME SLURRY METERING TANK CALIBRATION

Table Is In Gallons of Slurry Per Inch
Measured From "Fill Mark" At Top of Tank
Calibration: 70 gal/inch

IN.	GAL.	IN.	GAL.	IN.	GAL.	IN.	GAL.
1	70	29	2030	57	3990	85	5950
2	140	30	2100	58	4060	86	6020
3	210	31	2170	59	4130	87	6090
4	280	32	2240	60	4200	88	6160
5	350	33	2310	61	4270	89	6230
6	420	34	2380	62	4340	90	6300
7	490	35	2450	63	4410	91	6370
8	560	36	2520	64	4480	92	6440
9	630	37	2590	65	4550	93	6510
10	700	38	2660	66	4620	94	6580
11	770	39	2730	67	4690	95	6650
12	840	40	2800	68	4760	96	6720
13	910	41	2870	69	4830	97	6790
14	980	42	2940	70	4900	98	6860
15	1050	43	3010	71	4970	99	6930
16	1120	44	3080	72	5040	100	7000
17	1190	45	3150	73	5110	101	7070
18	1260	46	3220	74	5180	102	7140
19	1330	47	3290	75	5250	103	7210
20	1400	48	3360	76	5320	104	7280
21	1470	49	3430	77	5390	105	7350
22	1540	50	3500	78	5460	106	7420
23	1610	51	3570	79	5530	107	7490
24	1680	52	3640	80	5600	108	7560
25	1750	53	3710	81	5670	109	7630
26	1820	54	3780	82	5740	110	7700
27	1890	55	3850	83	5810		
28	1960	56	3920	84	5880		

SECTION IV

GENERAL PLANT DESCRIPTION

4-1 Plant Production Description

Plant Production Description

Process Flow

Tantalum & Columbium Oxides - an ore concentrate containing from 20 to 80% tantalum and columbium undergoes continuous ore digestion in a reactor with hydrofluoric acid. The feed rate of the ore varies with the percentage of metal it contains. The mixture is then filtered and the filtrate undergoes continuous extraction with methyl isobutyl ketone, sulfuric acid and hydrofluoric acid. This separates the mixture into two components: H_2CbF_7 and H_2TaF_7. The H_2CbF_7 fraction is then separated into two streams. The first stream is crystallized with oxalic acid and calcined in an electric furnace. This produces high purity columbium oxide. The second stream is precipitated and washed with ammonia to form Cb_2OH_5, which is then heated in a gas-fired kiln to produce columbium oxide. The kiln operation is campaigned. It may run continuously for two weeks, then shut down for a few months. The columbium oxide is cooled naturally in a rotating drum, and most is shipped to the Company's plant in Revere, PA, while the remainder is sold.

The H_2TaF_7 from the extractor is also separated into two streams. The first stream undergoes ion exchange with hydrochloric and hydrofluoric acid, is precipitated with ammonia, washed, and is calcined in an electric furnace forming high purity tantalum oxide. This operation occurs for one shift, 5 days/wk. The second stream of H_2TaF_7 is crystallized with potassium chloride and hydrofluoric acid forming K_2TaF_7. It is further reduced with metallic sodium, heated in a sealed electric furnace and cooled, forming potassium fluoride and tantalum. The potassium fluoride is extracted out with water and the tantalum is dried in a steam-jacketed drier. It is then screened, producing tantalum powder, of which about half is packaged and sold. The remainder is pressed and consolidated into bars. The

bars are melted and purified in a vacuum furnace (impurities condense on the walls). Some of the bars are rolled cold and annealed into sheets and foil, pickled in dilute hydrofluoric and hydrochloric acid, washed and sold. The remainder are made into wire, which is cleaned in sodium hydroxide, hydrofluoric acid and nitric acid baths and water-washed in between steps. It is finally dried in a gas-fired drier and sold.

Potassium Titanium Fluoride, Potassium Zirconium Fluoride - an ore containing Titanium oxide is digested in hydrofluoric acid, forming titanium fluoride. This is then reacted with potassium chloride, forming crystallized K_2TiF_6. Similarly, an ore containing zirconium dioxide is digested with hydrofluoric acid and reacted with potassium carbonate forming crystalline K_2ZrF_6. The following operation applies to either compound. The crystals are dried in a direct gas-fired rotary drier. Some of the product out of the kiln is used internally; some goes through a micro-pulverizer and blender and is packaged and sold.

Aluminum Master Alloys - a supply of aluminum is kept melted in a reverberatory furnace fired with either natural gas of #2 fuel oil (1% sulfur). The dross is skimmed and the aluminum is tapped, then needed, to ladles which carry it to an electric induction furnace where the alloys are made. There are eight alloying furnaces operating on a 3-hr. cycle, but only five can operate at one time. The alloys are poured into ingots which are then shot blasted before they are ready to be sold.

SECTION V

ENVIRONMENTAL MONITORING PROGRAM

5-1 Radiation Exposure Monitoring

5-2 Regulatory Compliance Permits

5-3 Air Quality Permits

5-4 Regulatory Records & Reports

5-5 Agreement to Upgrade Environmental Controls

5-6 Ambient Air Monitoring Program

ENVIRONMENTAL INFORMATION
Section V
5-1 (a)

Radiation Exposure & Monitoring

As we have described in the background section, in the production of the Tantalum and/or Columbium material we may or may not process ore or concentrates containing unwanted levels of Uranium and Thorium.

The following is a summary of the activities containing some detectable quantity of radioactivity that may require monitoring or surveilance.

We have studied EPA report 520-7-29 and believe that we, as an industry fall under Chapter 4, Section 4.5, Metallic and Non-Metallic Mining and Milling. The evaluation of our process and activities as studied and analyzed by us and by our certified health physics consultant, Robert G. Gallaghar, Applied Health Physics, Inc. include:

A. Receipt and storage of ore
B. Grinding
C. Digestion
D. Extraction
E. Storage of solid waste
F. Treatment of liquid waste

In contrast to Uranium milling and mining facilities which handle 500 - 1,000 Tons of ore per day, or 28 to 56 Ci/day our maximum daily throughput would be 10-14 Tons which assuming all or part containing Uranium and Thorium we have calculated that our maximum concentration would be 0.15 curies/day (based on .5% Uranium and/or Thorium).

These concentrations are never handled at these maximum quantities per day. We have along with our health physicist evaluated every portion of this process. It is our feeling that the most likely exposure would be in the grinding circuit. The entire ore digestion and grinding is a sealed system. In the operation in this plant we have three (3) men per shift; the maximum amount of time an employee spends is 1½ hours/shift in the grinding circuit.

The attached is a summary of air samples, smears and liquid samples. In addition to this we have recently instituted a radon detection program utilizing the Alpha Track Etch film. Our results indicate Radon in the grinding area 1.04 picocuries/liter based on a 30 day track exposure.

In the next step which is digestion of the ore the radioactive material reports to the sludge which is stored in concrete buildings and radon analysis is performed. The range of results is .003/.08 WL. The solubilized Ta/Cb is then extracted utilizing liquid-liquid extraction. The raffinate comprises about 6,000-8,000 gallons of the total 100,000 gallons per day which is treated in the waste plant. This raffinate has been found to contain total Alpha -- 8×10^{-8} μCi/ml. These 8,000 gallons are waste treated with the remaining waste water from the plant. The treated waste is then filtered. The filtrate goes into a storage lagoon prior to a second storage lagoon prior to discharge. Gross Alpha values from the discharge lagoon are attached.

EFFLUENT #6 LAGOON

Date	µCi/ml
3-30-77	$(0.0 \pm 6.9) \times 10^{-9}$
5-17-77	$(0.0 \pm 2.5) \times 10^{-10}$
7-13-77	$(0.0 \pm 6.3) \times 10^{-10}$
10-20-77	$(0.0 \pm 2.8) \times 10^{-10}$
3-28-78	$(3 \pm 6.9) \times 10^{-10}$
7-23-78	$(0.0 \pm 4.6) \times 10^{-10}$
2-2-79	$(0.0 \pm 6.7) \times 10^{-13}$
5-4-79	$(0.0 \pm 7.94) \times 10^{-10}$
8-5-80	3.6×20^{-10}
6-2-81	$(0.0 \pm 3.1) \times 10^{-10}$
10-21-81	$(0.0 \pm 3.1) \times 10^{-10}$
1-15-82	1.505×10^{-9}

Summary of Internal Radiation Exposures of KBI Employees for 1980 and 1981

The potential for internal radiation risks to employees is evaluated by analyses and interpretation of results of monitoring of air particulates, removable surface contamination and urine.

Air and smear samples are collected and analyzed as part of the quarterly surveys. Bioassay (urine) sampling of certain employees is performed at the discretion of the RSO. These data are reviewed and interpreted as part of the annual audit of our radiation protection program.

Results of the analyses and interpretations of these data are contained in the following attachments:

Appendix 3B (1) Summary and Interpretation of Air Particulates Monitoring for 1980 and 1981 (attachment 1)

Appendix 3B (2) Summary and Interpretation of Smear Sampling for Removable Radioactive Contamination during 1980 and 1981 (attachment 2)

Appendix 3B (3) Summary of Urine Bioassay of Employees for 1980 and 1981 (attachment 3)

Urine Bioassay Data for Employees Sampled during 1980 & 1981

Results of air sampling and surface contamination monitoring of the areas in which source materials are stored or used at KBI have not exceeded 50% of the currently accepted MPC's for air and our self-imposed limit of 1000 dpm/100cm² for removable alpha.

We forbid any smoking, eating or drinking in the Ta-Cb work areas, thus we do not consider injestion of U/Th bearing materials to be a significant risk to our employees. Inhalation of radioactive airborne particulates has not proven to be a risk, based upon past sampling data. However, we have required certain employees to submit periodic urine samples to verify that our assumptions are valid and that routine bioassay (urine, lung scans, etc.) are not required. Results of urine bioassay analysis obtained during the last 2 years has been summarized in the following table:

SUMMARY OF AIR PARTICULATE MONITORING 1980/1981

Date	Location	Volume (in^3)	Concentrations Gross Alpha in μ Ci/ml Highest	Lowest	Average
1980	073 Grind	7.7	3.3×10^{-12}	0.3×10^{-14}	1.6×10^{-12}
1981	073 Grind	7.7	1.1×10^{-13}	2.3×10^{-15}	5.6×10^{-14}
1980	073 Digest	7.7	1.1×10^{-12}	2.0×10^{-14}	5.6×10^{-13}
1981	073 Digest	7.7	2.0×10^{-12}	0.7×10^{-13}	1.35×10^{-13}
1980	007 Ore Store	7.7	7.0×10^{-14}	2.0×10^{-14}	4.5×10^{-14}
1981	007 Ore Store	7.7	7.0×10^{-15}	2.0×10^{-15}	3.6×10^{-14}
1980	026 Drying	7.7	1.2×10^{-13}	1.9×10^{-14}	6.95×10^{-14}
1981	026 Drying	7.7	7.0×10^{-14}	1.2×10^{-14}	4.1×10^{-14}

Maximum permissible concentration (per 10 CFR 20 Appendix B);

	Table I	Table II
Natural U	1×10^{-10}	5×10^{-12}
Natural Th	6×10^{-11}	2×1^{-12}
Our Action Level Total	1.5×10^{-11}	5×10^{-13}

SUMMARY OF SMEARS u100cm² as µCi/cm²

Date	Location	Results of Alpha Analyses of Smears			dpm/100cm²
		High Reading	Low Reading	Average	
1980	073 Grind	4.8×10^{-10}	3.1×10^{-9}	2.5×10^{-8}	5.5
1980	073 Digest	3.9×10^{-7}	5.9×10^{-9}	1.9×10^{-7}	42.0
1980	007 Ore Store	2.9×10^{-8}	3.1×10^{-9}	1.6×10^{-8}	3.5
1980	026 Drying	1.1×10^{-7}	8.7×10^{-9}	5.9×10^{-8}	13.0
1981	010 Bubble	2.9×10^{-8}	0.0	1.4×10^{-8}	3.0
1981	073 Digest	4.9×10^{-8}	2.4×10^{-8}	3.6×10^{-7}	7.9
1981	007 Ore Store	1.2×10^{-8}	0.0	6.0×10^{-9}	1.3
1981	Various	(reported in d/m; beta-)			
	Ore House to Lunch Room	45.9	0.0		17.0

Maximum permissible (gross alpha removable) 1000 dpm/cm²
Action Level: _ 200 dpm/100cm²

NATURAL URANIUM AND NATURAL THORIUM IN URINE

	Persons Tested	High Th	Low Th	All U
1980	13	$\leq$0.99 dpm	$\leq$0.33 dpm	5 µg/L
1981	10	$\leq$0.44 dpm	$\leq$0.20 dpm	5 µg/L

KBI - BOYERTOWN

REGULATORY COMPLIANCE PERMITS

DESCRIPTION	RENEWAL DATE	AUTHORITY/ ISSUE DATE	COPIES
NPDES - PA0011266 Permit renewal application submitted by D. Wolfe 10/01/81.	03/31/81	PA/DER 03/10/80	A. Kerr D. Wolfe C. Fuller
RADIATION - PA-391 License for Cadmium 109 3 MCI for use in Princeton Gamma-Tech Model XL-1 X-ray Fluorescence Analyzer	06/30/84	PA/DER	A. Kerr F. Coyle D. Wolfe C. Fuller
RADIATION - SMB-920 NRC License - Control # 07709		SMB-920 09/15/77	F. Coyle A. Kerr C. Fuller
ENCROACHMENT - 06706724 Encroachment permit to construct and monitor inlet box, sampling station 61	N/A	PA/DER 08/25/76	A. Kerr D. Wolfe
WATER QUALITY - 4674211 Water quality management permit for outfall #002	N/A	PA/DER 12/12/77	A. Kerr D. Wolfe C. Fuller
WATER QUALTIY - 4673210 Water quality management permit sandfilter backwash for plant outfall #003	N/A	PA/DER 01/30/74	A. Kerr D. Wolfe C. Fuller

KBI - BOYERTOWN

REGULATORY COMPLIANCE PERMITS

DESCRIPTION	RENEWAL DATE	AUTHORITY/ ISSUE DATE	COPIES
WATER QUALITY - 4670203 Water quality management permit for Industrial Waste Treatment System and outfall #001	N/A	PA/DER 03/31/71	A. Kerr D. Wolfe C. Fuller
WATER QUALITY - 4681203 Water quality management permit modification to lagoons 1 & 2	N/A	PA/DER 09/02/81	A. Kerr D. Wolfe C. Fuller
ENCROACHMENT - 19037 Water obstruction permit (encroachment) construct outfall box #001 - Swamp Creek in Colebrookdale Township	N/A	PA/DER 11/10/70	A. Kerr D. Wolfe
HAZARDOUS WASTE - PAD002335545 Boyertown has interim status as generator treator and storer of hazardous waste	N/A	EPAIII	A. Kerr D. Mann C. Fuller

KBI - BOYERTOWN

REGULATORY COMPLIANCE AIR QUALITY PERMITS

DESCRIPTION	RENEWAL DATE	AUTHORITY/ ISSUE DATE	COPIES
AIR EQUIPMENT - 46-313-006 (Amended) Building #073 scrubber permit	06/30/82	PA/DER 10/20/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-028 Building #073 dust collector permit	07/31/82	PA/DER 08/10/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-042 (Amended) Building 017 scrubber permit	07/31/82	PA/DER 10/16/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-043 Building 050 scrubber	07/31/82	PA/DER 08/10/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-044 Building 098 scrubber permit	07/31/82	PA/DER 08/10/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-045 (Amended) Building 011 dust collector permit	07/31/86	PA/DER 12/24/81	A. Kerr D. Wolfe C. Fuller

KBI - BOYERTOWN

REGULATORY COMPLIANCE AIR QUALITY PERMITS

DESCRIPTION	RENEWAL DATE	AUTHORITY/ ISSUE DATE	COPIES
AIR EQUIPMENT - 46-313-049 Building 001 Scrubber permit	10/31/82	PA/DER 11/03/80	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-050 Building 014 & 090 dust collector permit	07/31/82	PA/DER 10/20/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-051 Building 032 scrubber permit	07/31/82	PA/DER 08/07/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-053 Building 074 scrubber permit	07/31/82	PA/DER 08/07/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-313-054 (Amended) Building 087 scrubber permit	01/31/83	PA/DER 01/30/81	A. Kerr D. Wolfe C. Fuller
AIR EQUIPMENT - 46-302-060 Building 039 boiler	02/28/86	PA/DER 03/02/81	A. Kerr D. Wolfe C. Fuller

KBI - BOYERTOWN

REGULATORY RECORDS & REPORTS

DESCRIPTION	ISSUING AGENCY	FREQUENCY	SUBMITTED TO	PREPARED BY	COPIES ON FILE
AIR EQUIPMENT This permit requires reporting of: Annual ambient air survey under Air Quality Permit # 46-313-028	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr C. Fuller D. Wolfe
NPDES Water sampling	PA/DER	Monthly	PA/DER BMMA	R. Heinly	BMMA PA/DER A. Kerr C. Fuller D. Mann
WATER SUPPLY Surface water use report	DRBC	Annual	DRBC	R. Heinly	A. Kerr C. Fuller R. Sarla D. Mann
HAZARDOUS Hazardous waste shipments	PA/DER	Quarterly	PA/DER	R. Sarla	A. Kerr D. Mann C. Fuller
POT W/DISCHARGE Summary of industrial waste to BMMA	BMMA	Monthly	BMMA	R. Heinly	C. Fuller A. Kerr D. Wolfe
AIR SOURCES Annual PA emission data system of air emissions	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr D. Mann D. Wolfe

KBI - BOYERTOWN

REGULATORY RECORDS & REPORTS

DESCRIPTION	ISSUING AGENCY	FREQUENCY	SUBMITTED TO	PREPARED BY	COPIES ON FILE
MANIFEST	PA/DER	Annual	PA/DER	B. Sacks	A. Kerr A. Dunlea
CLOSURE	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr D. Mann
PREPAREDNESS	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr D. Mann
TRAINING	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr D. Mann
CONTINGENCY	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr D. Mann
ANALYSIS	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr D. Mann
INSPECTION	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr D. Mann
OPERATION	PA/DER	Annual	PA/DER	R. Sarla	A. Kerr D. Mann

KBI - BOYERTOWN

REGULATORY RECORDS & REPORTS

DESCRIPTION	ISSUING AGENCY	FREQUENCY	SUBMITTED TO	PREPARED BY	COPIES ON FILE
PCB INVENTORY	US/EPA	Annual	US/EPA	R. Kresge	A. Kerr
PCB INSPECTION	US/EPA	Annual	US/EPA	R. Kresge	A. Kerr
AIR EQUIPMENT H F Scrubbers	PA/DER	Daily	PA/DER		Plant Site
AMBIENT AIR - 46-313-028 Bldg. 73 Dust Collector	PA/DER	Bimonthly	PA/DER	R. Sarla	Plant Site

Section V
5-5

BWW

P.O.Box 1462, Reading, PA 19603 • Telephone 215/371-3600 • Telex (510) 651-0106

A Division of
Cabot Corporation

June 30, 1982

James D. Morris
Assistant Attorney General
Room 1200
1315 Walnut Street
Philadelphia, Pennsylvania 19107

Re: Your File Number: 46-18
DC677

Dear Jim:

In accordance with our conversation yesterday, enclosed are the following documents pertaining to the resolution of this matter:

1. Three copies of the Consent Order and Agreement which have been signed by officers of Cabot Berylco Inc.;

2. Completed Transmittal of Payment form;

3. A Corporate Minute authorizing the payment of $28,000 to the Clean Air Fund; and

4. A check dated July 1, 1982 in the amount of $28,000 made payable to the Commonwealth of Pennsylvania.

Would you kindly hold this check until the Consent Order and Agreements have been signed by Mr. Kona and yourself. Please send one fully executed copy to:

Wm. S. Richardson, Esquire
Cabot Berylco Inc.
P. O. Box 1462
Reading, Pennsylvania 19603

We appreciate your cooperation in resolving this matter.

Very truly yours,

David H. Recker (lfz)

DAVID H. RECKER

DHR/lfz
Enclosures

CONSENT ORDER AND AGREEMENT

NOW THEREFORE, on this first day of July, 1982, after full and complete negotiations in 1980 of all matters set forth in this Consent Order and Agreement, and upon mutual exchange of convenants herein, and intending to be legally bound hereby, it is ordered by the Department of Environmental Resources ("Department") and agreed to by KBI Division, Cabot Berylco Inc. ("CBI") that:

1. CBI is a corporation qualified to do business in the Commonwealth of Pennsylvania and is so doing business in the Commonwealth at its Boyertown Plant, County Line Road, Douglass Township, Montgomery County and Colebrookdale Township, Berks County.

2. At the Boyertown plant, CBI operates numerous chemical and metallurgical processes which emit fluoride compounds.

3. The Department has determined that the fluoride emissions from the chemical and metallurgical processes created air pollution on the dates specified in Exhibit A by permitting ambient concentrations of fluorides to exceed the Commonwealth's ambient air quality standards of Chapter 131, Section 131.3 of the Department's Rules and Regulations. Creating excessive air pollution is a violation of Section 8 of the Air Pollution Control Act, Act of January 8, 1960, P.L. 2119, as amended, 35 P.S. 4001 et seq ("Act"), Section 4008, Section 131.7 of the Rules and Regulations of the Department, 25 Pa. Code Paragraph 121.7.

4. CBI has controlled fluoride emissions from its inorganic salt manufacturing process (Building 1, PEDS No. 114) and its raw waste segregation tanks (PEDS No. 102).

5. CBI agreed to place controls on certain other processes listed below to reduce plant fluoride emissions.

6. CBI agreed to report any plant process malfunction, which increases fluoride emissions, to the Norristown Regional Office within five (5) days of its occurrence.

7. CBI agreed to cease the operation of any source indicated in Paragraph 6 above if said malfunction could not be repaired within three (3) days.

8. CBI agreed to monitor all scrubber recycle solutions daily and to maintain fluoride concentration in water solutions at or below 10 grams per liter for water scrubbers and to maintain caustic or sodium carbonate solutions at a minimum of 3 grams per liter for caustic or carbonate scrubbers.

9. CBI further agreed to continue its ambient fluoride sampling program and to submit results of that sampling to the Department.

10. CBI indicated its willingness to comply with the Act and all Air Resources Regulations promulgated thereunder.

11. On or before the below listed dates, CBI agreed to make the following sources conform to the requirements of the Act and to Chapters 121 and 127 of the Rules and Regulations and would thereafter continue to operate the sources in compliance with said Chapters:

	DATE	SOURCE	
a)	October 31, 1980	Tantalum-Columbium Extraction	(Bldg. 74, PEDS #124)
b)	December 31, 1980	Tantalum-Digestion Process	(Bldg. 87, PEDS #101)
c)	June 1, 1981	Aluminum Alloy Process	(Bldg. 18, PEDS #121, 122)
d)	June 1, 1981	Fluoride Salts Dryer	(Bldg. 17, PEDS #117)

12. In order to comply with Paragraph 11 above, CBI agreed that it would:

    a) On or before October 31, 1980, install new control equipment on its Tantalum-Columbium extraction operation (Bldg. 74, PEDS #124).

    b) For the Tantalum digestion process (Bldg. 87, PEDS #101):

        1) On or before July 1, 1980, submit plan approval application to the Norristown Regional Office for new air pollution control equipment.

        2) On or before August 1, 1980, place purchase orders for air pollution control equipment.

        3) On or before December 31, 1980, complete installation of control equipment.

c) On or before June 1, 1981, install ductwork modifications to reduce fluoride emissions from the Aluminum alloy process (Bldg. 18, PEDS #121, 122).

d) For the Fluoride salts dryer (Bldg. 17, PEDS #117):

1) On or before November 30, 1980, submit an amended plan approval application to the Norristown Regional Office for added air pollution control equipment.

2) On or before January 31, 1981, place purchase orders for the air pollution control equipment.

3) On or before June 1, 1981, complete installation of control equipment.

13. CBI would not operate its Tantalum digestion process (Bldg. 87, PEDS #101) without the benefit of its existing scrubber or a new air cleaning device.

14. Commencing on October 1, 1980, CBI would submit to the Air Pollution Control Engineer at the Department's Norristown Regional Office quarterly progress reports until such time as the Department notified CBI that such reports were no longer required.

15. Upon installation of the approved equipment and/or process changes, CBI would notify the Department and allow the Department's representatives to inspect and evaluate source operations and contaminant emissions. Nothing herein would be construed as limiting the Department's right to make inspections.

16. During implementation of the corrective action required under this Consent Order and Agreement, CBI would take all reasonable interim measures suggested by the Department as necessary to keep the above described emissions to a minimum, including, where appropriate, full utilization of existing emission control devices and operating procedures.

17. Nothing herein shall be construed to preclude CBI from discontinuing the operation of any source of air pollution which is the subject of this Consent Order and Agreement. Any such discontinuance would, for the duration thereof, have the same effect as compliance with the Department's Regulations. However, if CBI would discontinue said source's operation, it would promptly so notify the Department in writing. CBI would not resume operation of said source after June 1, 1981 unless and until approved air pollution control equipment had been installed and made operational and the source is capable of meeting the air contamination emission standards promulgated in the Rules and Regulations of the Department. Notwithstanding any provisions of this Consent Order and Agreement, if a source is out of operation for one year or more, it shall be subject to Paragraph 127.11 of the Department's Regulations.

18. In the event that CBI would have been prevented from adhering to any of the dates specified in this Consent Order and Agreement by reason of strike, fire, flood, delays in transportation or vendor delivery, unavoidable casualty, or any other causes beyond the control of CBI which CBI could establish that by exercising reasonable diligence it was unable to prevent, the aforesaid dates would have been extended for the period of such interruptions provided that CBI would only have been entitled to such extensions if CBI would have submitted a written report including written evidence and proof of the reason for delay to the Department within ten (10) days of its knowledge of the event or occurrence. Notwithstanding the extension(s) of time permitted by this Paragraph, in no event shall CBI request delay of final compliance as specified in Paragraphs 11 and 12 beyond December 31, 1981.

19. This Consent Order and Agreement constitutes an Order of the Department issued pursuant to Section 4 (4.1) of the Act, 35 P.S. 4004 (4.1). CBI recognizing its right to appeal any Order of the Department hereby waives its right to appeal this Order.

20. Paragraphs 1 through 33 of this Consent Order and Agreement constitute findings of the Department which CBI agrees are true and correct.

21. Contemporaneous with the execution of this Consent Order and Agreement, CBI shall make a payment to the Clean Air Fund in the amount of twenty-eight thousand ($28,000.00) dollars in full and complete settlement of this matter.

22. All payments shall be made payable by check to the Commonwealth of Pennsylvania and sent to the attention of:

    Morris Malin, Chief
    Division of Abatement and Compliance
    Bureau of Air Quality Control
    Eighteenth Floor, Fulton Building
    200 North 3rd Street
    Harrisburg, Pennsylvania 17120

    Checks shall be accompanied by Form No. ER-AQ-3.

23. As CBI fully complied with all the provisions and requirements set forth in this Consent Order and Agreement within the times specified for such performance, the Department did not institute an action at law or in equity for the violations of the laws of the Commonwealth specified in Paragraphs 3 hereof.

24. The Department reserved all rights to enforce this Consent Order and Agreement and to prosecute any violations of any Acts or Rules and Regulations of the Department except those explicitly waived in this Consent Order and Agreement. All rights and remedies contained herein are to be concurrent, unless specifically provided to the contrary.

25. Furthermore, this Consent Order and Agreement shall not be considered as a limitation or abridgment of the Department's rights and duties pursuant to Section 6.2 of the Act, 35 P.S. paragraph 4006.2; and nothing herein shall be construed to imply that the Department waives its right to bring such further enforcement action subsequent to any testing as may be necessary to achieve compliance with all applicable regulations and ambient air quality standards.

26. Any breach of this Consent Order and Agreement on the part of CBI could have been deemed a material breach, and the Department could, at its options, in addition to the remedies prescribed herein, proceed with any action at law or in equity to bring about compliance with the Act and the Rules and Regulations of the Department.

27. It is the intent of the parties hereto that the clauses hereof are severable, and should any part of this Consent Order and Agreement be declared by a court of law to be invalid and unenforceable, the other terms and provisions shall remain in full force and effect as between the parties, their employees, agents, legal successors in interest and assigns.

28. This is the entire agreement between the parties and no alterations, additions or amendments thereto shall be valid unless in writing and executed by the parties.

29. Nothing herein contained shall be construed to relieve or limit CBI from complying with the terms and conditions of any plan approval or permit existing, or hereafter issued to the Company by the Department.

30. This Consent Order and Agreement does not grant a variance from any requirement of the Air Pollution Control Act (35 P.S. Paragraph 4001, et seq), the Clean Air Act (42 U.S.C. Paragraph 7401 et seq) or any regulations promulgated thereunder, nor does it purport to modify any requirement of Pennsylvania's State Implementation Plan as approved under Paragraph 110 of the Clean Air Act. Further, this Consent Order and Agreement does not constitute a Consent Order under the provisions of Paragraph 113(d) of the Clean Air Act. Notice is hereby provided to CBI that it may by subject to additional penalties for non-compliance with the Pennsylvania State Implementation Plan under Paragraph 120 of the Clean Air Act.

31. The parties agree that CBI has fullfilled all obligations under the agreement reached in 1980; therefore, upon the payment to the Clear Air Fund as set forth in paragraph 21 above, no penalties of any kind for any alleged violation will be assessed for acts occuring before the date of this Consent Order and Agreement.

32. Attached hereto as Exhibit B is evidence of a resolution of the Board of Directors of Cabot Berylco Inc. authorizing the CBI signatories hereto to enter into this Consent Order and Agreement in behalf of CBI.

KBI DIVISION, CABOT BERYLCO INC.

Corporate Seal

BY: John A Lenerzo
Corporate President or Corporate Vice President

BY: Wm. S. Richardson
Corporate Secretary or Assistant Corporate Secretary or Corporate Treasurer or Assistant Corporate Treasurer

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES

BY: _____
N. Roa Kona
Regional Air Pollution Control Engineer

BY: _____
James D. Morris
Attorney for the Department

ER-AQ-3: Rev. 10/79

JULY 1, 1982

TRANSMITTAL OF [redacted] PAYMENT

PAYABLE TO: COMMONWEALTH OF PENNSYLVANIA

MAILING ADDRESS: Pa Department of Environmental Resources
Bureau of Air Quality Control
P.O. Box 2063 -- 18th Floor Fulton Building
Harrisburg, PA 17120

FROM: CABOT BERYLCO INC., FORMERLY KAWECKI BERYLCO INDUSTRIES, INC.
(Company)

BOX 1462

READING, PA. 19603

RE: Settlement Agreement with --

Company: CABOT BERYLCO INC. FORMERLY KAWECKI BERYLCO INDUSTRIES, INC

Plant: BOYERTOWN, PA.

Township: COLEBROOKDALE/DOUGLASS

County: BERKS/MONTGOMERY

Date: JULY 1, 1982
(Agreement Entered Into)

As required by the above agreement, a payment in the amount of $ 28,000 is enclosed.

John A. Lenerazzo
(Signature) VICE PRESIDENT

(Title)

ENCL.

CERTIFICATE

I, Walter F. Greeley, Secretary of Cabot Berylco Inc., a Corporation organized under the laws of the Commonwealth of Pennsylvania, hereby certify that at a meeting of the Board of Directors of said Corporation which was held and convened in accordance with the By-Laws on June 28, 1982, at which a quorum of the directors was present and voting, the following vote was passed:

> VOTED: That any Vice President and any Assistant Secretary of the Corporation be, and each of them individually hereby is, authorized and directed to execute on behalf of the Corporation the Consent Order and Agreement between the Corporation and the Department of Environmental Resources of the Commonwealth of Pennsylvania relating to emissions of fluorides from the Corporation's operations, substantially in the form presented to this meeting; and further to take all actions necessary or desirable to comply with the terms of said Consent Order and Agreement, including without limitation payment to the Pennsylvania Clean Air Fund of $26,000 in full and complete settlement of the matters described in the Consent Order and Agreement.

I further certify that the foregoing vote has not been amended or rescinded and remains in full force and effect.

IN WITNESS WHEREOF I have hereto set my hand and seal of the Corporation this 28th day of June, 1982.

Attest: Walter F. Greeley
Secretary

(1407F-0005F)

CABOT BERYLCO, INC. P. O. BOX 1462, READING, PA 19603

012655

DIV.	VOUCHER	INVOICE	DATE	GROSS	DISCOUNT	NET
07	100741		06 29 82	28 000 00	00	28 000 00
				28 000 00	00	28 000 00

00759

CABOT BERYLCO, INC.
P. O. BOX 1462, READING, PA 19603

012655

CR

FIRST NATIONAL BANK OF BOSTON
OF
OLD COLONY BANK OF HAMPDEN COUNTY N.A.

5-137
118

DATE: 07/01/82

AMOUNT: ***$28,000.00***

PAY TO THE ORDER OF COMMONWEALTH OF PENNSYLVANIA

CABOT BERYLCO, INC.

Louis W. Cabot

AUTHORIZED SIGNATURE

⑈012655⑈ ⑆011801379⑆ 400 354 2⑈

KAWECKI BERYLCO INDUSTRIES, INC.

P. O. Box 1462, Reading, Pa. 19603
Telephone: 215 / 929-0781

17 February 1978

Mr. Robert W. Schlosser
PA. DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Air Quality and Noise Control
1875 New Hope Street
Norristown, PA 19401

Subject: Fluoride Ambient Air Monitoring
Boyertown Plant

Dear Mr. Schlosser:

Details on a proposed ambient air monitoring network for the Boyertown plant are presented for your comments and approval. Specific details are presented on attachments.

Attachment I - Location of sampling stations
KBI Dwg. #D-1282 shows the location of four sampling stations with respect to sources. Station D is off plant property and will require approval of landowner.

Attachment II - Description of air sampling train - typical for each sampling station.

Attachment III - Sampling technique; frequency; analytical procedure; and sample calculations.

Attachment IV - Rationale and Explanation of Analytical Procedure

Since the plant does not have a full complement of sampling equipment, new equipment will be purchased for this program. Purchase orders will be let upon approval of this proposed plan by PDER.

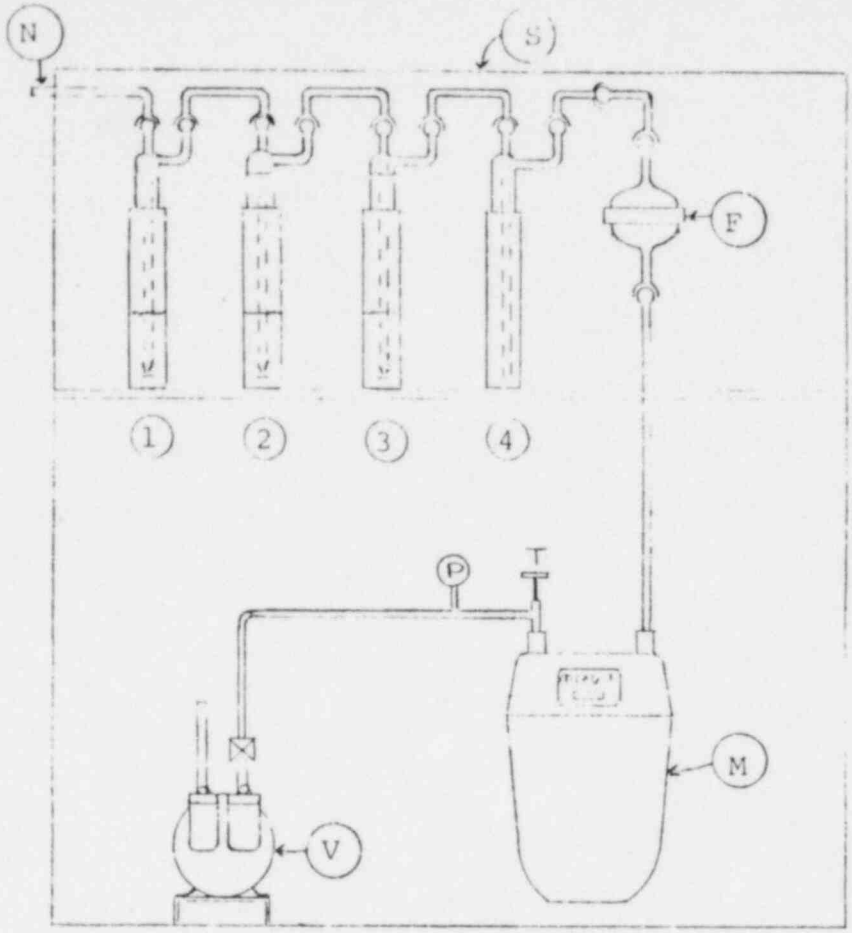
Please call me if you want to discuss further.

Very truly yours,

KAWECKI BERYLCO INDUSTRIES, INC.

Anthony L. Fala
Environmental Engineer

ALF:pad
Attachments
cc: J.Donnelly



(N) Inlet nozzle - glass - approx. 1/2 inch ID - 4-6 inches long.

(1) (2) (3) 500 ml Greensburg-Smith Impingers with impinging plate - glass.

(4) 500 ml modified Greensburg-Smith impinger without impinging plate - glass.

(F) Filter holder - glass construction ≈4 inch diameter.

(M) Rockwell type dry gas meter with direct reading totalizer Size 150 or 175.

(V) Gast type vane vacuum pump ≈1-2 cfm capacity.

(S) Wooden shelter approximately five feet above grade.

SP 10508 B

KAWECKI BERYLCO INDUSTRIES, INC. BOYERTOWN, PENNSYLVANIA				
LIMITS UNLESS OTHERWISE NOTED: FRACTIONAL ± 1/64' DECIMAL ± .010' ANGULAR ± ½°			THIS DRAWING IS OUR PROPERTY AND MUST BE USED ONLY IN CONNECTION WITH OUR WORK. ALL RIGHTS RESERVED.	
SCALE	DATE	ATTACHMENT II AMBIENT AIR SAMPLING TRAIN AND DESCRIPTION OF EQUIPMENT	SHEET NO. ____ OF ____	
DRAWN	APPROVED ALF		DRAWING NUMBER	REV.
CHECKED				

ATTACHMENT III

AMBIENT AIR SAMPLING TECHNIQUE AND ANALYTICAL PROCEDURE

(1) The sampling train will be set up as shown in Attachment II.

(2) Impingers 1, 2, and 3 will be Greensburg-Smith design and each will be charged with 200 ml of 0.1 Normal sodium hydroxide. Impinger 4 is a modified impinger and will be empty and used as an entrainment separator.

(3) Whatman #1 filter paper or equivalent, sized to fit filter holder, will be used to filter any particulate that may escape impinger train.

(4) Prior to start of sampling, the system will be checked for leaks at 15 inches mercury vacuum. Readings will be taken at the dry gas meter for 2-3 minutes. A leak rate less than 0.02 cfm is acceptable.

(5) An ambient air sample will be taken for 24 hours. The initial sampling rate shall be between 0.6-0.8 cfm. Readings of atmospheric temperature, meter temperature, meter pressure, and meter rate will be taken at start. Another set of readings will be taken 30-60 minutes later to insure steady state conditions at start. No additional readings will be taken until the end of sampling period. The readings will then be averaged and those values used in the formulas.

(6) After sampling is completed, the impingers will be emptied and washed with deionized water. The sodium hydroxide solution and washwater will be mixed and filtered through a Whatman 541 filter. The filter paper will be washed with an additional 20-40 ml DI water and added to filtrate. The total volume (ml) of filtrate will then be measured and submitted for analysis by fluoride specific ion probe with TISAB buffer. The Whatman 541 filter paper will be set aside and handled with the filter paper obtained from filter holder. Analytical results will be reported as micrograms fluoride per liter.

(7) The two filter papers will be transferred to a 250 ml beaker and leached with 150 ml DI water under continuous agitation for 24 hours. At the end of the leaching period, the contents will be filtered, the filtrate volume measured, and then submitted for analysis by the fluoride specific ion probe with TISAB buffer. Analytical results will be reported as micrograms fluoride per liter.

(8) The ambient air concentration will be calculated from the analytical data as follows:

(a) Total soluble fluoride pick-up. (W_t) as micrograms F^-:

Impinger-wash water solution $\quad ml \times \frac{\mu g\ F^-}{ml} = \mu g\ F^-$

Filter paper leach solution $\quad ml \times \frac{\mu g\ F^-}{ml} = \mu g\ F^-$

W_t = total μg soluble F^-

(b) Sample volume at atmospheric conditions (Q_t) as ft^3:

$$Q_t = \text{meter } (ft^3) \times \frac{T_{atm}}{T_{meter}} \times \frac{29.92 - P_{meter}}{29.92} \quad (\text{in.Hg})$$

(c) Ambient air concentration - C:

$$C = \frac{W_t}{Q_t} \times 35.314 = \text{micrograms soluble } F^-/\text{cubic meter}$$

ATTACHMENT IV

RATIONALE AND EXPLANATION OF ANALYTICAL PROCEDURE FOR AMBIENT SAMPLING

(1) Sampling Train

(a) Five hundred ml Greensburg-Smith impingers with impinging plate were chosen because:

(1) They effectively remove both gaseous and particulates from an air stream when sampling rate is below 1 acfm thru the units.

(2) They are of sufficient capacity to collect a large sample (est. 900-1000) cubic feet for 24 hour period) with no problems

(3) The pressure drop through impingers will be low enough (est. 4 inches Hg) that steady-state sampling can be achieved without too much operator attention.

(b) The purpose of filter after the impinger train is simply to act as a back-up for the impinger train. The filter will pickup any particulate that does get by impingers and also will verify the effectiveness of the impingers re particulate removal. The filter is as recommended by EPA in their sampling trains. No appreciable ΔP is expected thru this unit.

(2) Analytical Procedure

(a) The analytical procedure chosen to measure fluoride concentration is the specific ion probe used with total ionic strength adjustment buffer solution (TISAB). The analysis will be run on the sample with no prior distillation but after adjustment to proper pH.

This procedure is recommended because:

(1) This is the simplest procedure with least analyst error potential.

(2) The type of fluoride picked up in the ambient air sample can be measured by the probe with TISAB.

(3) The expected F^- concentration in the impinger and leach solutions will be low enough that the probe should give accurate results and be consistent.

(4) Distillation of a sample can add fluoride contamination from sample to sample and is more subject to analyst error.

(b) The fluoride reported by the analytical procedure is total soluble fluoride i.e. that fluoride absorbed or solubilized in alkali or water. It is felt that, in this situation, the total soluble fluoride will not be significantly different than total fluoride. Also, from an air pollution point of view, total soluble fluoride which includes gaseous fluoride is just as indicative as total fluoride.

SECTION VI

ENVIRONMENTAL EFFECTS OF ACCIDENTS

6-1 Prevention Prepardness and Contingency Plan

6-2 Installation Spill and Contingency Plan

6-3 Emergency Action for Radioactive Incidents

Section VI
6-1

County Line Road, Boyertown, PA 19512 / Phone: (215) 367-2181

A Division of
Cabot Corporation

21 December 1981

Mr. C. T. Beechwood, P.E.
Regional Water Quality Manager
PENNSYLVANIA DEPARTMENT OF
ENVIRONMENTAL RESOURCES
1875 New Hope Street
Norristown, PA 19512

Re: CABOT BERYLCO INC.
DOUGLASS TOWNSHIP, MONTGOMERY COUNTY
NPDES APPLICATION #PA 0011266

Dear Mr. Beechwood:

In response to your letter of 16 October 1981 to Mr. J. A. Cenerazzo of this firm and subsequent correspondence, attached are two (2) copies of a Preparedness Prevention and Contingency (PPC) Plan for our KBI Boyertown Plant.

After your review of the Plan, if you would like to visit our Boyertown Plant or if you have any questions, please do not hesitate to call me.

Very truly yours,

KBI

David W. Wolfe

David W. Wolfe, P.E.
Environmental Engineer

DWW:pad

Attachment(s)

cc: J. A. Cenerazzo

bcc: S. R. Reznek
C. E. Bollenbacher
R. L. Eschelman
R. H. Heinly
W. J. Hetrick
D. W. High
R. J. Kresge
D. E. Mann, Sr.
W. S. Richardson
R. M. Sarla
G. E. White
D. W. Wolfe
A. J. Zaborowski

Information Copies: D. M. Brietmayer

U WW

KBI

A Division of Cabot Corporation

PREPAREDNESS PREVENTION AND CONTINGENCY PLAN

(PPC PLAN)

11 December 1981

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Attachments

Location Map
Plant Plot Plan

1. General Description of the Industrial Activity

KBI's Boyertown plant is located on County Line Road and is situated partially in Colebrookdale Township, Berks County and Douglass Township, Montgomery County (see Location Map drawing #D-10-P20000-1). The plant is engaged in the production of non-ferrous metals and alloys and inorganic chemicals.

Columbium and tantalum are produced by digesting ores with hydrofluoric and sulfuric acids. After extraction from the ore leachate through the use of MIBK (methyl-isobutyl-ketone), hydrofluoric acid and deionized water, these Refractory Metals are then further refined and reacted in various process steps to produce metal and inorganic compounds. Wastewaters are treated on-site and are discharged after treatment to Berks Montgomery Municipal Authority treatment facility or to Swamp Creek. Sludges from the wastewater treatment plant are disposed of at the Pottstown Landfill. Numerous air pollution control devices consisting of baghouses and wet scrubbers are used throughout the plant to control emissions.

Aluminum base and copper base master alloys are also produced at the plant. However, there are no direct wastes associated with the production of these materials.

2. Organizational Structure for the Implementation of the PPC PLAN

This plan will be reviewed on an annual basis or as required by the KBI-Boyertown Plant PPC committee. Evaluations of the PPC Plan will include, but not necessarily be limited to, a review of new materials, processes and wastes handled and identification of potential spill sources. Changes in the PPC Plan, as well as changes in processes or new construction relative to the plan, will be reviewed and approved by the PPC committee before implementation.

The PPC committee consists of the following personnel.

KBI-Boyertown Plant Personnel	KBI Division Personnel
Emergency Coordinator	Environmental Engineer
Plant Manager	Manager of Compliance
Manager of Plant Technical Serivces	Manager of Safety & Health
Plant Engineer	
Plant Safety & Industrial Hygiene Supervisor	

Compliance with the PPC Plan is the responsibility of the Manager of Compliance Operations.

3. Material and Waste Inventory

Table I lists the location of bulk storage tanks and the materials stored at the Boyertown plant. From time to time drums of material are temporarily stored at various locations throughout the plant. These locations are not listed in this inventory since they do not represent permanent conditions. The following code lists the current descriptors for control and containment systems:

Code: A - Confined Process Area
C - Curbed Area
D - Diked Area
I - Impermeable
L - Limestone Pit
M - Area Monitored by Spill Containment System
O - Open Area

TABLE I: MATERIAL STORAGE INVENTORY

LOCATION	VOLUME (GAL.)	MATERIAL STORED	CODE
1 Oil			
1-1 Bldg. 039	20,000	#6 Fuel Oil	D-M
	74,000	#6 Fuel Oil	
1-2 Bldg. 029	950	Waste Oil	D-I-M
	950	Waste Oil	D-I-M
1-3 Bldg. 022	8,000	#2 Fuel Oil	D-M
	8,000	Empty	D-M

TABLE I: MATERIAL STORAGE INVENTORY (Cont'd)

LOCATION	VOLUME (GAL.)	MATERIAL STORED	CODE
2 Propane			
2-1 Bldg. 022	2,000	Propane	O
3 Ammonia			
3-1 Bldg. 018	10,000	Anhydrous NH_3	M
3-2 Bldg. 030	2,000	Anhydrous NH_3	M
3-3 Bldg. 055	2,000	Anhydrous NH_3	I-D
3-4 Bldg. 023	12,000	15% NH_3 Solution	A-1
		15% NH_3 Solution	A-1
4 Lime			
4-1 Bldg. 015			
Tank L-1	35,000	Lime Slurry	C-I-M
Tank L-2	45,000	Lime Slurry	C-I-M
	6,000	Lime Slurry	A-M
4-2 Bldg. 096	1,300	Lime Slurry	I-M
5 Sulfuric Acid			
5-1 Bldg. 035			
Tank 21	6,500	93% H_2SO_4	I-M
5-2 Bldg. 073			
Tank 22	8,000	93% H_2SO_4	L
5-3 Bldg. 083			
Tank 23	5,500	93% H_2SO_4	I-D
6 Organic Storage			
6-1 Bldg. 074	10,000	MIBK	I-D
7 Hydrogen Peroxide			
7-1 Bldg. 074		H_2O_2	I-D
8 Sodium			
8-1 Bldg. 100	10,000	Sodium	A

TABLE I: MATERIAL STORAGE INVENTORY (Cont'd)

LOCATION	VOLUME (GAL.)	MATERIAL STORED	CODE
9 Hydrochloric Acid			
9-1 Bldg. 019	6,000	20° Be HCL	A-I
9-2 Bldg. 055	5,000	20° Be HCL	A-I
10 Hydrofluoric Acid			
10-1 Bldg. 001	8,180	70% HF	C-L-M
10-2 Bldg. 019	6,300	70% HF	A-I-M
10-3 Bldg. 074			
Tank 4	10,000	70% HF	D-I
Tank 5	12,000	70% HF	D-L
Tank 6	12,000	70% HF	D-L
Tank 18A	12,000	Dilute HF	D-I
Tank 18B	12,000	Dilute HF	D-I
Tank 18C	12,000	Dilute HF	D-I
Tank 18D	12,000	Dilute HF	D-I
11 Bldg. 001			
11-1 K_2TiF_6			
Tanks 1 & 2	3,000	Fluoride Solution	I-M
Tanks 3 & 4	3,672	Fluoride Solution	I-M
Tanks 5 & 6	4,725	Fluoride Solution	I-M
Tank 7	2,100	Empty	I-M
Tanks 22, 23, 24, 26, 27, 28	1,000	Ti Precipitation	I-M
Tank 25	1,000	Ti Recirculation	I-M
11-2 K_2TiF_6			
Zr Reaction	1,000	Zr Reaction Tank	I-M
Tanks 1, 2, 3	2,000	Zr Precipitation	I-M
Tanks 4, 5	650	H_2ZrF_6	I-M
Tank 6	1,500	Mother Liquor Storage (Fluoride Liquid)	I-M
11-3			
Scrubber	2,000	Scrubber Water	I-M
Scrubber	28,000	Scrubber Water	I-M

TABLE I: MATERIAL STORAGE INVENTORY (Cont'd)

LOCATION	VOLUME (GAL.)	MATERIAL STORED	CODE
12 Waste Treatment			
12-1 Bldg. 015			
Tanks 1-5	10,000	General Waste Treatment	A-I
Tank 6	4,000	General Waste Treatment	M
Tank 7	20,000	Blowdown	A-I
Tank 8	20,000	General Waste Treatment	M
Tank 9	10,000	General Waste Treatment	M
13 Waste Collection			
13-1 Bldg. 018	3,000	Neutral Fluorides	A-I
13-2 Bldg. 109	5,000	Neutral Fluorides	C-I-M
	5,000	Neutral Fluorides	C-I-M
	1,500	HF Scrubber Waste	C-I-M
	2,400	Acid Fluorides	A-I
	5,700	Acid Fluorides	A-I
	8,000	Acid Fluorides	A-I
	3,000	Weak Acid Fluorides	A-I
	3,000	Weak Acid Fluorides	A-I
Ammonia Stripper Tank	50,000	Weak Ammonia Waste	C-I-M
Ammonia Stripper Tank	30,000	Weak Ammonia Waste	C-I-M
	2,000	NH_3 Scrubber Waste	A-I
Segregation Tank 2	24,000	Strong Acid Waste	C-I-M
Segregation Tank 3	25,000	Weak Acid Waste	C-I-M
Segregation Tank 4	26,000	Weak Acid Waste	C-I-M
Tank 6	6,000	Weak Acid Waste	C-I-M
13-3 Bldg. 030	10,000	Fluoride	C-I-M
	3,000	Scrub	C-I-M
13-4 Bldg. 025	3,000	Lab Wastes	D-I
	3,000	Lab Wastes	D-I
13-5 Bldg. 046			
6 Tanks	10,000	Dilute Fluorides	C-I-M
Segregation Tank 1	42,000	Dilute Fluorides	C-I-M

TABLE I: MATERIAL STORAGE INVENTORY (Cont'd)

LOCATION	VOLUME (GAL.)	MATERIAL STORED	CODE
13-6 Bldg. 055			
Tank 1	5,000	Nh_3	D-I
Tank 2	2,000	Fluoride	D-I
13-7 Bldg. 062			
"E" Tank	100,000	Plant Waste	D-I
"EE" Tank	100,000	Plant Waste	D-I
Tank 3	16,000	Clear Filtrate	D-I
13-8 Bldg. 098			
Tank 1	3,000	Lab Wastes	D-I
Tank 2	3,000	Lab Wastes	D-I
I Tank	16,000	Plant Waste	C-I-M
13-9 Bldg. 090			
Tank 1	1,500	Fluoride Scrubber Recycle Liquid	A-I
13-10 Bldg. 074			
Tank 17A	15,000	Weak Acid Waste	D-I
Tank 17B	15,000	Raffinate (Weak Acid)	D-I
Tank 17C	15,000	Weak Acid Waste	D-I

The various chemical materials and chemical products listed as well as related process materials have descriptive literature referable to safety, health and environmental concerns available thru the plant Safety and Industrial Hygiene Supervisor. The bulk of this material is in the form of Material Safety Data Sheets and is available to all employees.

4. Plant Operations

Generally, if a liquid spill were to occur, it would be contained either locally or by the spill containment facilities (See Section 22). The following is an evaluation of major potential hazards and actions to be taken.

A. Anhydrous Ammonia

(1) Description: Anhydrous ammonia is stored as a compressed gas in liquid form. Upon release it quickly boils and vaporizes to a gas which is lighter than air. It has a high affinity for water. It has a choking effect when inhaled.

(2) Locations:

a. An 8,000 gallon tank located 80 feet Northwest of the Northwest corner of Building 018 marked as A-1 on Plot Plan.

b. A 2,000 gallon tank located on the street side of Building 030, marked as A-2 on Plot Plan.

(2) Locations: (Cont'd)

c. A 2,000 gallon tank located on the Southwest side of Building 055, marked as A-3 on Plot Plan.

d. Two smaller tanks which are too small a volume to be considered a major hazard are mentioned here only for reference: one is adjacent to the large bulk tank A-1 and the other is normally on the Southwest side of Building 074.

e. A transport vehicle operated by a vendor and could be at various places within the plant area.

(3) Release: A spill incident would be an uncontrolled discharge from a bulk storage tank, transfer line or transporting vehicle. It would result from a tank rupture, a corrosion leak, a broken valve, pipe or other device, or a pressure relief valve that has failed to close after relieving excess pressure. It will be assumed that the discharge cannot be readily stopped and it would appear that the contents of the tank could be completely discharged.

(4) Response Action: The release of gas will best be controlled by water fog, hence the Fire Brigade is instructed to spray a water fog upon the source of discharge approaching it from an upwind direction. The resultant solution will be alkaline and the Pollution control Group must, therefore, be involved. The Maintenance Group will be alerted and their efforts will be directed to any possible means to stop the discharge.

(5) Isolation and Evacuation: In the event of an uncontrolled discharge, a zone 100 feet upwind of the spill and 200 feet downwind will be cordoned off by the Fire Brigade. If the spill is continuous and severe, the Response Coordinator may initiate an evacuation of the windcone zone for a distance of .7 mile long by .4 mile wide. All evacuated plant personnel will report to the Guard Office for head count and reassignment.

B. Propane

(1) Description: Propane is stored as a compressed gas in liquid form (LPG). Upon release, it quickly boils and vaporizes to a gas approximately the same density as air. The gas is highly flammable and in the proper concentration it will explode upon ignition. The discharge from the tank may or may not be on fire when discovered.

(2) Locations: A 2,000 gallon bulk tank for storage of liquified propane gas (LPG) is located East of Building 022 (Warehouse) and South of Building 040 (Warehouse) near the property fence. It is marked as B-1 on the Plot Plan.

(3) Release: A spill incident would be an uncontrolled discharge from the bulk storage tank or a transporting vehicle. It would result from a tank rupture, a corrosion leak, a broken valve, or other device, or a pressure relief valve that has failed to close after relieving excess pressure. It will be assumed that the discharge cannot be readily stopped and it would appear that the contents of the tank could be completely discharged.

(4) Response Action: The release of propane gas must be approached with extreme caution. If the gas is afire, the Boyertown fire Dispatcher will be immediately notified for assistance. The Fire Brigade will be summoned in all cases and if the gas is afire, water will be applied to the metal tank in efforts to keep the tank cool at the fire point and to prevent any spreading of fire. If the released gas is not afire, it must be approached with extreme caution as it could be ignited at any monent with explosive force. The Maintenance Group will be alerted and their efforts will be directed to any possible means to stop the discharge at the source. All approaches to the spill will be from an upwind direction and in the event of no wind, it would be best to not approach the spill beyond the zone of an explosive mixture.

(4) Response Action: (Cont'd)

It is not necessary to notify the Pollution Control Group.

(5) Isolation and Evacuation: In the event of an uncontrolled discharge, a zone 100 feet upwind of the spill and 200 feet downwind will be cordoned off by the Fire Brigade. This zone may be enlarged in the event that there is no burn at the point of discharge.

If there is no burn and quantities of gas are being released, the windcone zone will be evacuated for a distance of 500 feet or more as directed by the Response Coordinator. All evacuated plant personnel will report to the Guard Office for head count and reassignment.

C. Metallic Sodium

(1) Description: Sodium is a metal element which melts at 208°F. At ordinary (ambient) temperatures, it is a soft solid. In air at temperatures above about 150°F it will ignite and burn. The resultant caustic fumes can cause choking and will create a dense fog. The metal is explosive when it contacts water.

(2) Location: The bulk sodium is stored in a tank located in Building 100 and is marked as C-1 on the Plot Plan.

(3) Release: A spill incident will be defined as a discharge of molten sodium from a source which cannot be readily stopped, it is burning and it appears to be accumulating faster than the fire is consuming it. This incident will be judged more serious if other sensitive equipment or combustibles are exposed to the fire.

(4) Response Action: A sodium discharge will in most cases ignite almost immediately. Special trained personnel are available on all shifts as workers in the adjacent Building 032 and are to be alerted immediately for fire fighting purposes. The plant Fire Brigade will be alerted for assistance and at the discretion of the area supervisor, the Boyertown Fire Dispatcher will be notified for assistance.

The Maintenance Group must be alerted and their efforts will be directed toward any possible means to stop the discharge at the source.

The Pollution Control Group should be alerted for possible assistance and cleanup procedures.

(5) Isolation and Evacuation: In the event of a sodium fire in Building 100, a zone 200 feet in diameter around the building will be cordoned off by the Fire Brigade.

At the discretion of the Response Coordinator, a larger area may be evacuated depending upon the severity of the spill.

All evacuated plant personnel will report to the Guard Office for head count and reassignment.

D. Methyl Isobutyl Ketone (MIBK)

(1) Description: MIBK is a volatile, flammable liquid. It has a characteristic organic odor. The vapors are heavier than air and disperse poorly except in a brisk breeze. The liquid does not mix with water.

(2) Location: A 10,000 gallon [illegible] tank is located in the South corner of the fenced area of Building 074. This tank is designated D-1 on the Plot Plan.

(3) Release: A spill incident could be a large volume spill of MIBK in the vicinity of the MIBK storage tank, or a delivery truck, with or without a fire. The bulk storage tank is located within a diked area which is designed to hold the volume of the storage tank.

(4) Response Action: A discharge of liquid MIBK from the bulk storage tank will probably be contained within the dike around the tank and all efforts should be directed to prevent any ignition of the vapor. The plant Fire Brigade will be alerted and if no fire has started, they will cordon off the area to prevent accidental ignition. If any substantial amount of liquid has accumulated (2-3 inches) or it appears that substantial amounts will be released from the tank, the Boyertown Fire Dispatcher must be notified for assistance. Upon arrival, they will be directed to apply foam to the surface of the accumulated liquid. All vehicular traffic, including fire fighting apparatus, should be stopped no less than 100 feet of the spill.

The Maintenance Group must be alerted and their efforts should be directed to means of returning the liquid to enclosed tanks.

(5) Isolation and Evacuation: In the event of liquid MIBK accumulation within the diked area of the storage tank, the area will be cordoned off for a radius of 100 feet of the tank and no vehicular traffic will be permitted beyond that point. In the event of a fire which is near or involves the bulk MIBK storage tank, Building 074, 087 and 088 will be evacuated. All evacuated plant personnel will report to the Guard Office for head count and reassignment.

E. Anhydrous Hydrogen Fluoride (AHF)

(1) Description: AHF is colorless liquid with a boiling point of 67°F. The liquid vaporizes readily, especially at ambient temperatures above 67°F. The vapor combines with the humidity in the air and appears as dense white fog. The vapor is pugent, irritating and is highly corrosive and toxic. The vapor is non-flammable.

(2) Location: An anhydrous hydrogen fluoride tank is located in the East corner of the plant at the corner of County Line and Mill Crest Roads. It is marked E-1 on the Plot Plan.

(3) Release: An incident is any leak or accidental discharge of AHF that cannot or is not immediately stopped.

(4) Response Action: A water fog system is installed over the storage tanks. In the event of an AHF leak, the Fire Brigade will be alerted and if the water fog system is not activated, it will be turned on. The water fog system will be turned on only by authorized persons. An alternative for small leaks will be a fog nozzle from a fire hose directed manually to the leak area.

(4) Response Action: (Cont'd)

The Maintenance Group will be alerted and their efforts will be directed towards a safe means of stopping the discharge at the source.

The Pollution Control Group must be alerted and their efforts will be directed towards containment and disposal of the acid solutions formed from the water fog. The amount of this liquid can be minimized by prudent closure of some of the foggers as directed by the Response Coordinator. The Fire Brigade will cordon off an area by the AHF tank for a minimum radiums of 250 feet upwind and 500 feet downwind. The Plant Security Group will as rapidly as possible effect road closures on County Line and Mill Crest Roads.

In the event the spill is not immediately controlled, evacuation, as necessary, will be ordered by the Response Coordinator. All evacuated plant personnel will report to the Guard Office for a headcount and reassignment.

F. Hydrofluoric Acid, Aqueous (HF)

(1) Description: Aqueous HF (70%) is a colorless liquid which vaporizes readily at ambient temperatures. It is a highly corrosive and toxic acid. The vapors are pungent, irritating, corrosive and toxic.

(2) Locations: Bulk storage of 70% HF is located in six tanks at five locations: (Reference locations numbers on Plot Plan).

F-1 at the Anhydrous HF dilution plant (same as E-1).

F-2 two tanks Southwest of Building 073.

F-3 South of Building 074 adjacent to the MIBK storage tank.

F-4 Northwest side of Building 019.

F-5 between Buildings 001 and the Waste Plant (015).

(3) Release: A spill incident is an uncontrolled discharge of 70% aqueous HF from a bulk storage tank, a delivery truck or from a process line which obscures its source or limits access to insure control.

(4) Response Action: The Fire Brigade will be alerted and their activities will be to cordon off the area and assist in the spreading of lime. The Pollution Control Group will be alerted and they will direct the application of bagged lime to the spill and finally they will direct the cleanup and disposal of waste materials.

The Maintenance Group will be alerted and their efforts will be directed to the possible stopping of the discharge at the source.

(5) Isolation and Evacuation: In the event of an uncontrolled discharge of aqueous HF, a zone 100 feet upwind and 200 feet or more downwind will be cordoned off. Depending on the magnitude of the spill and wind conditions, the Response Coordinator may direct the evacuation of a windcone zone. The dimensions of the zone will be at the discretion of the Response Coordinator. All evacuated plant personnel will report to the Guard Office for a head count and reassignment.

5. Material Compatibility

Due to the nature of plant operations, it is imperative that plant personnel be aware of material compatibility. It is the responsibility of the engineering and maintenance departments to insure that good engineering practices are followed with respect to construction and corrosion resistance when new or replacement equipment is installed.

Prior to process start up, a Major Hazard Analysis must be conducted to evaluate risks and any potential harm to public health and welfare or to the environment. A major consideration of this analysis is a review of the materials of construction and their suitability for the environment in which they will be used.

6. Inspection and Monitoring Program

The metallic acid storage tanks are ultra-sonic tested for metal thickness once a year and the record is kept in the Maintenance office.

All employees are constantly on the alert for unusual conditions which are immediately reported to their Supervisor for corrective action. The Response Coordinator must be notified of all releases to the environment.

The hazardous waste storage tanks are equipped with level indicating probes, the high level probes sound an alarm at the Guard Office and at the Waste Plant. In addition, the high level probe turns off the fill pump to the tank. The level probes are constantly being monitored as they are the operating tool of the Waste Plant.

7. Preventive Maintenance

Since many of the chemicals and operations at the plant are hazardous by nature, a sustained program of maintenance and inspection must be maintaned for the health and safety of plant personnel.

If a piece of equipment is determined to require maintenance, a written Work Order request must be submitted to the maintenance department. After the equipment has been repaired, a completed Work Order is returned to the requisitioner.

The plant pollution control group maintains a record of all repairs to environmental control equipment. The records include: the date maintenance was requested, maintenance work done to the equipment and the date that the maintenance was completed.

8. Housekeeping Program

It is the responsibility of each plant employee to maintain good housekeeping practices. If housekeeping is relaxed, spilled material may enter the plant storm sewer system and be monitored at NPDES Outfall 002. It is consequently necessary that good housekeeping practices be maintained to avoid a non-compliance situation at Outfall 002.

Good houskeeping practices include the following:

A. Any solids spilled that are known to be insoluble and innocuous, such as ores, should be cleaned up immediately by operator of the vehicle from which the spillage occurred. The operator shall notify his foreman as to what was spilled. If in the opinion of the foreman, the material will cause a hazard, the foreman will contact the pollution control group and the emergency response coordinator.

B. Any solids spilled that are known to be soluble should not be cleaned up by the operator, unless approved by his foreman. If in the opinion of the foreman, the material poses a hazard, the foreman will contact the pollution control group and the emergency response coordinator.

C. Any liquids spilled should not be cleaned up by the operator unless approved by his foreman. The foreman will then notify the pollution control group and if necessary, the emergency response coordinator.

A permanent record of spills is maintained by the pollution control group to insure that clean-up complies with environmental requirements.

9. Security

The entire production area is enclosed with a 6 ft. high chain link fence with 3 strands of barbed wire on top of the fence. The gates are kept closed and locked at all times (other than those on Mill Crest Road due to constant plant traffic). All visitors to the plant must sign in at the Guard Office and be cleared. All visitors must secure hard hats and safety goggles at the Guard Office before entry to the plant is permitted. At the end of the visit, visitors must sign out at the Guard Office and return safety equipment.

All remaining property is enclosed with steel wire fencing. All gates are kept locked at all times.

Guards are on duty 24 hours a day, 7 days a week. From 4 P.M. to 8 A.M. Monday thru Friday and on weekends, and holidays all day, the Guard will tour the 38 guard stations each hour. On tour, the guard is constantly on the alert for gates unlocked, broken pipes, overflowing tanks, odors, alarms, fires, prowlers and electrical malfunctions.

10. External Factors

External factors to the plant will have minimal adverse effect, if any, to public health and safety or to the environment.

If a power outage were to occur, discharge of waste water would be discountinued through automatic closing of a valve on the plant effluent line. The generation of additional plant wastes would cease during a power outage since chemical operations would be shut down.

The plant is located outside of the 100 year flood plain. In 1972, flood waters from Hurrican Agnes (100 year + flood) reached the plant. However, they did not cause any environmental hazards from plant operations.

The plant has never experienced a labor strike of any significant duration. If such a strike were to occur environmentally sensitive operations are located within the plant which is surrounded by a chain link fence and therefore, not easily accessible for vandalism to occur.

11. Internal and External Communications

The plant is served by an internal phone system by which one can communicate directly with another party or page that person(s) through the public address system.

There is also an alarm system at the plant for specific areas of the plant. If an alarm situation were to occur, it would be sounded at the appropriate location of the incident and remotely in the Guard Office. The Guard Office is manned 24 hours a day, 7 days a week. Therefore, an alarm condition would not go unnoticed.

All external communications with police and fire agencies are through the outside phone system. There are no direct alarm ties with any outside agency.

12. Employee Training Program

The following is the job description for the waste treatment plant operators:

The Waste Plant Operator must perform his duties as outlined in the Waste Plant Operating Manual.

In addition, he must be constantly on the alert for leaks, ruptured pipes, malfunctioning valves, probes, pumps or overflowing tanks within his area. In case of ruptured pipes or overflowing tanks, he must immediately start or stop the appropriate pumps, and open or close the proper valves. He must then notify his Supervisor. All malfunctioning valves, probes, pumps must be immediately reported to his Supervisor.

In case of fire or explosion, the Operator must call the Guard by dialing 254 and report conditions, then he must call the Fire Brigade over the public address system by dialing 112.

In addition to the above, all employees are aware of the hazards associated with materials and chemicals used at the plant and are constantly on the alert for unusual conditions which are immediately reported to their Supervisor for corrective action.

13. List of Emergency Coordinators

Primary Emergency Coordinator:

Charles E. Bollenbacker
Plant Telephone (215) 367-2181 Ext. 237
Home Telephone (215) 469-9101
Home Address - RD #2, Pottstown, PA 19464

1st Alternate Emergency Coordinator:

Nicholas C. Feola
Plant Telephone (215) 367-2181 Ext. 342 294
Home Telephone (215) 323-0431
Home Address - 71 Pulaski St., Stowe, PA 19464

2nd Alternate Emergency Coordinator:

Donald W. High
Plant Telephone (215) 367-2181 Ext. 326
Home Telephone (215) 689-5318
Home Address - Box 103, RD #2, Douglassville, PA 19518

14. Duties and Responsibilities of the Emergency Coordinator

The Response Coordinator shall be responsible for establishing and maintaining a training program for the purposes of timely and proper responses to emergency and spill events.

All involved personnel must be familiar with the procedures, equipment, systems and mobilization of the PPC Plan. This includes periodic review of the plan with all personnel operating in the areas where major potential spill events could occur in addition to practice exercises as required.

The Response Coordinator shall establish preparedness and prevention programs for all major spill potential areas, ensuring that fire extinguishers, fire control equipment, spill control equipment, decontamination equipment, water at adequate volume and pressure, foam producing equipment, spill cleanup equipment, absorbents and other spill event chemicals, internal communications systems and other spill event equipment are maintained, available and operative. Equipment such as protective wearing apparel, breathing apparatus and other safety equipment must also be available and operable for use, if required. All involved personnel must be instructed in the proper and safe use of all emergency equipment.

The Response Coordinator shall notify the Plant Manager and the Manager of Compliance of spill events, non-compliance situations and other emergencies.

15. Chain of Command

If a spill or other environmental incident is discovered by an employee, it is his responsibility to contact his immediate supervisor who will then contact the emergency response coordinator. The emergency response coordinator will then notify the Plant manager, the Manager of Compliance and those personnel listed below as required.

	Home Phone
Emergency Coordinator - C. E. Bollenbacher - Ext. 237	469-9101
1st Alternate - N. C. Feola - Ext. 342	323-0431
2nd Alternate - D. W. High - Ext. 326	689-5318
12-8 Shift Supervisor - D. G. Fizz - Ext. 112	326-6256 (U)
Alternate - R. W. Fronczak - Ext. 352	367-7321
8-4 Shift Pollution Control Group Leader -	
R. M. Sarla - Ext. 231	489-3215
1st Alternate - R. H. Heinly - Ext. 291	367-8779
2nd Alternate - A. T. Campitelli - Ext. 291	779-2139
Maintenance Group Leader - S. G. Capiotis - Ext. 350	372-5685
1st Alternate - D. S. Herman - Ext. 217	845-7885 (U)
2nd Alternate - R. L. Stovall - Ext. 217	929-4965
Safety Group Leader - R. J. Kresge - Ext. 346	262-6092
Alternate - D. D. Weller - Ext. 346	845-2698
Fire Brigade Group Leader - R. J. Kresge - Ext. 346	262-6092
Fire Marshall - J. Minotto - Ext. 217	323-5670
12-8 Shift Brigade Chief - R. W. Fronczak - Ext. 352	367-7321
Alternate - D. G. Fizz - Ext. 112	326-6256 (U)

8-4 Shift Brigade Chief - J. G. Paretti - Ext. 372	323-6691
Alternate - J. M. Sarla - Ext. 219	369-0231
4-12 Shift Brigade Chief - R. B. Kehl - Ext. 233	367-7678
Alternate - M. W. Goheen - Ext. 112	582-2940
8-4 Shift Security Group Leader - T. R. Mest	369-0948 (U)
Alternate - F. W. Majka	779-7124
4-12 Shift Supervisor - M. W. Goheen - Ext. 112	582-2940
Alternate - R. B. Kehl - Ext. 233	367-7678
Weekends/Holidays - Security Guard - Ext. 254	367-2181
Manager of Compliance - W. J. Hetrick - 371-3649	678-4472

(U) - Unlisted

16. List of Agencies to be Notified

In the event of an environmental emergency, the following agencies will be notified as required.

A. Pennsylvania Department of Environmental Resources:

(1) Norristown Regional Office

8 A.M. to 4 P.M. (215) 631-2405

Other hours (215) 631-2400

(2) If regional office cannot be contacted:

(717) 787-4343

B. EPA Region III - Philadelphia

(215) 597-9898 (24 hours)

(215) 597-9899 (24 hours)

C. National Response Center

(800) 424-8802

D. Pennsylvania Fish Commission

(215) 584-0255

E. Police

(1) Montgomery County (215) 327-1441

(2) Berks County (215) 367-2500

F. Fire Department

(1)	Montgomery County (Gilbertsville)	(215) 323-2424
(2)	Berks County (New Berlinville)	(215) 367-2500

G. Sewage Treatment Plant

Berks Montgomery Municipal Authority	(215) 367-9449 or (215) 367-6803

H. Downstream Users

Philadelphia Suburban Water Co. Pickering Creek Plant	(215) 527-0441

17. Emergency Equipment

The emergency response equipment is maintained in good condition and is kept in the emergency response vehicle. The plant Safety and Industrial Hygiene supervisor is responsible for inspection and maintenance of this equipment. The emergency response vehicle is located between Buildings 009 and Building 021. The following is a list of the equipment in the emergency response vehicle:

A. Two chemical acid suits

B. Two 4 hour Scott emergency air packs

C. Two 1/2 hour Scott Air packs and two spare tanks

D. 6 to 12 pair heavy duty acid boots

E. 6 to 12 pair lightweight acid boots

F. 12 pair acid gloves

G. Two harnesses and lifelines (75 feet)

H. One portable stretcher

I. Six long handle shovels

J. Two step ladders and two extension ladders

K. 4 to 6 lightweight two-piece acid suits

L. First Aid Kit: bandages, HF Burn Treatments

M. Oxygen inhalator

N. Assorted hand tools, pipe clamps, rubber sheeting, tank bands, wooden plugs, tool kit, explosive proof emergency lighting

In addition to the above, safety showers and eye wash stations are located thru out the plant and are functionally tested each month. A Draeger gas detector and an oxygen analyzer are available for use and routinely inspected.

18. Evacuation Plan for Installation Personnel

While it is deemed to be only a remote possibility that evacuation of the plant will be necessary, evacuation of specific buildings may be more appropriate. Evacuation of the plant will be directed only by the Plant Manager or by non-facility authorities, such as the On-Scene Coordinator (OSC). In this event, evacuation procedures, as outlined by state and regional contingency plans will be followed.

Evacuation of buildings will also be directed by the Plant Manager or by non-facility authorities, such as the OSC. Local conditions, such as fire, may also dictate such evacuation. All building exits within the KBI-Boyertown Plant are appropiately marked. Exits are also generally self-evident and well known by all personnel.

19. Arrangements With Emergency Response Contractors

Most environmental hazards that may occur at the plant can be controlled by the use of in-house personnel and equipment. In the event that the hazard cannot be contained or cleaned up through the use of in-house resources, the following will be contacted.

A. For heavy equipment, trucks, and labor:

R. M. Guinther, Inc. (215) 367-8587

B. Laboratory Services

Wastex Industries, Inc.
Pottstown, PA (215) 327-0880

C. Clean-up Services by Experienced Contractors

(1) Rollins Environmental Services
Bridgeport, NJ (609) 467-3100

(2) Mobile Dredging
Exton, PA (215) 363-6677

D. Disposal Services

(1) Liqwacon
York, PA (717) 846-1900

(2) I.U. Conversion Systems, Inc.
Horsham, PA (215) 441-5900

(3) Chemical Waste Management
5760 Jefferson Drive
Reading, PA 19606 (215) 582-4816

20. Agreements with State and Local Emergency Response Teams and Hospitals

Copies of the KBI-Boyertown plant spill contingency plan have been sent to the following:

A. Gilbertsville Fire Company
David Hollowbush, Chief
Gilbertsville, PA 19525
(215) 323-2424 Sent: 27 July 1981

B. Douglass Township Police Dept.
Frederick Ziegler, Chief
19 Municipal Drive
Gilbertsville, PA 19525
(215) 679-4131 Sent: 27 July 1981

C. New Berlinville Fire Company
William C. Heffner, Chief
New Berlinville, PA 19545
(215) 367-2500 Sent: 27 July 1981

D. Pottstown Memorial Medical Center
Albert P. Pollick, President
Firestone Boulevard and High Street
(215) 327-7000 Sent: 29 July 1981

E. Colebrookdale Township Police Dept.
R.D. #1
Boyertown, PA 19512
(215) 367-2500 Sent: July 1981

21. Pollution Incident History

In the past, incidents have resulted from leaks in process tanks or pipelines, accidents during material handling, overflows from tanks and escape of liquids from buildings or confined areas. These incidents generally result in a change of pH in the effluent.

To prevent pH excursions in the plant effluent, continuous pH monitoring of the effluent was recently installed. If a non-compliance situation is detected, the discharge will be routed to one of two lined spill containment basins for additional treatment prior to discharge. Each basin will have a capacity of approximately 1,000,000 gallons.

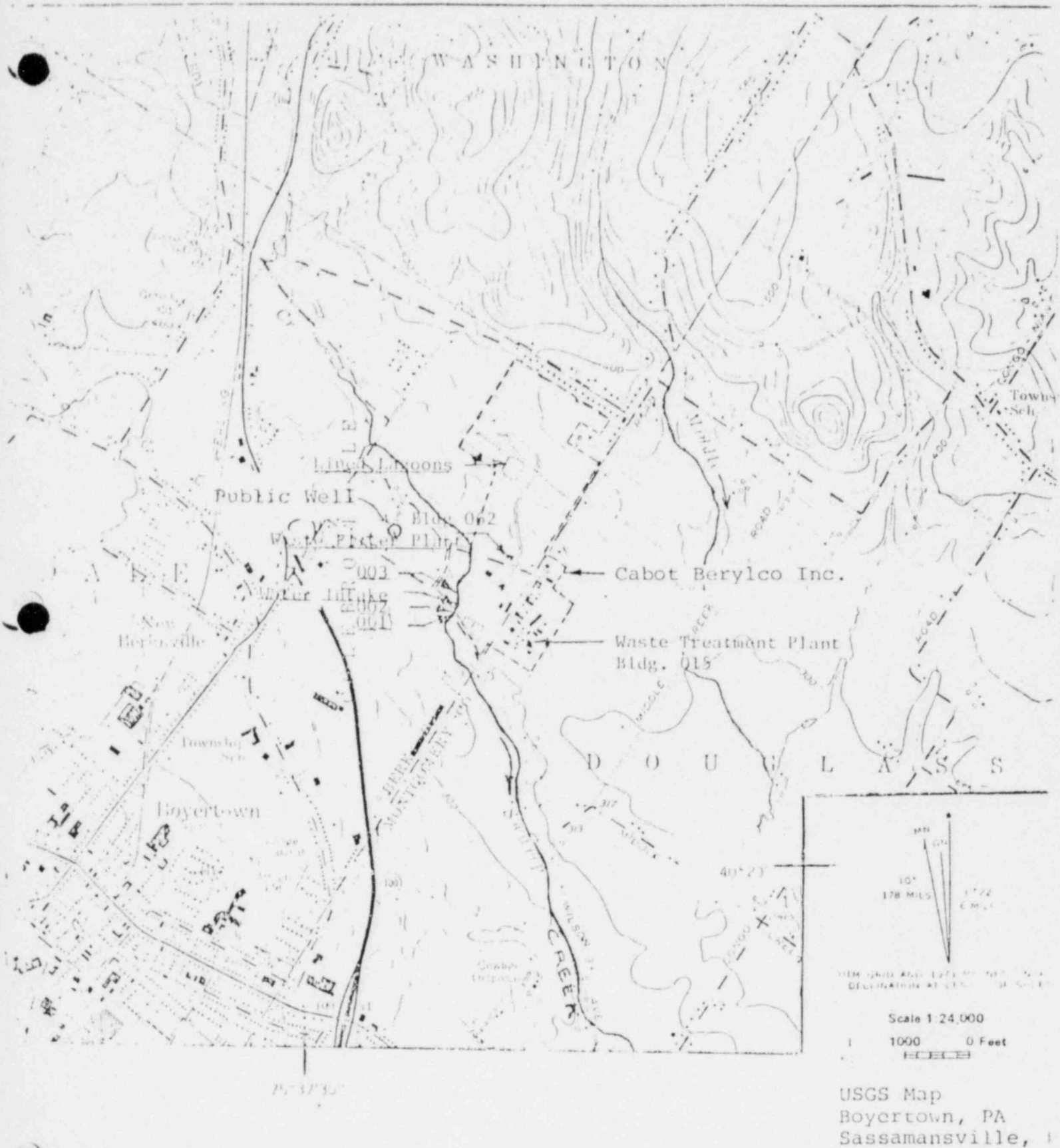
Maintenance records of inspections and repairs to tanks or equipment causing pollution incidents are kept by the plant pollution control group.

22. Implementation Schedule

The KEI Boyertown Plant is presently involved with a major spill containment project. The project consists of the installation of two lined containment basins and pumping facilities with automatic instrumentation. Each basin will have a capacity of approximately 1,000,000 gallons. The installation of these basins is covered under Water Quality Management Permit No. 4681203.

It is expected that Basin #2 can be put into service by 28 February 1982 and that Basin #1 can be put into service by 30 June 1982.

ATTACHMENTS



Location Map
Cabot Berylco Inc.
Douglass Township
Montgomery County, Pennsylvania

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PURSUANT TO ENVIRONMENTAL PROTECTION AGENCY

40 CFR SUBPART D DATED 5/19/1980

INSTALLATION SPILL AND CONTINGENCY PLAN (ISCP)

KBI DIVISION - BOYERTOWN PLANT

EPA IDENTIFICATION NUMBER PAD002335545

KBI DIVISION - BOYERTOWN PLANT

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APPENDIXES

A. Emergency Response Equipment and Materials

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C. ISCP Directory and Mobilization Plan Contact Points

D. Major Spill Potential Sites

KBI DIVISION

INSTALLATION SPILL AND CONTINGENCY PLAN (ISCP)

BOYERTOWN PLANT

I. GENERAL

This ISCP has been prepared in accordance with the Clean Water Act and the Resource Conservation and Recovery Act (RCRA) (particularly 40 CFR 264 Subpart D), with specific reference to 40 CFR 1510. In addition, the appropriate EPA Regional Pollution Contingency Plan and the State Emergency Response or Contingency Plan are incorporated herewith as an element of this ISCP. Additional references are made to 40 CFR 116 and 40 CFR 117, all of which are incorporated as an element of this ISCP.

The ISCP will establish the responsibilities, duties, procedures and resources to be employed when responding to a spill event, fire, or similar emergency. This ISCP shall be reviewed annually and revised as frequently as required to maintain a current plan.

Copies of this ISCP will be maintained at the facility at a place designated by the Emergency Coordinator, at the office of the corporate Environmental Engineer and at the Cabot corporate offices in Boston, MA. Those elements of the ISCP included by reference will be maintained only in the Emergency Coordinator files in that these references are a matter of public record and inclusion in all file plans is deemed unnecessary.

Copies of this ISCP have been offered to those agencies as required by 40 CFR 264.53. Public domain references incorporated into this ISCP, however, were submitted only by way of reference.

The abbreviations and definitions employed in this ISCP are the same as those found in 40 CFR 1510.

II. OPERATIONAL - RESPONSE PHASES

The required actions to be taken to respond to a spill event, fire, or explosion are outlined in Phases as described herein. It must be recognized that elements of any one phase may take place concurrently with one or more other phases. In the event of any spill event, responsive actions will be promptly taken to report such spill events and to prevent oil and hazardous substances from entering any navigable waters (including surface discharge) or water supplies.

Phase 1. Discovery and Notification

In the event of any spill event or fire (or similar emergency condition), the discoverer of the spill event or fire shall immediately notify the Emergency Coordinator or his designate who will then activate the ISCP as required. The Emergency Coordinator and his responsibilities are described in 40 CFR 264.55 and 40 CFR 264.56. The Emergency Coordinator is identified and his contact telephone number and location is given in Appendix B.

Instruction signs with telephone numbers of the Emergency Coordinator, or his designate, are posted at all major spill potential sites to speed response. The major spill potential sites are listed in Emergency Response Plan starting on page #5.

The discoverer of a spill event or fire might include, but is not limited to, all personnel of KBI Division, representatives of any governmental agency, or the general public. Off-site spill events reported to the Emergency Coordinator will be immediately reported to the On-Scene Coordinator (OSC) as identified in Appendix C.

Details of the activation procedures and the mobilization process are found in section "Mobilization Plan". The Emergency Coordinator, or his appointed representative, must be continuously available in the event of emergency.

Examples of spills to be reported include, but are not limited to, oil spills, significant discharges of hazardous and toxic substances, evidence of a spill by discovery of a slick or wheen on water from oil, gasoline, or other hazard-out polluting substances. Reference is made to 40 CFR 116 and 40 CFR 117 for "reportable quantities". Spill events are interpreted to include only spills to surface (navigable) waters and/or underground water supplies. Spill events are spills not contained by secondary containment provisions.

Phase 2. Evaluation and Initiation of Action

Fires and explosions will be immediately reported to the appropriate fire department as listed in Appendix C. Fire protection systems including extinguishers are located strategically throughout the facility. Signs are posted at all potential fire hazard locations warning of the danger.

Spill events of reportable quantities will be reported to the OSC. The RRC has assigned the OSC for the plant. The OSC can delegate authority to the Emergency Coordinator provided subsequent actions conform to the requirements of the ISCP and to OSC directives.

Following notification of the OSC, the OSC (or Emergency Coordinator) shall insure that a report of a spill event is immediately investigated. Based on all available information, the OSC shall:

a. Evaluate the magnitude and severity of the discharge.

b. Determine the feasibility of removal.

c. Assess the effectiveness of removal actions.

The OSC shall, when appropriate and as soon as possible after receipt of a report, advise the RRC of the need to initiate further governmental (non-facility) response actions.

The OSC shall insure that adequate surveillance is maintained to determine that removal actions are being properly carried out.

Further details of activation procedures and the mobilization process are found in the section "Mobilization Plan".

Phase 3 - Containment and Countermeasures

These are defensive actions to be initiated as soon as possible after discovery and notification of a discharge. These actions may include public health and welfare protection activities, source control procedures, salvage operations, placement of physical barriers to halt or slow the spread of a pollutant, emplacement or activation of booms or barriers to protect specific installations or areas, control of the water discharge from upstream impoundments and the employment of chemicals and other materials to restrain the pollutant (or fire) and its effects on water related resources.

Equipment, chemicals, services, etc. available for containment and related purposes are tabulated in Appendix A. Bag limestone is stored in shed midway on side of R&D Bldg. #11 opposite Analytical Bldg. #25.

Phase 4 - Cleanup, Mitigation and Disposal

This includes actions taken to recover the pollutant from the water and monitoring activities to determine the scope and effectiveness of removal actions. Actions that could be taken include the use of sorbers, skimmers, and other collection devices for floating pollutants; the use of vacuum dredges or other devices for submerged pollutants; the use of reaeration or other methods to minimize or mitigate dissolved, suspended, or emulsified pollutants; or special treatment techniques to protect public water supplies or wildlife resources from continuing damage. The goal should be to leave the area and cleanup equipment in as good a condition as it was before the emergency.

Pollutants and contaminated materials that are recovered in cleanup operations shall be disposed of in accordance with procedures agreed to at the State or local level or between the Emergency Coordinator and the Environmental Engineer. Ultimate disposal of such waste materials shall be coordinated with the OSC, when applicable.

Equipment, chemicals, services, etc. available for cleanup, mitigation and disposal purposes are tabulated in Appendix A. See page 5 of Oil Spill Prevention Control and Countermeasure Plan.

Phase 5 - Documentation and Cost Recovery

In the case of non-facility caused discharges where the facility is assisting, by request, the EPA in cleanup activities, the collection of samples and necessary data must be performed at the proper times during the case in order to fix liability and for other purposes. The corporate Legal Department shall be consulted on these matters, including any spill incident that progresses beyond the property lines. As directed by the OSC or Emergency Coordinator, photographs shall be taken of the spill in black and white and/or color. The photographs should show the source and extent of pollution. The following information shall be recorded on the back of each photographic print:

a. Name and location of facility.

b. Date and time the photograph was taken.

c. Names of the photographer and witnesses.

d. Shutter speed and lens opening, if applicable.

e. Type of film used and details of film processing, if applicable.

The immediate developing type of photographic process may be of major assistance to the less-than-professional photographer by allowing on-the-spot inspection of results and "retakes" as needed to obtain an acceptable photograph. Such photographic records may be required for facility or non-facility spill events.

III. REPORTING REQUIREMENTS

All spill events, fires, explosions shall be immediately reported to the Emergency Coordinator who will then be responsible for activating the ISCP as required. In the absence of the Emergency Coordinator, the spill event shall be reported directly and immediately by an appointed representative of the Emergency Coordinator by telephonic means to the RRC. Fires and explosions will be reported to the appropriate fire department. The telephone numbers for 24-hour service are given in Appendix C. Instruction signs with appropriate telephone numbers are posted at all major spill potential sites. The major spill potential sites are tabulated in Appendix D. The Emergency Coordinator telephone shall be manned as required during plant operation.

The Emergency Coordinator (or OSC) is responsible for subsequent activation of the ISCP immediately following receipt of a report of a spill event. The Emergency Coordinator shall develop a complete separate record of each spill event, fire, or explosion. Records of spill events are especially important for non-facility caused spills where the facility is requested to aid in cleanup activities by the OSC, in order to facilitate cost recovery.

Any significant discharge of hazardous and toxic substances which, in the judgment of the Emergency Coordinator, poses a substantial threat to the public health or welfare or which exceeds EPA reportable quantities (RQ) identified under 40 CFR 117 shall be classified as a medium or major discharge.

While it is permissible for the Emergency Coordinator to report spill events by telephonic means to the Duty Officer, NRC, USCG, toll-free telephone number (800)424-8802, in addition to the RRC, the activation procedures are simplified if the Emergency Coordinator notifies the RRC only (telephonically). However, the Emergency Coordinator must ensure

that the OSC, or if so directed by the OSC, the Emergency Coordinator, contacts appropriate agencies listed in Appendix C, or as referenced in 40 CFR 1510.

For any spill event classified as a medium or major spill, a follow-up written message will be prepared by the Emergency Coordinator and distributed at least to the OSC and the state environmental agency within 15 days after the spill event. The format of the written reports should generally follow that indicated in 40 CFR 1510.56. When more than 1,000 U.S. gallons of oil (medium and major spills) or more than 500 U.S. gallons of a hazardous liquid substance (or any major discharge of a hazardous substance) have been discharged into or upon a navigable water in a single spill or when two spill events occur within any 12 month period, the written report will contain the following additional information, if requested by the OSC:

1. Description of facility from which spill originated (including maps, flow diagrams and topographic maps); date facility was put into operation; storage or handling capacity; and normal daily/weekly throughput.

2. Cause of spill, including a failure analysis of system or sub-system in which the failure occurred. Describe unique problems encountered.

3. Facility spill corrective actions, including resources committed, attempts to reclaim spilled substance and/or countermeasures taken. Include a description of equipment repairs and/or replacements.

4. Effectiveness of response and removal actions by the discharger, State and local forces, or Federal agencies and other special forces.

5. Additional preventive measures taken or contemplated to minimize the possibility of a recurrence and recommendations to improve response actions and changes for reclaiming if a similar spill should occur.

6. A complete copy of the Spill Plan with any amendments.

Upon discovery of a spill in which the pollutant may flow past the boundary of the installation, or a spill into navigable waters, the Emergency Coordinator will notify the Corporate Legal Department to ensure that information, records and samples adequate for legal purposes are obtained and safeguarded for future use.

The Emergency Coordinator is responsible for the predetermination of which chemicals used at the facility are hazardous and for obtaining technical assistance as may be necessary in the event of a spill. List of Hazardous Materials is maintained by the Safety & Health Dept.

The Emergency Coordinator shall ensure that the telephone through which all spill events at the facility are to be reported is staffed or manned appropriately.

IV. MOBILIZATION PLAN

A facility-caused spill event, fire or explosion shall be reported immediately by the discoverer tc the Emergency Coordinator, who will activate the ISCP. The Emergency Coordinator, or his appointed representative, shall be responsible for prominantly displaying the telephone number for spill event reporting purposes in major potential spill areas, etc., including the security department, treatment plant, the fire prevention and protection agencies and the Safety Department.

When a discoverer reports a spill event, fire or explosion, the following information shall be obtained by the Emergency Coordinator, or his appointed representative and recorded:

1. Name, location, telephone number of the caller (discoverer).

2. Location, reason, type of emergency involved. Date and time of emergency (estimate).

*3. Name, hazard class, quantity, container type of involved materials. Distinguish between total spilled and total amount in the water, where applicable.

4. Type and response of other personnel contacted, if any (fire, security, etc.).

5. Extenuating circumstances: weather conditions, population density in area, injuries to persons and property, etc.

*6. Carrier information, if applicable (name, mode, vehicle numbers, shipping paper numbers, etc.).

*7. Shipper information, if applicable (name, location).

*8. Co-signee information, if applicable (name, location).

9. Summary of information given to caller (discoverer).

*10. Summary of information on action taken by the installation response team. Note when containment was effected and when cleanup was commenced.

11. Record date, time of call and signed by recorder of message.

NOTE: Delete items asterisked (*) in the case of a spill event (and not a fire or explosion).

The Emergency Coordinator shall be notified of any spill event and the Emergency Coordinator shall then notify the RRC (OSC), if necessary. The OSC shall then assume responsibility for all subsequent actions toward the successful containment, cleanup, mitigation and disposal of the spill. However, the OSC may and undoubtedly will delegate such authority to the Emergency Coordinator provided subsequent actions conform to the requirements of the ISCP and to OSC directives. The Emergency Coordinator shall cooperate with the OSC insofar as required. The Emergency Coordinator shall maintain a chronology of events for the spill.

The Emergency Coordinator shall activate any portions or all of the facility resources, as appropriate, and any required elements of the local emergency task force. Any such activation shall be reported to the OSC. If the spill event exceeds the response capability of the installation, the OSC shall be notified at the earliest possible time.

NOTE: In any cases of injury to humans, the facility dispensary or other medical facilities shall be contacted by the Emergency Coordinator prior to any or all other communications. See Appendix C.

The Emergency Coordinator shall assist all outside agencies, such as the local fire, police, ambulance services, where practical. This assistance shall include access directions to the scene, when applicable. See Appendix C.

The Emergency Coordinator is responsible for developing all required records of spill response activities, including surveillance. Any actions or activations by the Emergency Coordinator must be duly recorded.

Regarding hazardous substances discharges, the Emergency Coordinator must determine the severity of the spill and the course of action required. A major concern in the response to such spill events must be the protection of response personnel from dangers of the spilled chemicals, which are often toxic, corrosive, acidic, or explosive.

A. The polluting hazardous substance must be identified as soon as possible. If chemical analysis is required, the facility, or other corporate, chemistry lab shall be utilized (or a local commercial lab). Sampling bottles of appropriate size and material must be utilized as established by the Chemist. New clean glass bottles are generally preferred (See 40 CFR 1510, Annex, VI, Section 1601).

B. Extreme care must be exercised in sample collecting at hazardous substances spill sites to prevent personal injury. If it is necessary to enter a hazardous substance spill area, especially in the case of unidentified substances, appropriate safety clothing should be worn including a self-contained breathing apparatus. The Safety Department and the Security Department are responsible for implementing safety measures and maintaining the spill area secure, respectively.

C. The Emergency Coordinator, after determining the identity of the spilled substance, must have information detailing chemical toxicity in the environment, flammability and explosive nature. Data from the manufacturer for significant chemicals utilized at the facility is on file in the Corporate Safety Office. Material safety data sheets are maintained, as appropriate, in the Safety & Health Dept., for all significant chemicals produced or used at the plant. Additional information regarding chemicals can be requested from the Chemical Manufacturing Association (CMA) in the CHEMTREC (Chemical Transportation Emergency Center) program by calling (800)424-9300. The Emergency Coordinator and response team members and the various security and fire departments should be familiar with the potential spill chemicals insofar as practical.

The Emergency Coordinator shall be responsible for establishing the coordinating a training program, maintained on a current basis, for the purposes of timely and proper responses to emergency and spill events.

All involved personnel must be familiar with the procedures, equipment, systems and mobilization of this ISCP. This includes a review of the ISCP with all personnel operating in the areas where major potential spill events could occur.

The Emergency Coordinator shall coordinate preparedness and prevention programs for all major spill potential areas, ensuring that fire extinguishers, fire control equipment, spill control equipment, decontamination equipment, water at adequate volume and pressure, foam producing equipment, spill cleanup equipment, adsorbents and other spill event chemicals, internal communications systems and other spill event equipment are maintained, are available if and when required, and are operable as required. Equipment such as protective wearing apparel, breathing apparatus and other safety equipment must also be available and operable for use, if required. All involved personnel must be instructed in the proper and safe use of all emergency equipment. If requested by the OSC, the Emergency Coordinator shall be prepared to take photographs of a spill event (See Section II of this ISCP, "Operational-Response Phases", Phase 5).

The Emergency Coordinator shall notify the Environmental Engineer (telephone (215)921-5052 or (215)921-5355) of all medium or major spill events and other emergencies as required. The Environmental Engineer will notify the Public Affairs Department, who shall be responsible for reporting public information to the news media as applicable. Specifically, the Public Affairs Department shall be responsible for:

A. Assisting the media in getting correct information concerning the spill substance involved.

B. Explaining how the Emergency Coordinator other facility forces are controlling the incident.

C. Acting as a liaison between media and facility to allow other team members to perform their roles without media interference.

D. Preventing other team members and other facility personnel from suggesting implication of the facility because of their unfamiliarity in dealing with the media.

While spill prevention is not specifically addressed in the ISCP, as it is in the Spill Plan, it is important to stress certain features of the Spill Plan for reference in the ISCP. It shall be the responsibility of the Emergency Coordinator to ensure that the following features are incorporated into the normal and routine operation of the facility:

A. Facility gate inspections of trucks and railroad tank cars.

B. Trucks must have rear lights that can be seen.

C. Trucks must have the proper placards in place.

D. A fully charged fire extinguisher must be in each cab.

E. Trucks must not be overloaded.

F. The driver should have a safety data sheet on the material that he is hauling, if requested, and if available.

G. Proper personal protective safety equipment must be used by the driver during loading or unloading operations.

H. The driver's accident record should be reviewed annually.

Reference to DOT regulations for transport of hazardous materials is made to "The Hazardous Materials Transportation Act", (HMTA). The crux of HMTA is contained under 49 CFR 170-179. The Emergency Coordinator should be generally familiar with DOT references with regard to non-facility transporters of hazardous substances.

V. EVACUATION PLAN

While it is deemed to be only a remote possibility that evacuation of a facility will be necessary, evacuation of specific buildings within the facility may be more appropriate. Evacuation of a facility will be directed only by the Plant Manager or by non-facility authorities, such as the OSC. In this event, evacuation procedures, as outlined by the referenced state and regional contingency plans will be followed.

Evacuation of buildings will also be directed by the Plant Manager or by non-facility authorities, such as the OSC. Local conditions, such as fire, may also dictate such evacuation. All buildings within KBI Division are appropriately marked according to exit, as required. Exits are also generally self-evident and well known by all personnel.

Appendix A - Equipment List

The following ER equipment will be maintained in good condition in the ER vehicle:

1. Two Chemical Acid suits
2. Two 4-hour Scott emergency air packs
3. Two 1/2-hour Scott Air packs & two spare tanks
4. 6-12 pair heavy duty acid boots
5. 6-12 pair light weight acid boots
6. 12 pair acid gloves
7. Two harnesses and lifelines (75 feet)
8. One portable stretcher
9. Long handle shovels - six
10. One 12-foot straight ladder
11. 4-6 lightweight two-piece acid suits
12. First Aid kit: bandages, HF burn treatments
13. Oxygen inhalator
14. Assorted hand tools, pipe clamps, rubber sheeting, tank bands, wooden plugs, tool kit

APPENDIX B - CALL LIST

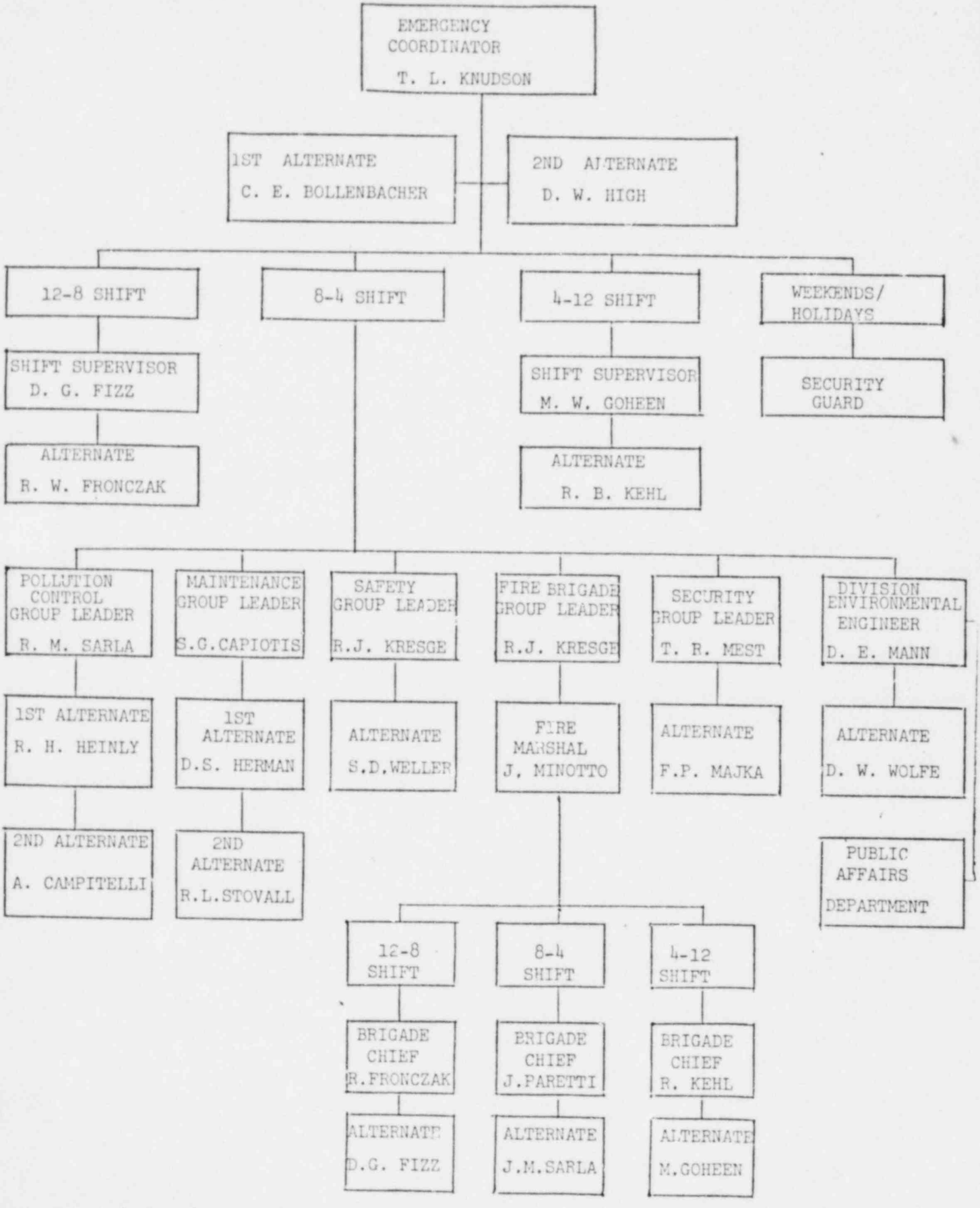
Emergency Coordinator - T.L. Knudson	369-1135
1st Alternate - C.E. Bollenbacher	469-9101
2nd Alternate - D.W. High	689-5318
12-8 Shift Supervisor - D.G. Fizz	326-6256 (U)
Alternate - R.W. Fronczak	367-7321
8-4 Shift Pollution Control Group Leader - R.M. Sarla	489-3215
1st Alternate - R.H. Heinly	367-8779
2nd Alternate - A.T. Campitelli	779-2139
Maintenance Group Leader - S.G. Capiotis	372-5685
1st Alternate - D.S. Herman	845-7885 (U)
2nd Alternate - R.L. Stovall	929-4965
Safety Group Leader - R.J. Kresge	262-6092
Alternate - S.D. Weller	845-2698
Fire Brigade Group Leader - R.J. Kresge	262-6092
Fire Marshall - J. Minotto	323-5670
12-8 Shift Brigade Chief - R.W. Fronczak	367-7321
Alternate - D.G. Fizz	326-6256 (U)
8-4 Shift Brigade Chief - J.G. Paretti	323-6691
Alternate - J.M. Sarla	369-0712
4-12 Shift Brigade Chief - R.B. Kehl	367-7678
Alternate - M.W. Goheen	582-2940
8-4 Shift Security Group Leader - T.R. Nest	369-0948 (U)
Alternate - F.B. Majka	779-7124
Division Environmental Engineer - D.E. Mann	678-3304
Alternate - D.W. Wolfe	929-1639 .
4-12 Shift Supervisor - M.W. Goheen	582-2940
Alternate - R.B. Kehl	367-7678
Weekends/Holidays - Security Guard	367-2181

(U) = Unlisted

KBI DIVISION

BOYERTOWN PLANT EMERGENCY RESPONSE ORGANIZATION

APPENDIX B



APPENDIX C

KBI DIVISION

BOYERTOWN PLANT - Tel. No. (215)-367-2181

ISCP DIRECTORY AND MOBILIZATION PLAN CONTACT POINTS

1. OSC, RRC:
   EPA Region III, PA
   Jeff Hass, (215)-597-9898 (24 hours)
   (215)-597-9899 (24 hours)
   Pennsylvania DER - (717)-787-4343 (24 hours)

2. NRC - (800)-424-8802

3. Chemical Manufacturer's Association
   Chemical Transportation Emergency Center
   (CHEMTREC) (800)-424-9300

4. Emergency Coordinator, Primary
   Theodore L. Knudson
   Plant Telephone - (215)-367-2181
   Boyertown Plant
   Home Telephone - (215)-369-1135
   Home Address - 86 Popodickon Drive, Boyertown, PA 19512

5. Emergency Coordinator, Alternates
   Charles E. Bollenbacher
   Plant Telephone - (215)-367-2181
   Boyertown Plant
   Home Telephone - (215)-469-9101
   Home Address - R.D. #2, Pottstown, PA 19464

   Donald W. High
   Plant Telephone - (215)-367-2181
   Boyertown Plant
   Home Phone - (215)-689-5318
   Home Address - Box 103, R.D. #2, Douglassville, PA 19518

6. KBI, Division - Legal Department - (215)-921-5018 (W.S. Richardson)

7. KBI, Division - Environmental Engineer - (215)-921-5052 (Dave Mann)
   (215)-921-5355 (Dave Wolfe)

8. Gilbertsville Fire Dept. (Montgomery County) - (215)-323-2424
   New Berlinville Fire Dept. (Berks County) - (215)-367-2500

9. Montgomery County - Police - (215)-327-1441
   Berks County - Police - (215)-367-2500

10. Boyertown Ambulance - (215)-367-2500
    Hospital - Pottstown Memorial Medical Center (215)-326-7100
    Hospital - Community General - Reading - (215)-376-4881

11. Plant Security Telephone No. - (215)-367-2181 - Ext. 254

12. Waste Treatment Dept. - Ext. 338

13. Plant Manager - Alfred J. Zaborowski - Ext. 229

14. Plant Engineer - Donald W. High - Ext. 326

15. Maintenance Group Leader - S.G. Capiotis - Ext. 350

16. Pollution Control Contact - Ralph M. Sarla - Ext. 293

17. Safety & Health Dept. - R.J. Kresge - Ext. 346

18. Downstream Waste Intake Operators - None

19. Contractors for spill clean-up - See Appendix D, Page 5 of Oil Spill Prevention Control & Countermeasure Plan.

APPENDIX D

MAJOR SPILL POTENTIAL SITES

Tank 17-C - Outside Bldg. #74

Segregation Tank #2 -
Segregation Tank #4 - } Segregation tank area

Emergency Precautions for Incidents Involving Radioactive Materials and/or Radiation Areas

Regulations and safety procedures require posting of containers and/or areas in which licensed quantities of radioactive materials are used or stored. The magnitude of radiation risks must not be overestimated in emergency situations where fire, explosion or other life threating events requiring prompt and effective action exist. Practical concern to save life and controlling the extent of damage or risk to health and property dictate the use of a few common sense rules that should govern emergency measures that may involve radioactive materials at this location.

1. Perform necessary rescue and first aid without delay.
2. Prevent unnecessary risks to personnel and property by,
   a. Prompt evacuation of affected area
   b. Confine and control spread of fire and/or explosion risks; remain up-wind as much as is practical.
   c. Caution other fire/emergency support personnel that chemical and/or electrical risks far outweigh radiological exposure risks.
3. Notify Radiation Safety Officer (RSO) and others named on Emergency Call Roster.
4. Under the supervision of the RSO, follow the attached clean-up procedures.

CLEAN-UP EQUIPMENT FOR SPILLS OF US-NRC LICENSED MATERIAL

2	Radiation Survey meters with audio/head set
3	Spade shovels-long handle
3	Square point shovels-long handle
50	55 gallon open head drums with lids and hoops 4 ml plastic drum liners
3	Push brooms, soft bristle
3	Push brooms, hard bristle
25#	Chalk dust or pulverized limestone
12	Disposable coveralls
12 pair	Disposable overshoes
12	Dust marks (R-12)
12 pair	Gloves
3	Dust pans
3	Dust brushes
1000'	Twine or ribbon
4	2' wood stakes for marking of area
1 box	Assorted warning signs, labels, placard

Depending upon the location and magnitude of the spill, availability should be ascertained for portable generator and lights. Industrial rubber tired vacuum cleaner, front end loader and scraper equipment. Air sampling instrumentation will be used during clean-up operations.

CLEAN-UP PROCEDURE

Determine area exposed to spill using G.M. survey instrument and visual checking. Quarantine site with rope, string, warning signs, etc. Adjacent, uncontaminated area should be checked for background readings. Minimize movement to prevent scattering of spill and tramping into ground. No equipment should be moved from area until certified clean and identified in writing by type and description. Chalk or crayon should be used to mark cleared equipment. Area should be checkerboarded with chalk dust squares, numbered and lettered to facilitate methodical cleaning. Work should be done from upwind side by properly equipped crews working in designated areas from outside in. Air sampling will be done during clean-up operations. Respirators will be fit tested and worn by all persons. Chart should be maintained identifying each enumerated square as it is cleared.

Following initial clean-up, all personnel, equipment, entire area and adjacent perimeter should be surveyed with G.M. instruments, visually checked and results documented by the RSO or his assistant.