CABOT CORPORATION

REVERE PENNSYLVANIA PLANT

(formerly known as KBI - Penn Rare Division)

FINAL DECONTAMINATION AND DECOMMISSIONING SURVEY - 1990 FOR NRC LICENSE SMB-920, DOCKET 40-6940

REQUESTING RELEASE FOR UNRESTRICTED USE OF REVERE PLANT AND REMOVAL FROM LICENSED PROGRAM.

William C. Gannon
Radiation Safety Officer
January, 1991

cc: Fred B. White
Roger M. Bergman
Anthony T. Campitelli
Mark H. Hague
Gerri Scoll, Esq.

FINAL DECONTAMINATION AND
DECOMMISSIONING SURVEY - 1990
January, 1991

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FINAL DECONTAMINATION AND
DECOMMISSIONING SURVEY - 1990
January, 1991

1 OBJECTIVE

During the summer of 1989, it was decided that, if possible, we should try to complete the decontamination of the Cabot Revere, Pennsylvania property in order for it to be omitted from the Cabot Source Material License SMB-920, which has been under application since December, 1988.

The first task was to review any records of the work performed at Revere in 1970 involving radioactive ores and checking all previous surveys of the area. It was unclear, at the time, if the residues had or had not already been returned to Boyertown. This task was completed.

The next step included contracting the previous clean-up and survey team, Bullinger's Mill, Inc. (herein referred to as the Contractor), to re-survey the operating areas at the Revere Plant. This task was completed by April 16, 1990.

Results of the survey conducted by the Contractor concluded that radioactive material remained buried at one site (the dump site) with a few pieces (lumps measuring from one to eight pounds in size) scattered near the old pit.

2 MISSION

Remove radioactive material from all Revere plant areas. Fill in any excavation with clean stone. Check area by sampling and then re-survey the decontaminated areas.

3 HEALTH AND SAFETY

The Contractor is familiar with the safe handling of our natural source material residues. The material at Revere is hard fused slag, which is not a dust problem. Once the material was unearthed, large chunks (between three and ten pounds) could be survey meter checked for identification and segregation. Only the Contractor and his helper were involved in the operation. A calibrated survey meter was at the site for monitoring radioactivity. The maximum reading on direct contact with the material was 200 μR/H with the Ludlum Model 19 survey meter.

4 MATERIAL MANAGEMENT

All material found to be radioactive was transported to Boyertown and dumped into Mausoleum #6, which contains residues from the Reading Tulpehocken Street Plant clean-up.

5 FINAL RADIATION SURVEY

Once all the decontamination operations were completed and the samples checked, a final survey was performed by the Contractor to verify the property has been decontaminated in accordance with the applicable guidelines. Core samples must yet be taken to check for buried indicators. (NOTE: This core sampling step was holding up the completion of this survey. Mr. Keith McDaniel of the NRC concurred that Cabot may submit what documentation we have to date, and submit the core sample verification at a later date.

6 THE PLAN

6.1 Re-survey the Revere plant site with a μR meter; pay special attention to the firing area and dump areas (Key map 31 and Old Pit).

6.2 Survey and sampling show that radioactive material is buried at the old dump. No indications of other problems.

6.3 Excavate dump; selectively remove large chunks of radioactive slag by best method. Material is < 200 μR/h and not a dust problem. Approximately five (5) tons of radioactive slag was transported to Boyertown and placed into Mausoleum #6. The excavated holes were filled with local stone.

6.4 Re-survey cleaned areas with a calibrated μR meter.

6.5 Take bore (core) samples at any suspicious peak μR areas, if any found. Evaluate and clean-up if needed.

6.6 Write report to request release for unrestricted use.

7 GUIDELINES FOR DECONTAMINATION (U. S. NRC)

See following pages.

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT
PRIOR TO RELEASE FOR UNRESTRICTED USE
OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE,
OR SPECIAL NUCLEAR MATERIAL

U. S. Nuclear Regulatory Commission
Division of Fuel Cycle
and Material Safety
Washington, D. C. 20555

November 1976

The instructions in this guide in conjunction with Table 1.1 specify the radioactivity and radiation exposure rate limits which should be used in accomplishing the decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table I.1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control will be considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.
2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table I.1 prior to applying the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.
3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.
4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but

would not be limited to, special circumstances such as razing of buildings, transfer or premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such request must:

a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table I.1. A copy of the survey report shall be filed with the Division of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Director of the Regional Office of the Office of Inspection and Enforcement, USNRC, having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

   a. Identify the premises.

   b. Show that reasonable effort has been made to eliminate residual contamination.

   c. Describe the scope of the survey and general procedures followed.

   d. State the findings of the survey in units specified in the instruction.

Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

Table I-1. Acceptable surface contamination levels

Nuclides[a]	Average[b,c,f]	Maximum[b,d,f]	Removable[b,e,f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm²	15,000 dpm α/100 cm²	1,000 dpm α/100 cm²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm²	300 dpm/100 cm²	20 dpm/100 cm²
Th-nat, Th-232, Sr-90 Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm²	3,000 dpm/100 cm²	200 dpm/100 cm²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and other noted above.	5,000 dpm βγ/100 cm²	15,000 dpm βγ/100 cm²	1,000 dpm βγ/100 cm²

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm².

[e] The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

8 RADIOLOGICAL SAFETY STUDY - 1970

See following pages.

HEALTH PHYSICS REPORT

of

RADIOLOGICAL SAFETY STUDY OF THE EXPERIMENTAL PROCESSING
of
COLUMBIUM-TANTALUM ORE

at the
Revere Plant
Kawecki Berylco Industries, Inc.
Revere, Pa.

July 2 and 29, 1970

SUMMARY

This report briefly describes the experimental processing of columbium-tantalum ore by alumina thermic reduction. The thermite reaction is completed in less than 5 minutes, reducing approximately 3500 pounds of ore containing 0.12% natural thorium plus 0.04% natural uranium to columbium-tantalum alloy which contains less than 0.01% of these materials and a slag containing 0.14% source materials. The slag has been stored pending decision as to appropriate disposal methods. Samples of air particulate and settled dust indicated the air concentrations were well below 1/10 of the MPC's. Our study of the experimental processing did not detect any significant risk to personnel or the environs. The processing methods and safety practices are essentially the same as those currently used by Union Carbide Corp. at their plant in Marietta, Ohio under AEC license SMB-933.

INTRODUCTION

The initial experimental processing of columbium-tantalum ore containing traces of source materials at KBI's plant in Revere, Pa. was carried out on July 2, 1970. This work was performed as a pilot plant study in accordance with the terms and conditions of AEC Source Materials License #SMB-920 (Docket #40-6940) as amended on May 28, 1970. This report has been prepared for submission to the AEC per commitments to AEC dated December 19, 1969 and May 7, 1970.

DESCRIPTION OF PROCESS

Approximately 50,000 pounds of columbium-tantalum ores were received at KBI's Revere plant in 100 pound burlap sacks. The ore was repackaged into 50 gallon steel drums and stored in a warehouse at the plant site. The drums were transferred to the blending building where the ore was loaded into a blender along with fine particulate aluminum. After blending, the mix was discharged to a transfer hopper and moved by crane to the Reaction Building containing a number of large steel pots lined with magnesium-oxide. Each of five pots were loaded with approximately one thousand pounds of the thermite ore mixture. The mixture was remotely ignited. The alumino thermic reduction took less than five minutes. The resultant molten mass in each pot was allowed to cool for several days, then the pots were inverted. The metal fractures into small pieces, separated from the slag which contained the source material. The slag was loaded into 55 gallon drums and stored in the warehouse pending decision as to method of disposal.

RADIOLOGICAL SAFETY SURVEY OF PROCESS

On July 2, 1970, William Gannon, Asst. Radiological Safety Officer, KBI and R. G. Gallagher, Consultant Health Physicist, made a thorough radiological survey of the initial processing of 3500 pounds of columbium-tantalum ore. This ore contains 0.11-0.16% thorium by weight. External radiation measurements of the steel drums at contact were 0.5 - 0.7 mR/hr.

All personnel involved in the experimental processing of the columbium-tantalum ore wore respiratory protection during those operations likely to produce airborne particulate activity. High volume air samples were taken of the loading, blending, and reduction operations. The results of alpha analyses of these air samples in a low background NMC gas proportional counter are shown in Table 1.

These data indicate airborne particulate activity was not in excess of the current maximum permissible concentrations (MPC's) for natural thorium of 3×10^{-11} µCi/cc.

Smear samples were taken of settled dust on various exposed surfaces within the Blending Building and the Reaction Building using self-adhesive smears which were alpha counted in an NMC gas proportional counter. The results of analyses of these samples are shown in Table 2.

Samples were also obtained and analyzed to evaluate the radioactivity of (a) raw materials, (b) product and (c) slag. Results of these analyses are contained in Table 3.

CONCLUSIONS

The storage and processing of the columbite ores at the Wayne plant were conducted in a manner that did not result in any significant risk to employees or to the environs. These procedures are very similar to those currently used and licensed by the AEC.

Respectfully submitted,

APPLIED HEALTH PHYSICS, Inc.

By _____
Robert G. Gallagher
Certified by American Board of Health Physics

dm

TABLE 3 - THORIUM MATERIAL BALANCE

3500 lbs. columbite x $\frac{.08\%}{100}$ = 2.80 lbs. thorium

SLAG

Q17-1	422 lbs. x $\frac{0.13\% \text{ Th}}{100}$	= 0.54[illegible] lbs. thorium
Q17-2	410 lbs. x $\frac{0.108\% \text{ Th}}{100}$	= 0.4428 lbs. thorium
Q17-3	442 lbs. x $\frac{0.128\% \text{ Th}}{100}$	= 0.5658 lbs. thorium
Q17-4	417 lbs. x $\frac{0.090\% \text{ Th}}{100}$	= 0.3353 lbs. thorium
Q17-5	446 lbs. x $\frac{0.132\% \text{ Th}}{100}$	= 0.588? lbs. thorium

Slag Total 2.49 lbs. thorium

ALLOY

Q17-1 to 5 500 lbs. x $\frac{<0.01\% \text{ Th}}{100}$ x 5 = <0.25 lbs. thorium

Recovered Total 2.74 lbs. thorium

$\frac{2.7[illegible]}{2.80}$ x 100 = 98% Recovery

TABLE 1 - RESULTS OF AIR SAMPLING

July 2, 1970 Survey

Sample No.	Operation Sampled	Results (uCi/cc)
1	Loading Cb-Ta ore into blender	4.49×10^{-13}
2	Discharging blender mix into transfer hopper	Background
3	Loading reduction pots	4.29×10^{-13}
4	Alumina thermic reaction	6.77×10^{-14}

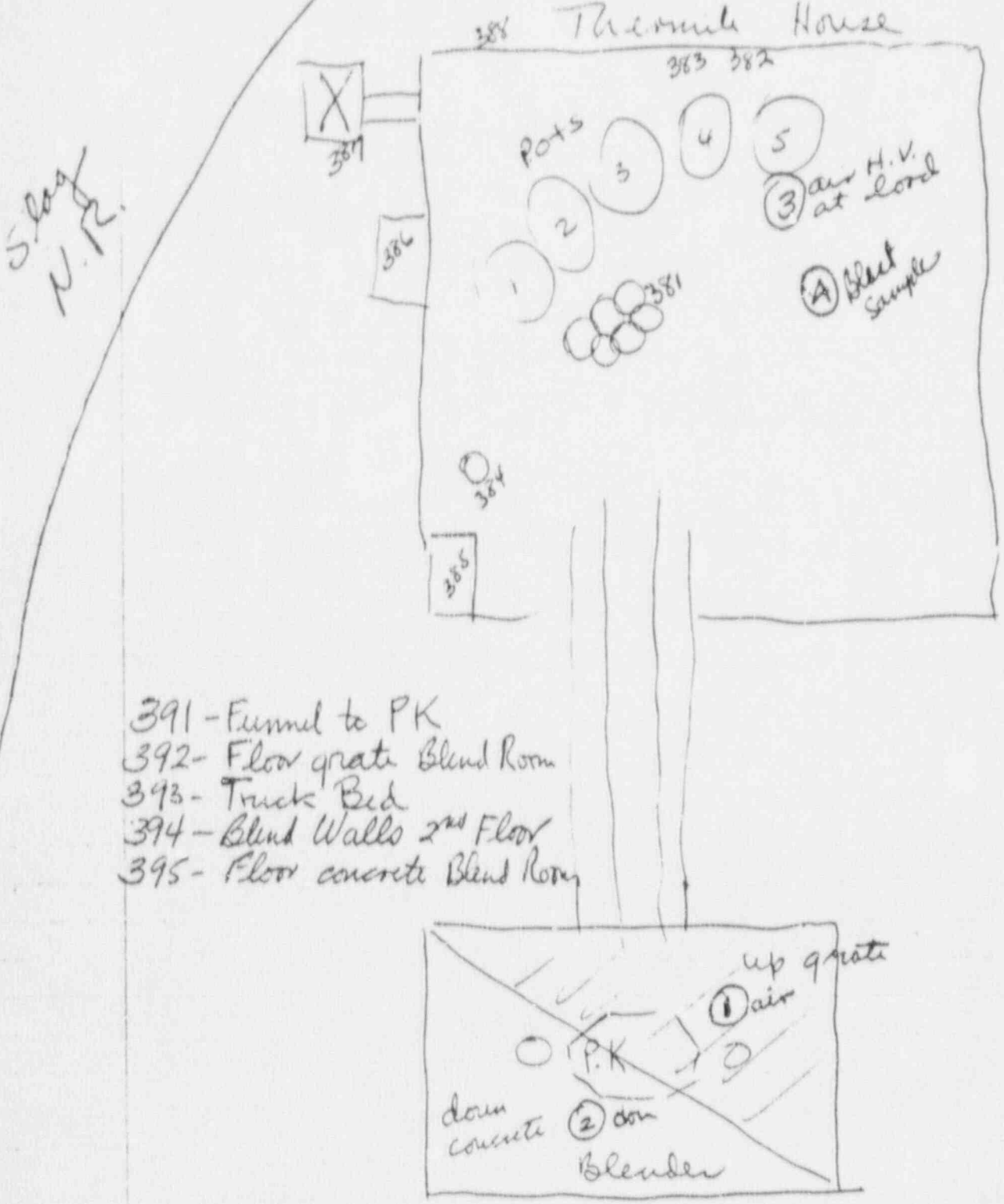
July 29, 1970 Survey

9 HISTORICAL NOTEBOOK ENTRIES AND SURVEY OF 1975

The following pages include the historical record of the firing of Saint Lawrence Pyrochlore to make ferro-columbium alloys at the Cabot (Penn Rare) Revere, Pennsylvania Plant during the Summer of 1970. This information is taken from William C. Gannon's 1975 Survey Notebook.

air Respirator
Welsh M/g Co. 2175

July 2, 197



1. High Vol sample up stairs Unloading & Tad 30 min
2. High Vol sample Downstairs Unloading c 4 min
3 " " " Top of Pot 2 min
4. " " " Room Sample Blast 10 min

381 Top metal Shield
382 Dust Wall shelf
383 Dust Wall
384 Crain Buttons
385 Bench Stand Dust
386 Green Canopie
387 Rusty Flue Piles
388 Corrugated Sheet outside

Warehouse
Low .6 mr/h
High .5-.[illegible]
.2-.4 mr/
Pyrochlore 7.5 mr
Columbite .5-.7 mr

Bob Gallagher & Myself c D. Schuly & F. Maz

Smear Samples c H.V. Filters taken to A.H.P. by Bob Gallagher today.

All samples to A.H.P. for evaluation W.C.M.

7/15/70 Call Mazepa for weight of Slag from Q-17 for F.Th

	#		% Th		# Th
Q17-1	422	x	.130	:	.5486
-2	410	x	.108	:	.4428
-3	442	x	.128	:	.5658
-4	417	x	.090	:	.3353
-5	446	x	.132	:	.5887
	avge 427				2.49 # Th

Comparison weight of similar heat (slags)

Average Slag weighs 450-460 #

Table 3

7/16/70 Thermite Metal Samples

	#		% Th		
Q-17-1	~ 500	x	.01	:	< .05
2		x	.01	=	.05
3		x	.01	:	.05
4		x	.01	:	.05
5		x	.01	:	.05
					< .25 # Th

3600 # Columbite x $\frac{.0008\% Th}{100}$ = 2.88 # Th in ORE

.17

Total Th found 2.7 #

Spot check Penn Rate

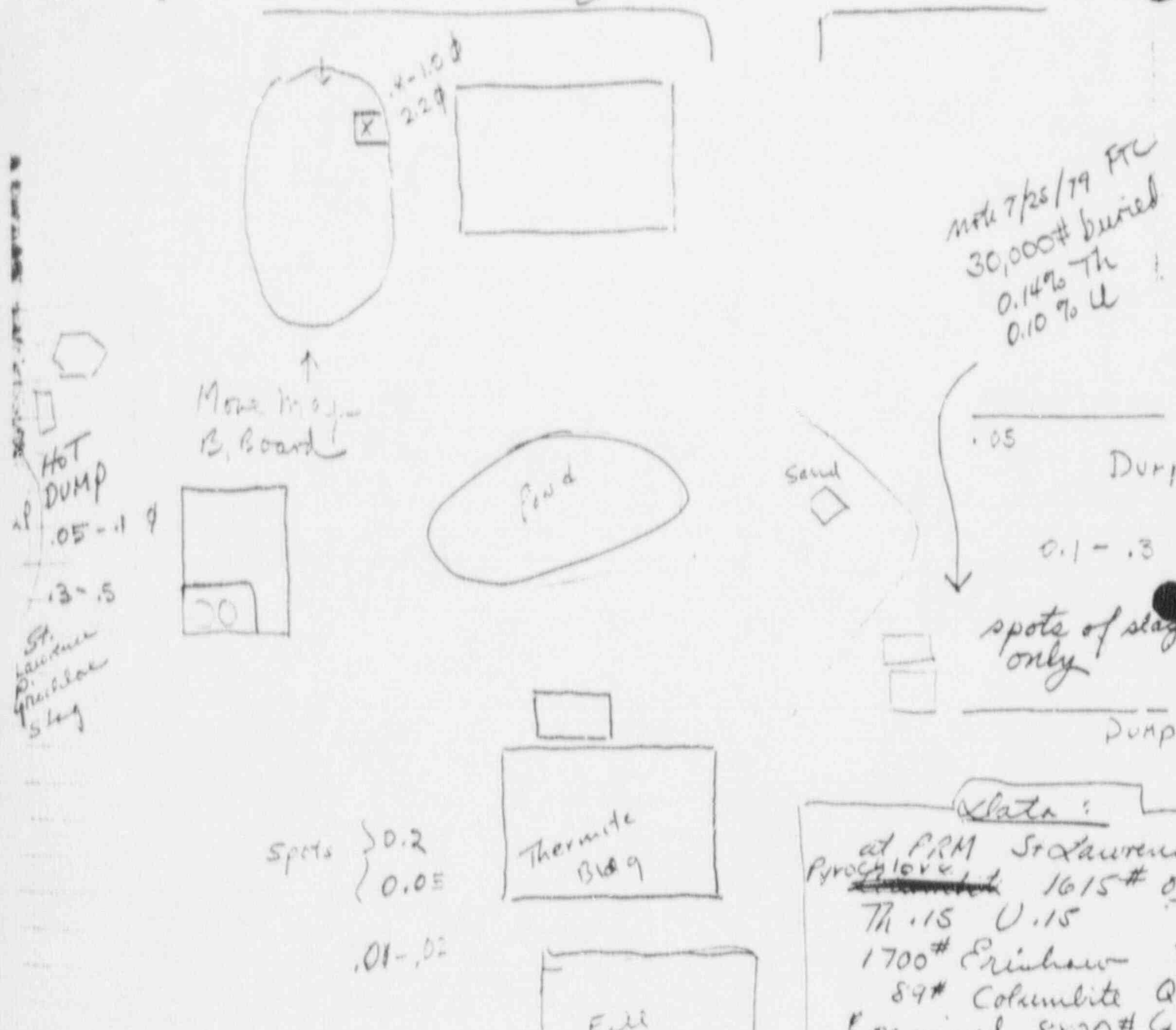
March 29-19

W. Gannon visited area & toured with F. Mayer. Checked all possible areas where slag and source material might have been. All area was clear and One radiation area in the Bubble Building is clearly marked Radiation Area with drums marked Radioactive Material.

W Gannon 2/19/-1

Pere Rare Survey 11-7-72

R. Gallagher, F. White F. Mazepa, W. Harmon



Data:

at FRM St Lawrence
Pyrochlore 1615# on h[and]
Th .15 U .15
1700# Erinhaw
89# Columbite QIT
Consumed 8800# St Law[rence]

Move Map Regulations to lunch room B.B

Cover dump with 2-3 ft fill to cover exposed slag

10-CFR20
20.304

4 ft

Don't let slag be dumped into the creek

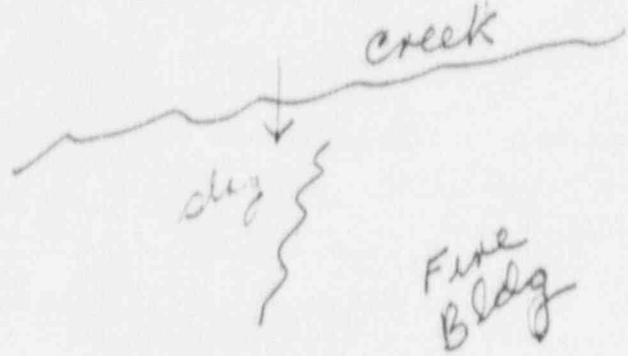
ø = mR/H
Baird Atomic Meter

Tenn Rare Expert 17.1.

Gallagher - Gannon White Mazepa -

Slag Pile at creek - New Slag 10 mR/h - 12

send to Boyertown so be add to in Prev Sludge p



Min for heat in X ble 5 - 6 mR/H
inside firing building

Blend for next fire 5 mR/H

Use Respirator in Blend Areas
Signs - Respirator + AEC
Fire Extinguisher Position - yellow
First Aid equip most non existant
Grounding Electrical
Interlocks in Blend Building

Behind Fe Bldg - near Pond - Dump + Barrel
.02 - .03 MR/H

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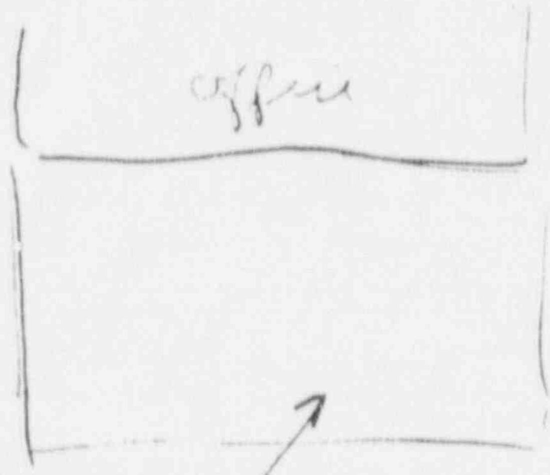
jlo/revdecon.wp

Warehouse Area



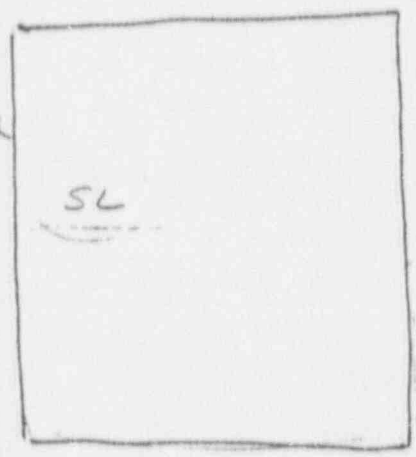
St Lawrence 10 mR/H

Blend 4 mR/H

" 20 mR/H surface

Respirator Area blending

4 at 3 ft St Lawrence 20 mR/H



Send Notice To Employees Pa + AEC 3 OK

Tape Radioactive Mtl. order for Penn Rare. ✓

Signs Radiation Area "

To Penn Rare 2-4-75 complete

Applied HEALTH PHYSICS inc.
2986 Industrial Blvd. · Box 107 · Bethel Park, Pa. 15102 · Phone 412 · 563-2242

GAMMA SURVEY OF KBI - PENN. RARE PLANT, REVERE, PENNSYLVANIA

May 14, 1975

Surveyed May 14, 1975 by Robert ·. Gallaghar and William C. Cannon using calibrated gamma survey meter (Health Physics Instruments, Model 1010, s/n 106).

1. Pile of slag and flux behind Firing House. One spot underneath the slag pile measured 0.32 mrad/hr. The rest of the pile measured 0.02-0.03 mrad/hr.

2. Burial site - measured 0.02-0.14 mrad/hr.

Plant was properly posted with Form AEC-3 and Pennsylvania Department of Health "Notices to Employees."

Plant supervisor requested results of survey of Penn. Rare.

10 D&D SURVEY

The following information was transmitted to Fred B. White (Revere Plant Manager) per a call from Gerry LeRoche to William C. Gannon (January 3, 1990). Mr. LeRoche questioned why we have not done a D&D survey so we could remove Revere from license.

1/9/90

Fred

Copy of Guidelines for Release of Revere Site.

At Reading, KBI called in Applied Health Physics to do this Decon and Survey.

The job got too expensive because of the size of the operations. You should not have nearly those problems. Applied Health is the only one I know who could do the job for you at this time. Talk to them first and get an estimate.

412-563-2242

WC Yannon

DRAFT

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL

U.S. Nuclear Regulatory Commission
Division of Fuel Cycle and Material
Safety
Washington, D. C. 20555

The instructions in this guide in conjunction with Table I specify the radioactivity and radiation exposure rate limits which should be used in accomplishing the decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table I do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control will be considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering matrial unless contamination levels, as determined by a survey and documented, are below the limits specified in Tables I prior to applying the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table I. A copy of the survey report shall be filed with the Chief, Materials Branch, Division

of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Director of the Regional Office of the Office of Inspection and Enforcement, USNRC, having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

a. Identify the premises.

b. Show that reasonable effort has been made to eliminate residual contamination.

c. Describe the scope of the survey and general procedures followed.

d. State the findings of the survey in units specified in the instruction.

Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b c f]	MAXIMUM[b d f]	REMOVABLE[b e f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm^2	3000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm $\beta\gamma$/100 cm^2	15,000 dpm $\beta\gamma$/100 cm^2	1000 dpm $\beta\gamma$/100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such obje[illegible].

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The average and maximum radiation levels associated with surfce contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

11 PRELIMINARY SURVEY - MARCH 1990

See following pages.

cc: JR Cassarella

CABOT

TO: Fred White DATE: April 26, 1990

FROM: WC Gannon

Attached is a copy of the report I received from Bullinger's Mill on April 18, 1990. I have reviewed the data on the various maps. Any numbers larger than 14 (microR's) indicate contamination accor[illegible] the NRC guidelines. There are only a few spots, and Mr. Bullinger informed me that hand pick[illegible] 'est find the large chunks of slag that seem to be scattered here and there. They could be put [illegible] id sent to Boyertown. The NRC informs me that they will be coming to the plant when [illegible] clean, and ready for the survey, to release the Revere site from our license.

WCG/jle
42601.mem

cc: JR Cassarella

W.C. Gannon

preliminary survey 3/14/90

BULLINGER'S MILL, INC.

RD 4 BOX 4363 RAPP RD. FLEETWOOD, PENNSYLVANIA 19522
(215) 944-8364

April 16, 1990

Mr. William C. Gannon
Cabot Corporation
County Line Road
Boyertown, PA 19512

Dear Mr. Gannon:

The results of our survey at the Revere Plant are as follows:

February 13, 1990: A walk-around survey was done. A high reading was found behind Building #5. An elevated reading was found beside the warehouse - Building #25. At several spots in the empty-drum storage area, elevated readings were noted. First drafts of Key Maps were made, and one survey was completed at the Old Pit.

February 20, 1990: Survey was completed at the Old Pit and one survey was completed behind Building #5.

March 14, 1990: Sample and picture of same were taken behind Building #5. Survey of drum storage area, Key Map 31, was completed.

Enclosed please find survey maps and pictures. If I can be of additional assistance, please notify me.

Thank you,

Joseph J. Bullinger

Joseph J. Bullinger
President

Invoice 44-411 Grayline SNAP-A-WAY FORM

Invoic

BULLINGER'S MILL, INC.
Grade K.D. Native Hardwoods
RD 4 Box 4363 Rapp Rd.
FLEETWOOD, PENNSYLVANIA 19522

No.

Date April 16, 1990

Your Order No.

Sold To
Cabot Corp.
County Line Rd.
Boyertown, Pa 19512

Shipped to
Penn Rave Metals
Revere, Pa.

Our Order No.	Salesman	Terms	F.O.B.	Date Shipped	Shipped VIA

Quantity Ordered	Quantity Shipped	Stock Number/Description	Unit Price	Unit	Amount
Feb	13	Travel Time - 2 men @ 30 ea			60
		2 men 7.5 hrs	42 00	hr	315
Feb	14	Office Time 2 hrs	20	hr	40
Feb	20	Travel Time 2 men @ 30 ea			
		2 men 7.5 hrs	42	hr	315
March	14	Travel Time 2 men @ 30 ea			60
		2 men 7.5 hrs	42	hr	315
April	13	Office Time 4 hrs	20	hr	80
		Office expence - photo - Phone - Postage			17.
		Total Due			1262.

WilsonJones
GRAYLINE FORM 44-411 3-PART
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Original /Invoi

RMC

CERTIFICATE OF CALIBRATION

Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22° C and 760 mmHg.

RMC SERVICE NO. 14512

INSTRUMENT IDENTIFICATION LUDLUM (Manufacturer) #19 (Model) 37373 (Serial Number)

CALIBRATION SOURCE ID. A-0009-6 130 Ci ^{137}Cs R59-10 10mCi ^{137}Cs

RANGE	CALIBRATION POINT	INSTRUMENT READING Before Adjustment	After Calibration
25	10 uR/hr	9.8 uR/hr	10 uR/hr
	20	19.2	20
50	10	10.2	10.2
	40	40	40
250	100	100	100
	200	200	200
+ 500	100	135	110
	300	230	215
	400	375	360
5000	1000	1150	1100
	2000	3000	1950
	4000	3500	3500

COMMENTS

+ USED AS REFERENCE POINTS AFTER LOWER CALIBRATION FOR LOWER RANGE LINEARITY

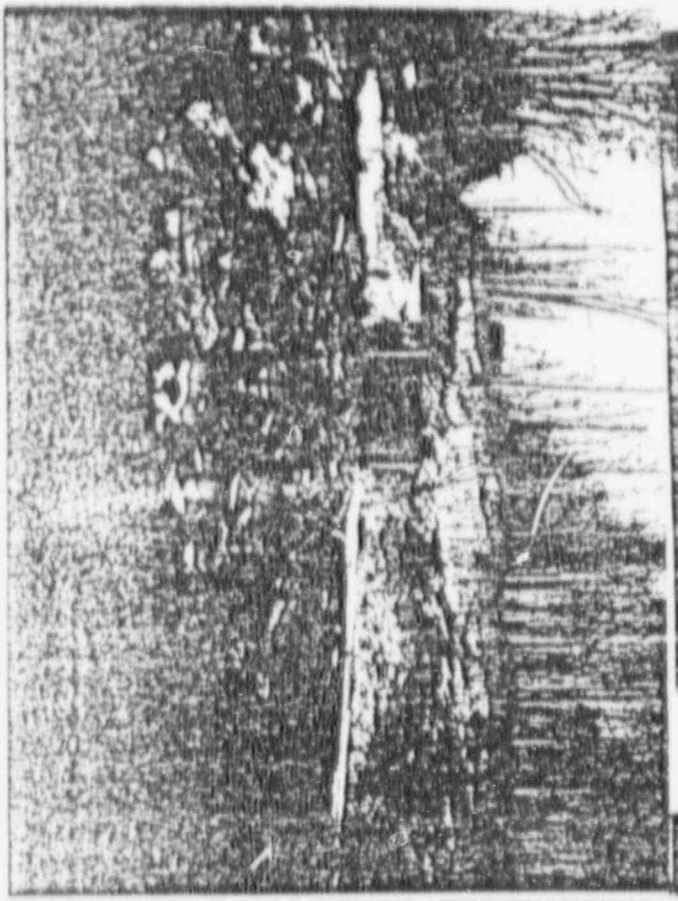
Calibration Performed by Kenneth Warden Date Oct. 11, 1989

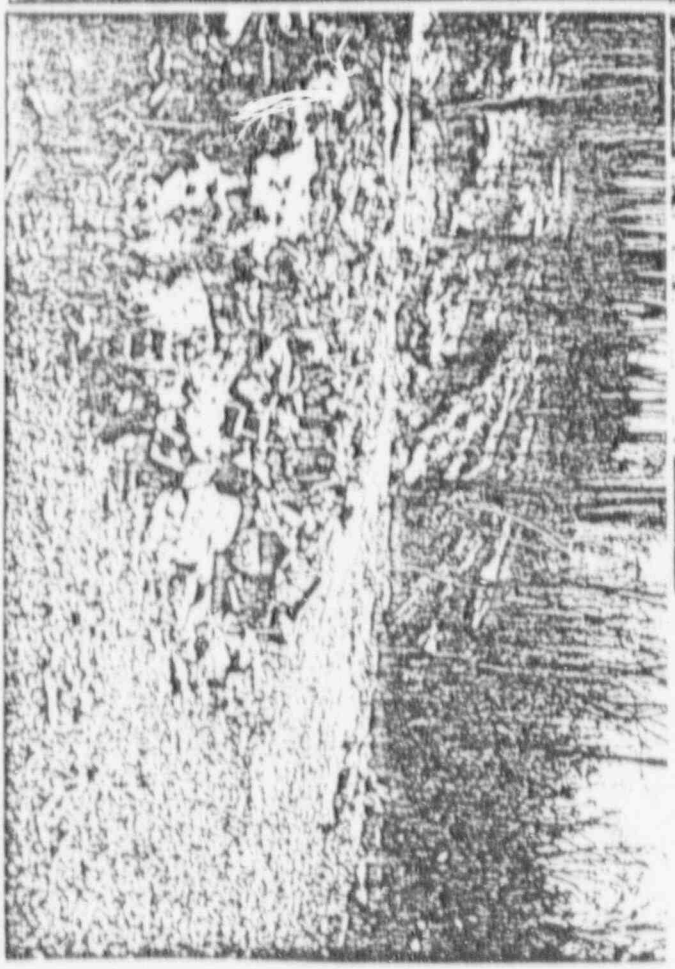
I certify that the above information is correct.

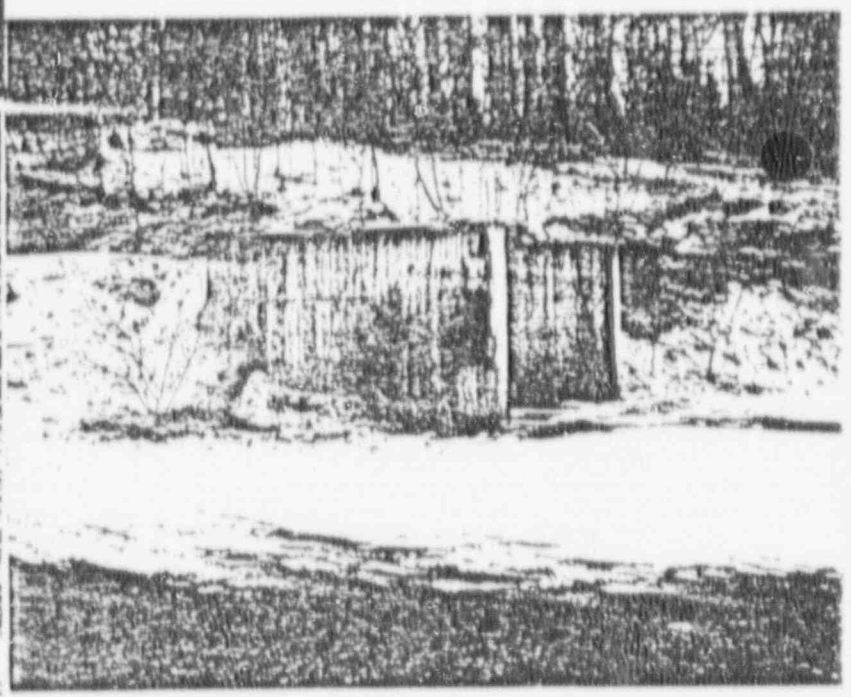
Authorized Agent C E Jones Jr

Title RSO Date 10-11-89

(RMC is not responsible for damage incurred during shipment or use of this instrument)







2/90

The Old Pit. Revere Plant, Cabot Corp.

Each block 20 meters square.

Rapp Creek

Survey of Revere Site for CaLot Corp. Date 2/20/90

Meter used: Ludum
Area: 20 meters square.
Blocks: 3 meters square.

Taken by: J.Bullinger

Approved by: W Gannon

Background:
Sand Blast Shed, pole
Bag House, corner
Bird Feeder at Office
Stop sign at Rt 611

Map # 1 -- The Old Pit
Three foot readings in circle.

	1		2		3		4		5	
	5	6	7	8	8	9				
A	(6) 5		(7) 7		(8) 8					
	6	15	6	9	9	9				
	5	5	6	22	7	5	8			
B	(6) 6		(6) 7		(7) 7		(7) 7			
	7	10	6	6	6	6	7	7		
	8	7	6	7	6	6	6	7		
C	(9) 9		(12) 14		(6) 6		(6) 7			
	9	15	18	7	5	5	6	6	~~6~~	~~6~~
	7	9	8	7	6	5	6	6	7	7
D	(10) 11		(6) 7		(5) 6		(5) 5		(6) /	
	8	7	7	6	5	5	6	7	6	6
	6	6	6	6	6	6	6	6	6	7
E	(6) 5		(6) 6		(7) 9		(6) 6		(6) 6	
	7	7	7	7	7	6	7	7	7	8

Survey of Revere Site for Cabot Corp. Date 2/15/90

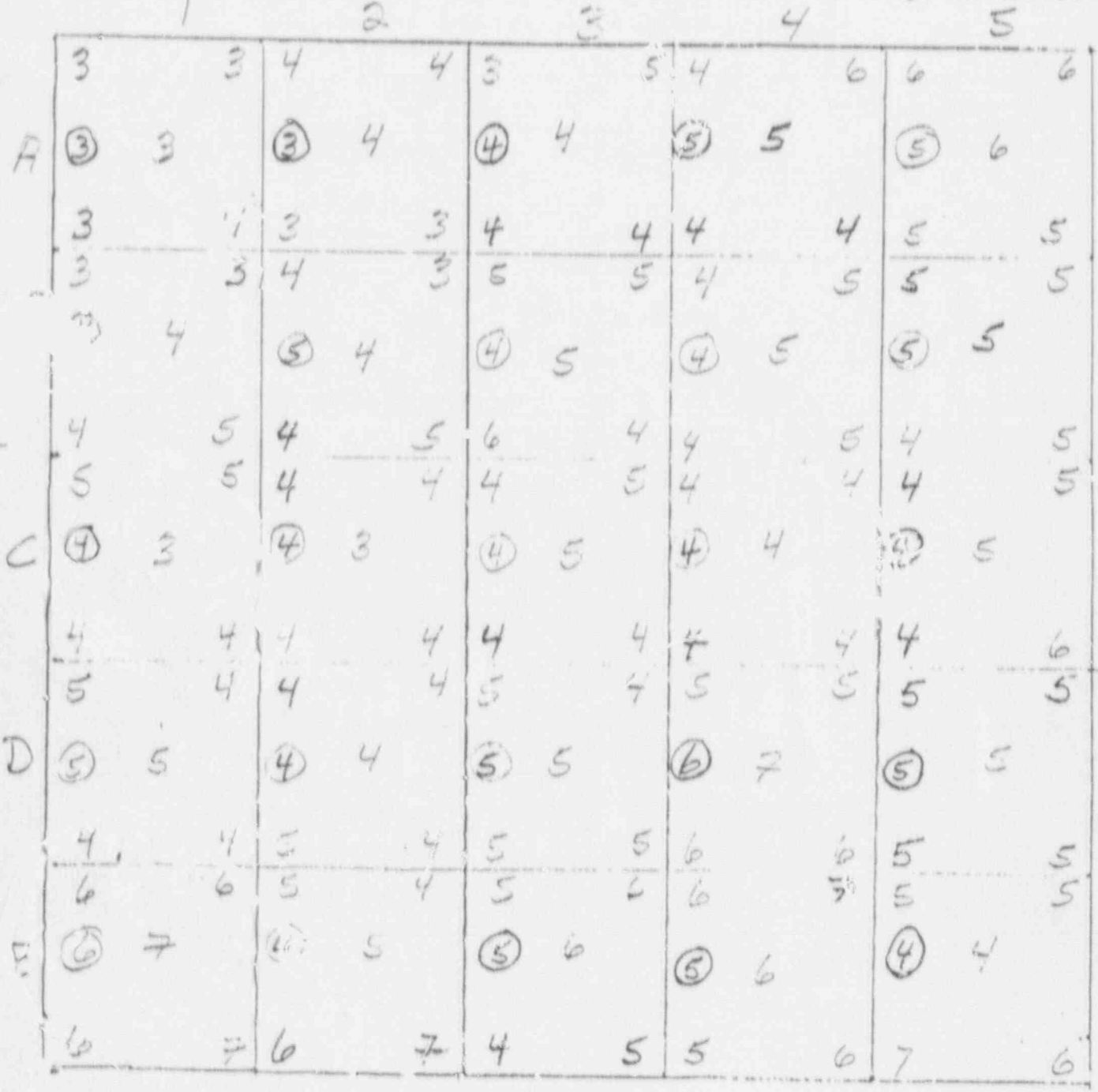
Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

Taken by: J.Bullinger

Approved by: ------ W. Gunston

Background:
Sand Blast Shed,pole 5
Bag House,corner 6
Bird Feeder at Office 5
Stop sign at Rt 611 5

Map # 2 The Old Pit
Three foot readings in circle.



Survey of Revere Site for Cabot Corp. Date 2/20/90

Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

Taken by: J.Bullinger

Approved by: ------ W. Gannon

Background:
Sand Blast Shed,pole 5
Bag House,corner 5
Bird Feeder at Office 5
Stop sign at Rt 611 5

Map # 3 - The Old Pit
Three foot readings in circle.

3 3 / (4) 4	4 6 / (3) 4	7 7 / (7) 7	
3 4 / 4 3 / (4) 4	4 3 / 5 4 / (4) 4	5 7 / 5 7 / (6) 6	7 7 / 7 8 / (7) 6
7 7 / 5 6 / (4) 5	7 5 / 5 4 / (4) 4	4 5 / 6 6 / (5) 6	6 6 / 7 6 / (7) 7
4 4 / 5 5 / (5) 5	5 3 / 6 4 / (6) 6	4 5 / 5 6 / (5) 6	7 6 / 6 6 / (6) 7
6 6 / 6 6 / (6) 6	6 7 / 7 7 / (6) 6	7 7 / 5 6 / (1) 5	6 / Pipe
7 8	7 7	7 7	

Rapp creek

Survey of Revere Site for Cabot Corp. Date 7/20/

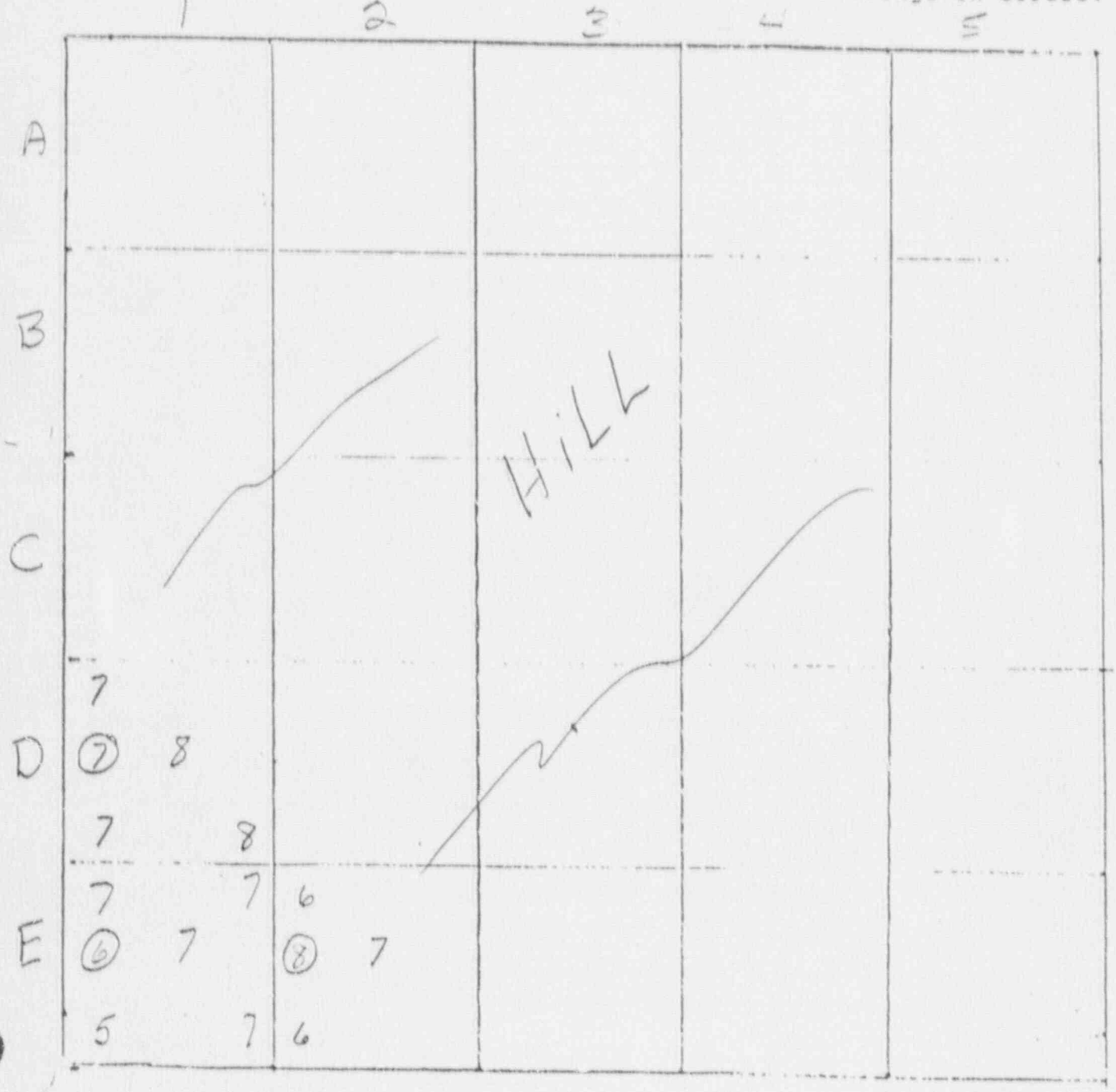
Meter used: Ludum
Area: 20 meters square.
Blocks: 4 meters square.

Taken by: J.Bullinger

Approved by: ------ W. Gannon

Background:
Sand Blast Shed, pole
Bag House, corner
Bird Feeder at Office
Stop sign at Rt 611

Map # 4 — The Old Pit
Three foot readings in circle.



Survey of Revere Site for Cabot Corp. Date 2/20/90

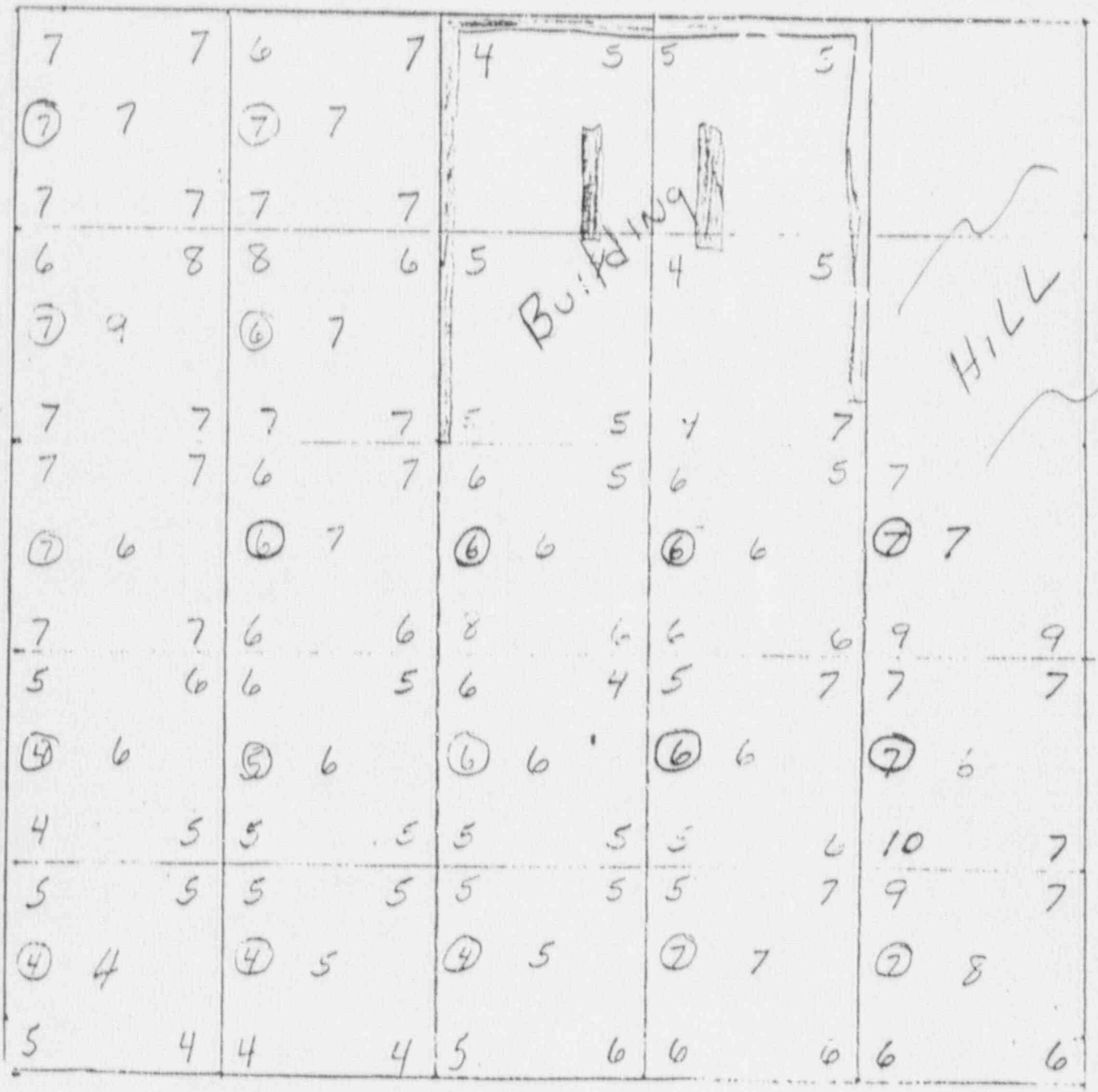
Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

Taken by: J.Bullinger

Approved by:------ W. Gannon

Background:
Sand Blast Shed, pole 5
Bag House, corner 6
Bird Feeder at Office 5
Stop sign at Rt 611 5

Map # 5 - The Old Pit
Three foot readings in circle.



Survey of Revere Site for Cabot Corp. Date 2/20/90

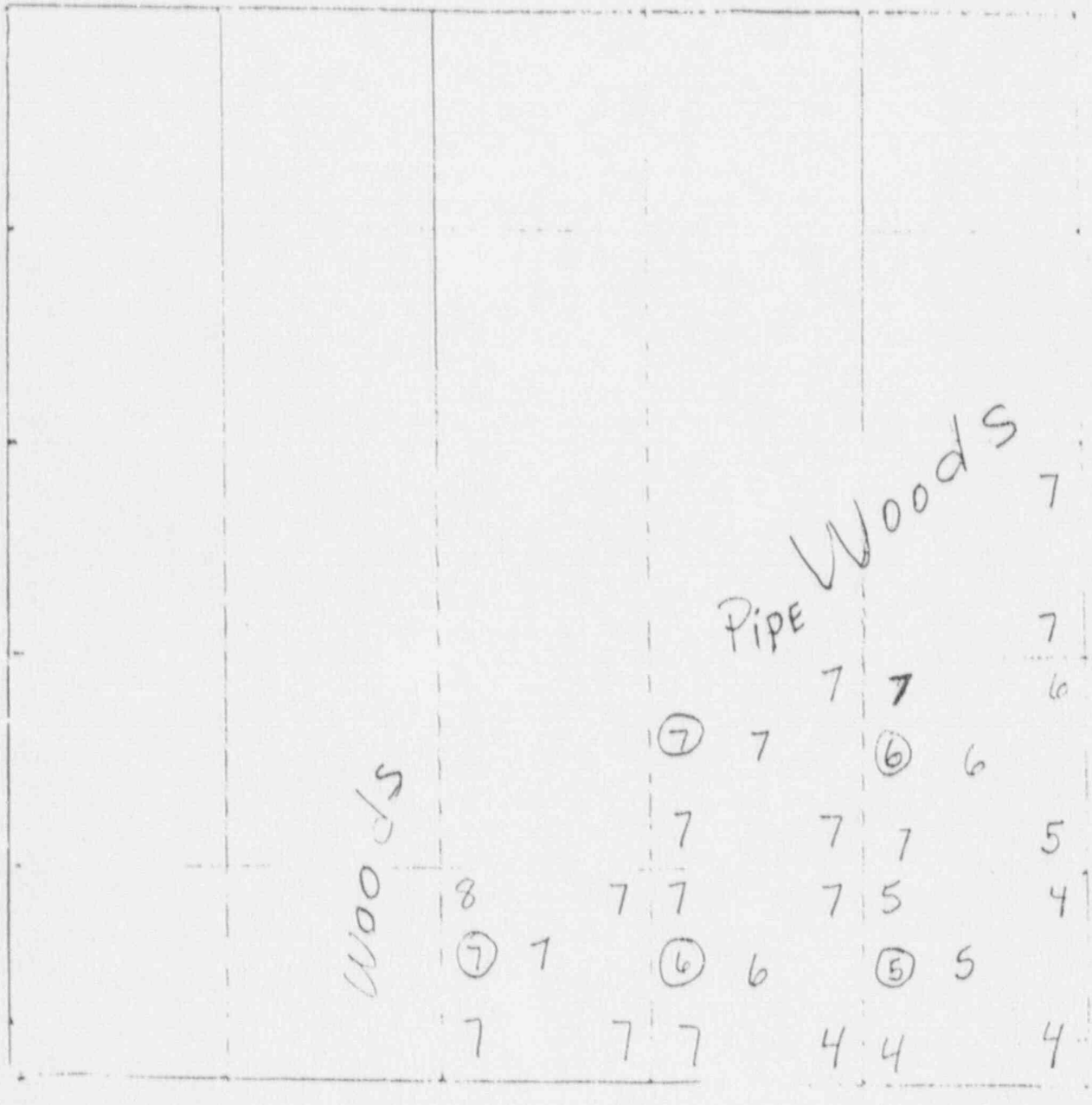
Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

Taken by: J.Bullinger

Approved by: W. Gannon

Background:
Sand Blast Shed pole 5
Bag House,corner 6
Bird Feeder at Office 5
Stop sign at Rt 611 5

Map # 6 - The Old Pit
Three foot readings in circle.



Survey of Revere Site for Cabot Corp. Date 2/20/90

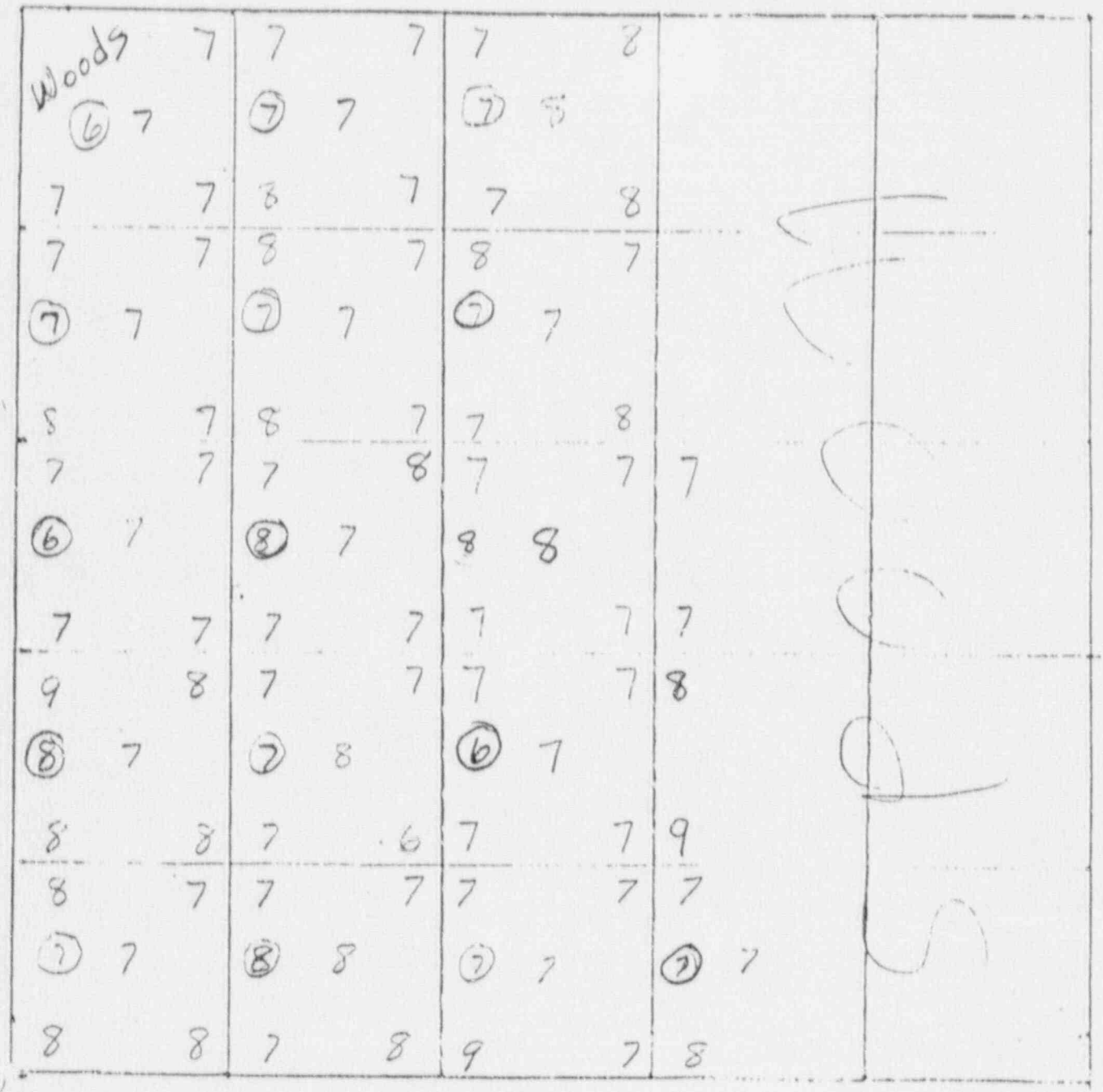
Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

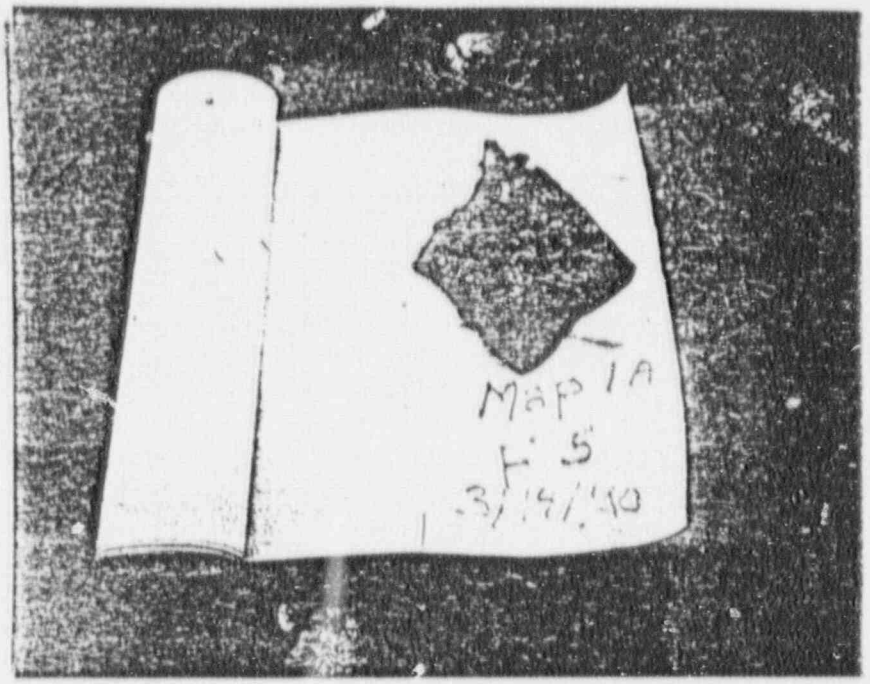
Taken by: J.Bullinger

Approved by: W. Gannon

Background:
Sand Blast Shed,pole 5
Bag House,corner 6
Bird Feeder at Office 5
Stop sign at Rt 611 5

Map # 7 - The Old Pit
Three foot readings in circle.




MAP 1A
F 5
3/14/90

Survey of Revere Site for Cabot Corp. Date 3/14/90

Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

Taken by: J.Bullinger

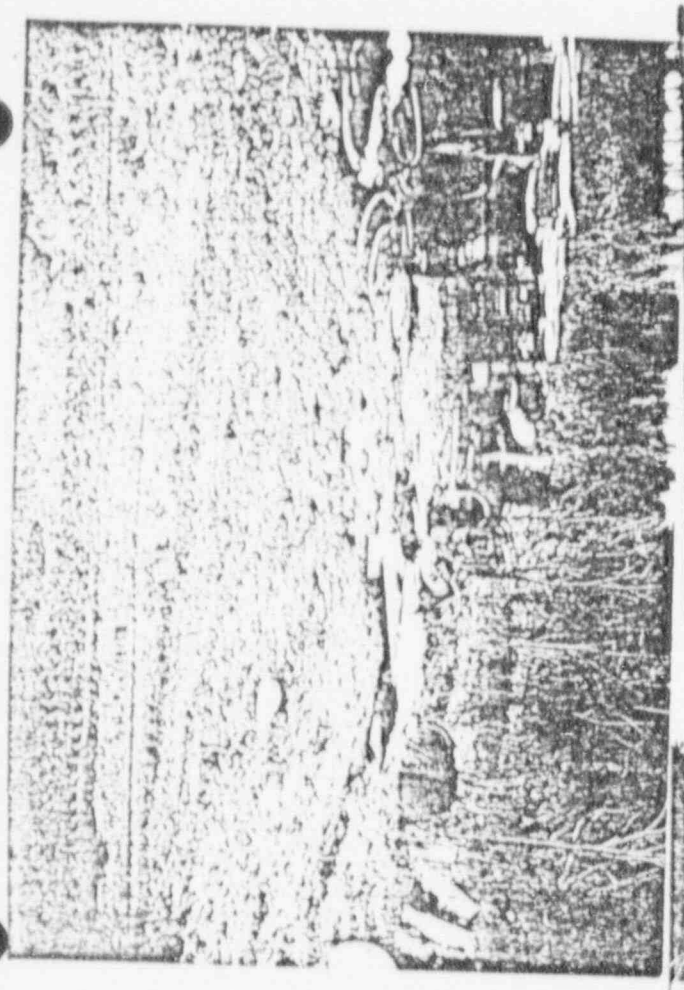
Approved by:------ W. Gannon

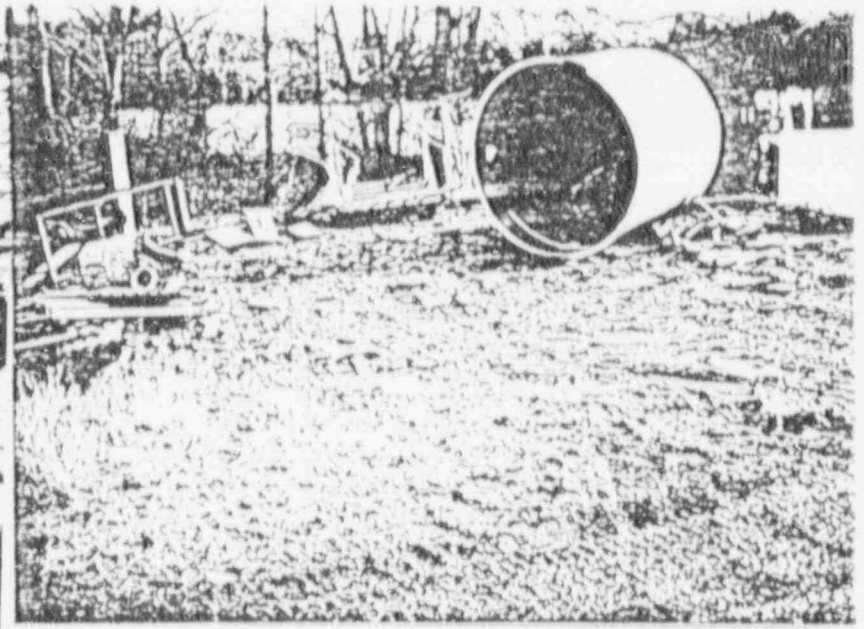
Background:
Sand Blast Shed, pole 5
Bag House, corner 5
Bird Feeder at Office 5
Stop sign at Rt 611 5

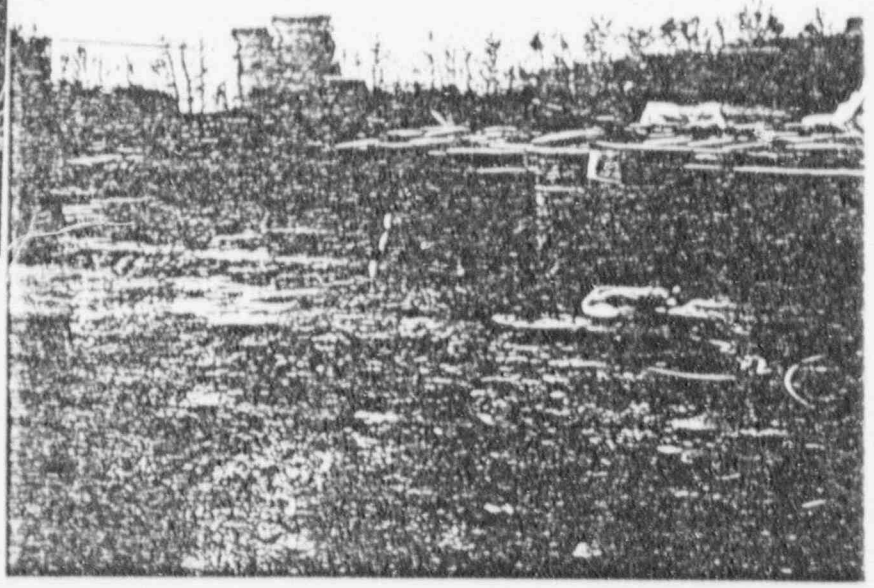
Map # 1A Building 4
Three foot readings in circle.
Bldg # 5 on plant Maps

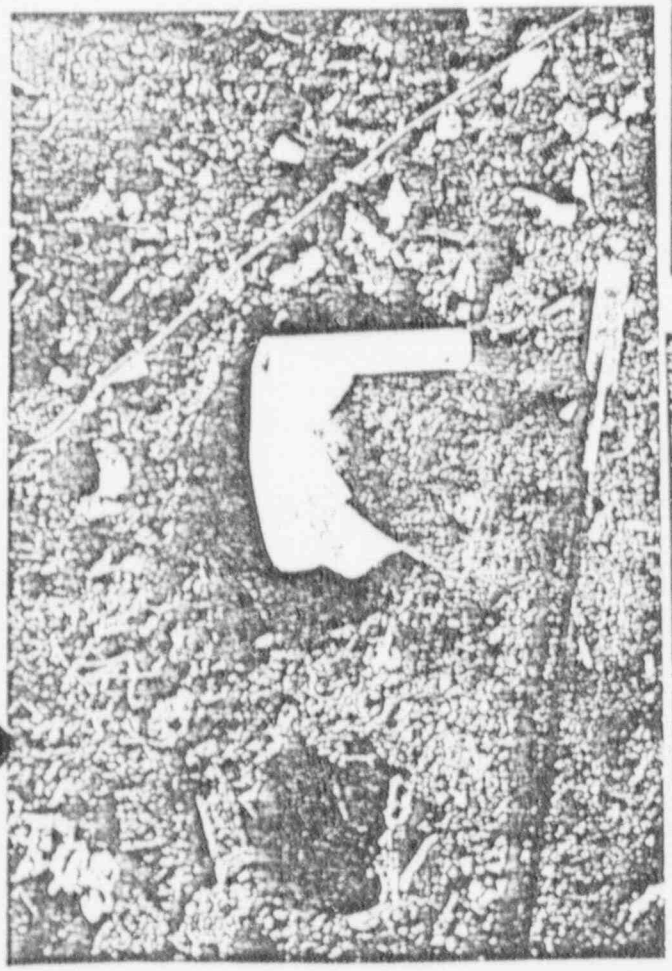
	1	2	3
A			
B	Pipes	6 6	6 6 6 5 / (6) 6 (5) 5
C	15 5 / 7 5 / (5) 6	5 6 6 / (6) 6 6	4 6 / 8 5 / (6) 6
D	7 6 / 6 6 / (5) 5	6 6 6 / 6 6 6 / (5) 5	6 6 / 5 6 / (5) 6
E	6 6 / Debris / 6 11	6 6 6 / 5 6	6 6 / 5 6 / (6) 6
F	Bldg #5	6 6 / 4 5 / (5) 4 / 6 7 / 8 7	6 7 7 / 5 4 / 50 4 / (6) 6 / 7 6 / 7 75

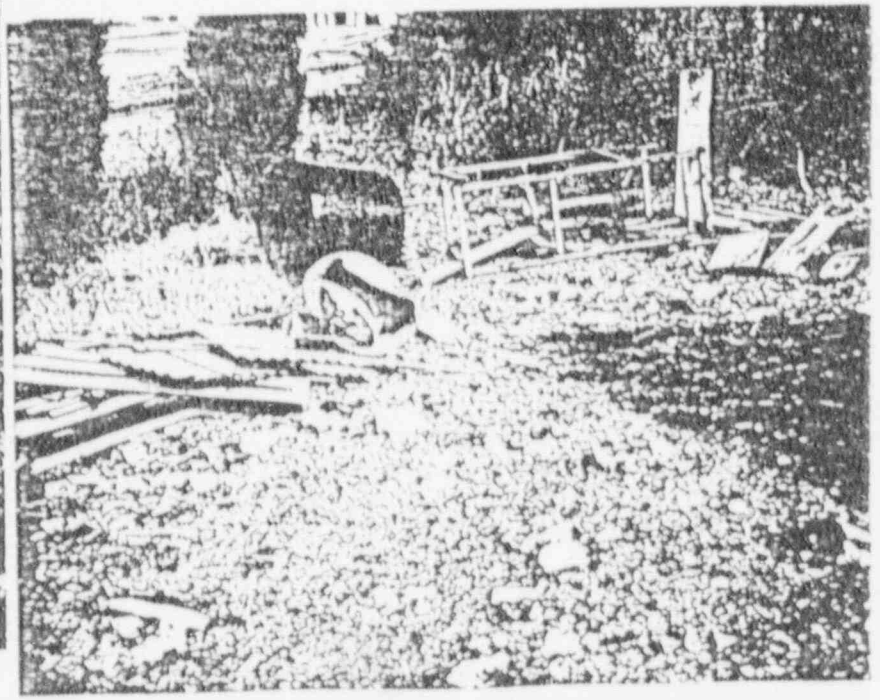
Bldg # 4

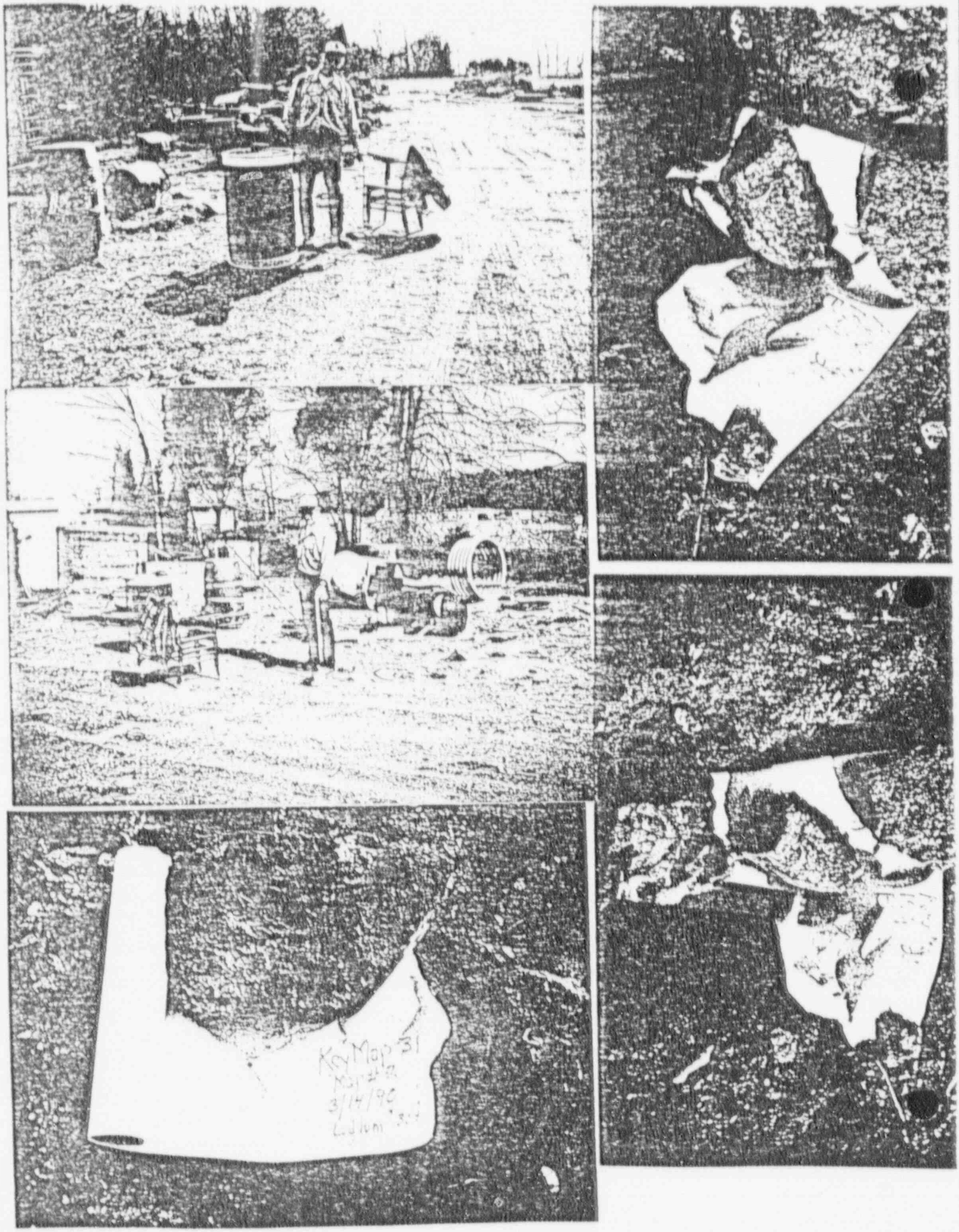


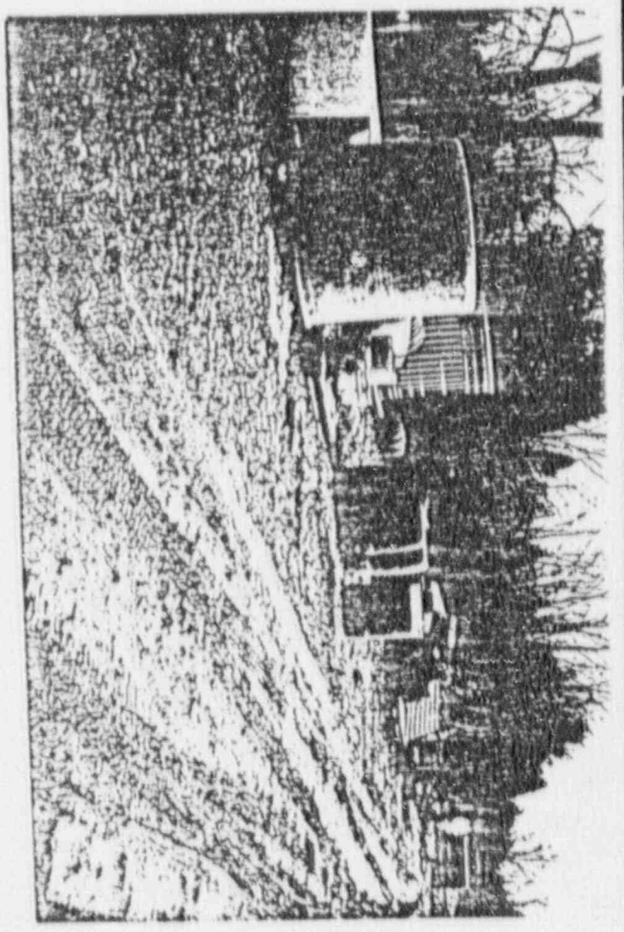









Key Map 31
3/14/96



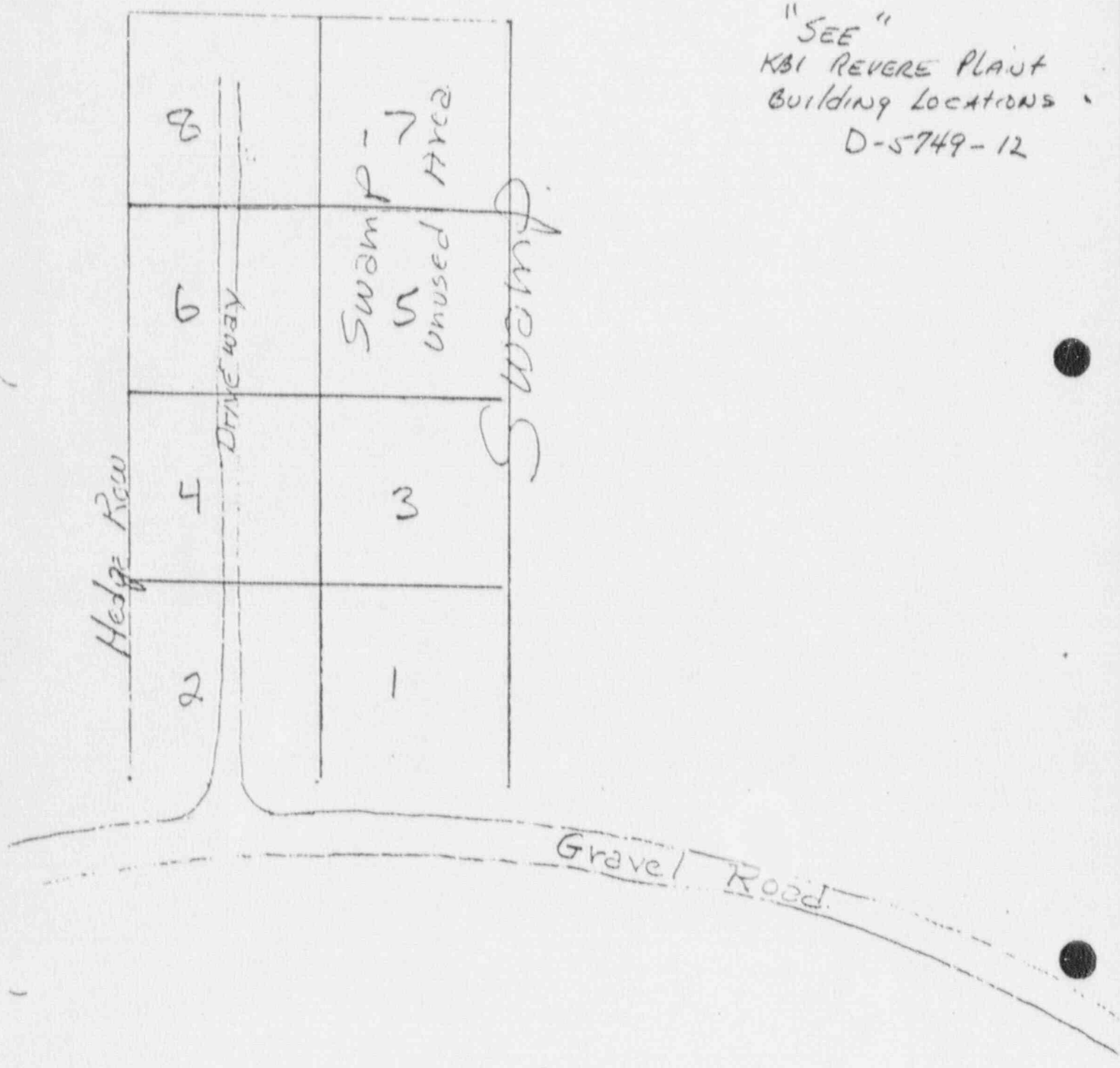
Empty Drum and used equptment area, No.31 on plant map.

Revere Plant. Cabot Corp.

Each block 20 meters square.

KEY MAP 31

"SEE"
KBI REVERE PLANT
BUILDING LOCATIONS.
D-5749-12



Survey of Revere Site for Cabot Corp. Date 3/14/90

Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

Taken by: J.Bullinger

Approved by:------W. Gannon

Background:
Sand Blast Shed,pole 5
Bag House,corner 5
Bird Feeder at Office 5
Stop sign at Rt 611 5

Map # 1
Three foot readings in circle.

Key Map # 31

	1	2	3	4	5
A	7 / ⑥ 15 / 5 — 5 / 20				
B	5 / ⑥ 6 / 11 — 5 / 7				
C	7 / ⑦ 9 / 11 — 6 / 10				
D	22 / ⑩ 11 / 15 — 12 / 13	12			
E	10 / ⑦ 6 / 10 — 5 / 6	6			

Swamp

Survey of Revere Site for Cabot Corp. Date 3/14/90

Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

Taken by: J.Bullinger

Approved by: W. Gannon

Background:
Sand Blast Shed, pole 5
Bag House, corner 5
Bird Feeder at Office 5
Stop sign at Rt 611 3

Map # 2
Three foot readings in circle.

Key Map # 31

	1		2		3		4		5	
	23	10	22	10	11	13	11	13	7	6
A	(9) 9		(10) 10		(11) 15		(9) 12		(7) 7	
	6	8	17	13	11	14	11	10	5	8
	17	5	8	25	11	11	7	6	6	6
B	(9) 9		(9) 8		(12) 17		(11) 21		(8) 6	
	7	9	13	10	12	12	12	9	8	12
	9	15	9	9	8	7	8	7	9	12
C	(8) 6		(10) 11		(11) 16		(7) 7		(8) 10	
	6	10	11	11	16	10	9	9	9	3
	6	12	13	10	12	13	8	7	18	17
D	(9) 10		(15) 18		(11) 11		(8) 8		(12) 11	
	5	21	8	20 Test	16	8	7	9	13	8
	6	13	6	21	10	7	7	6	6	7
E	(5) 6		(8) 11		(6) 7		(6) 7		(5) 5	
	6	8	7	16	7	7	6	5	6	6

Survey of Revere Site for Cabot Corp. Date 3/14/90

Meter used: Ludum
Area; 20 meters square.
Blocks; 4 meters square.

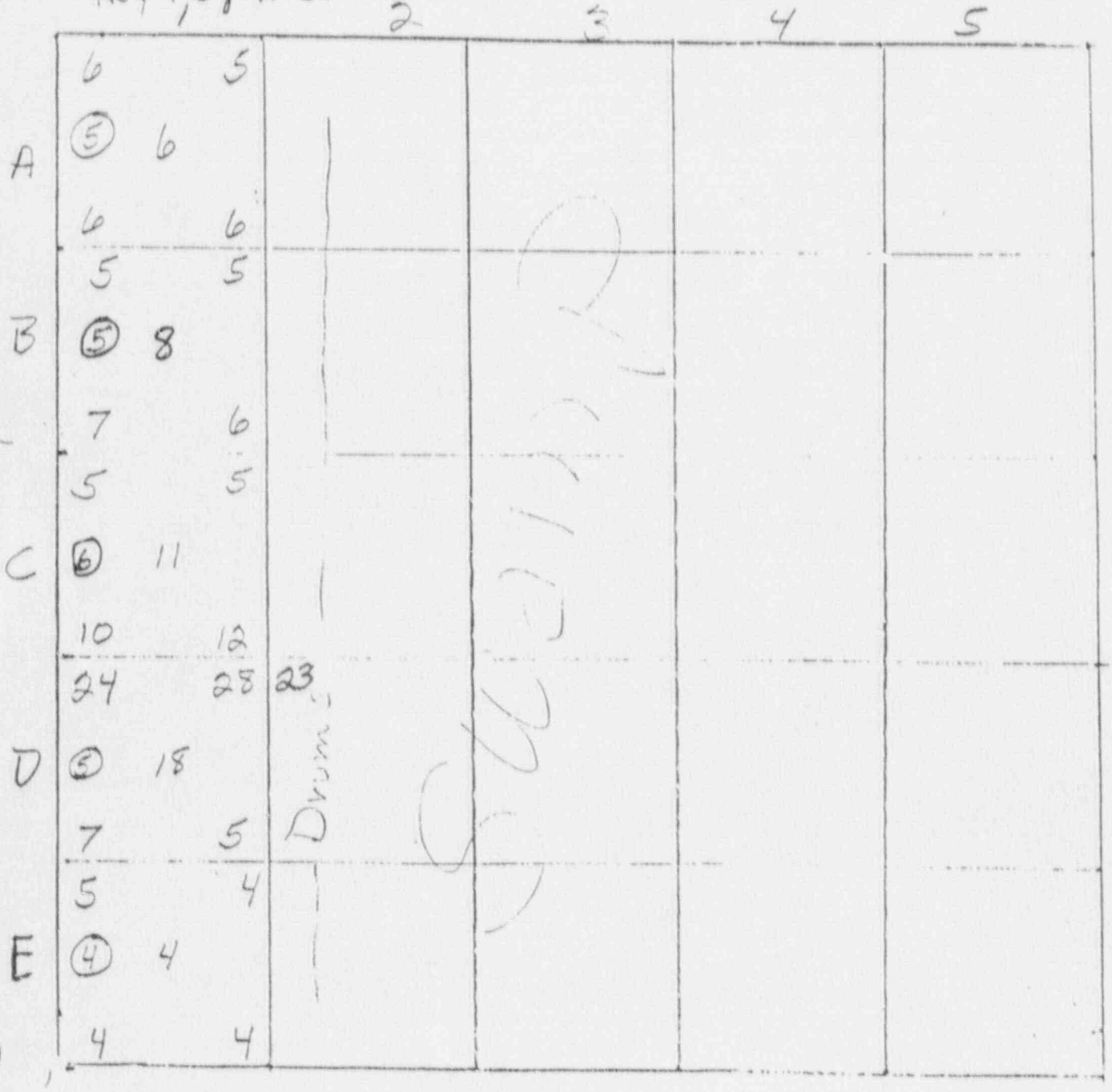
Taken by: J.Bullinger

Approved by: ------W. Gannon

Background:
Sand Blast Shed,pole 5
Bag House,corner 5
Bird Feeder at Office 5
Stop sign at Rt 611 5

Map # 3
Three foot readings in circle.

Key May #31



FINAL DECONTAMINATION AND DECOMMISSIONING SURVEY - 1990

Survey of Revere Site for Cabot Corp. Date 3/14/90

Meter used: Ludum
Area: 20 meters square.
Blocks; 4 meters square.

Taken by: J.Bullinger

Approved by:------ W. Gannon

Background:
Sand Blast Shed,pole 5
Bag House,corner 5
Bird Feeder at Office 5
Stop sign at Rt 611 5

Map # 4

Three foot readings in circle.

Key Map # 31

	1	2	3	4	5
	5	6	4 4	5 5	4 4
A	(3) 5 Trash		(5) 5	(6) 6	(5) 4
	7	4	5 7	9 7	4 4
	4 4	4 5	4 7	6 5	5 4
B	(4) 4	(6) 6	(8) 7	(6) 7	(5) 5
	5 12	9 8	8 7	6 13	5 5
	5 7	8 11	16 5	10 7	5 4
C	(8) 8	(9) 9	11 12	(8) 13	(3) 5
	17 11	15 13	10 13	12 9	10 5
	20 36	30 14	10 12	13 8	17 12
D	(18) 32	(11) 12	(10) 9	(10) 12	(12) 13
	32 33	17 17	10 12	15 13	14 9
	20 43	32 13	10 11	11 8	16 7
E	(15) 16	(11) 19	(9) 9	(9) 9	(9) 9
	21 18	11 10	12 9	9 14	12 9

FINAL DECONTAMINATION AND DECOMMISSIONING SURVEY - 1990

Survey of Revere Site for Cabot Corp. Date 3/14/90

Meter used: Ludum
Area: 20 meters square
Blocks: 4 meters square

Taken by: J. Bullinger

Background:
Sand Blast Shed, pole 5
Bag House, corner 5
Bird Feeder at Office 5
Stop sign at Rt 611 5

Approved by: ------ W. Gannon

Key Map 31

Map # 6
Three foot readings in rcle.

	1	2	3	4	5
A	4 4 (3) 3 3 4	3 4 (5) 8 3 5	5 4 (4) 5 5 5	Debris (4) 4 3 12	24 6 (6) 6 5 5
B	3 6 (4) 4 3 3	4 5 (4) 5 3 5	9 4 (5) 5 5 5	4 7 (6) 7 9 7	6 5 (4) 4 7 4
C	3 4 (3) 4 3 3	4 5 (4) 5 4 4	5 5 (5) 5 4 4	4 3 (4) 4 5 5	4 4 (5) 4 5 5
D	5 4 (5) 5 8 34	4 4 (5) 5 9 4	4 5 (5) 5 5 5	5 5 (5) 5 5 5	7 5 (5) 6 6 5
E	7 18 (9) 10 5 5	10 4 (4) 5 5 5	4 6 (5) 4 4 4	5 5 (5) 5 5 9	5 6 (5) 9 6 5

12 CLEAN UP CONTRACT

BULLINGER'S MILL, INC.
RD 4 BOX 4363 RAPP RD. FLEETWOOD, PENNSYLVANIA 19522
(215) 944-8364

Aug. 15,1990

Cabot Corp.
County Line Rd.
Boyertown.Pa. 19512
Att. Mr. William Gannon

Proposal for cleanup of Penn Rare Metals Site.

Bullingers Mill, Inc. hereafter known as the contractor,will provide to Cabot Corp., hereafter known as the company, the following, on a time and material basis.

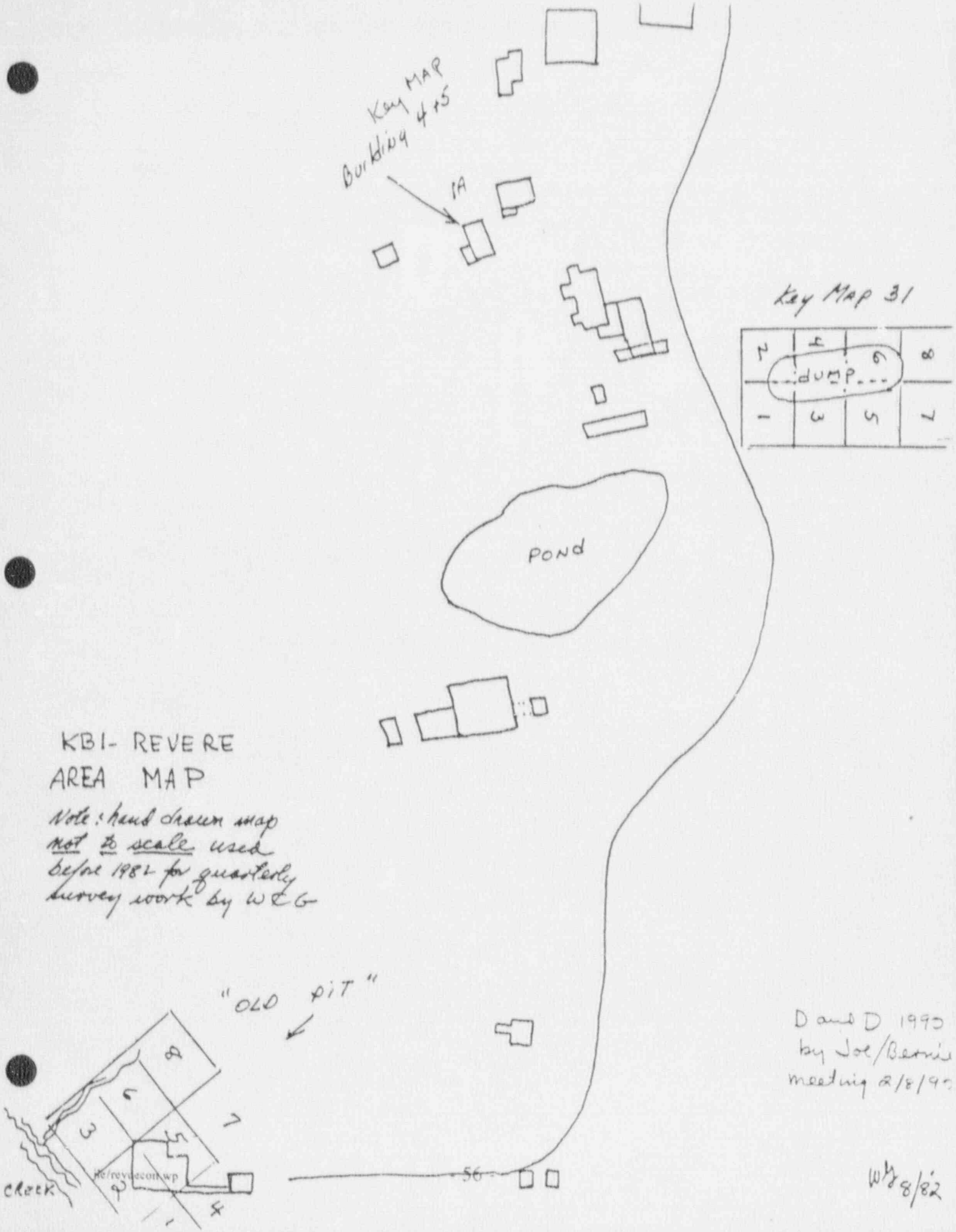
A. Dump truck(6 yd.) and skid loader with one operator, at $34 per hr.
B. Backhoe, if needed at an aditional $25 per. hr. plus hauling.
C. Crawler front end loader,if needed, at anaditional $25 per hr., plus hauling.
D. Labors at $15 per hr.
E. Contractor will provide all usual hand tools, special tools or rental of equpt. will be bought or rented by the Contractor and billed to the Company.
F. Travel time of $30 per day per man.
G. Contractor will keep records of location, amount of material removed, before and after cleanup readings, and date and time spent at each location. The contractor will work to the best of his ability, and to the best of the meters furnished him by the Company, but cannot guarantee this type of work.
H. Due to the nature of the work involved, the Contractor assumes no liabilith for any and all damages. The Company retains ownership of all materials transported and the Contractor will deliver material solely at the Companys risk and direction.

Joseph J Bullinger Pres for Bullinger's Mill, Inc.

William C. Gannon 8/28/90 for Cabot Corp.

13 REVERE PLANT MAP - 1982 AND MAPS OF THE "OLD PIT" AND KEY MAP 31

See following pages.



KBI- REVERE
AREA MAP

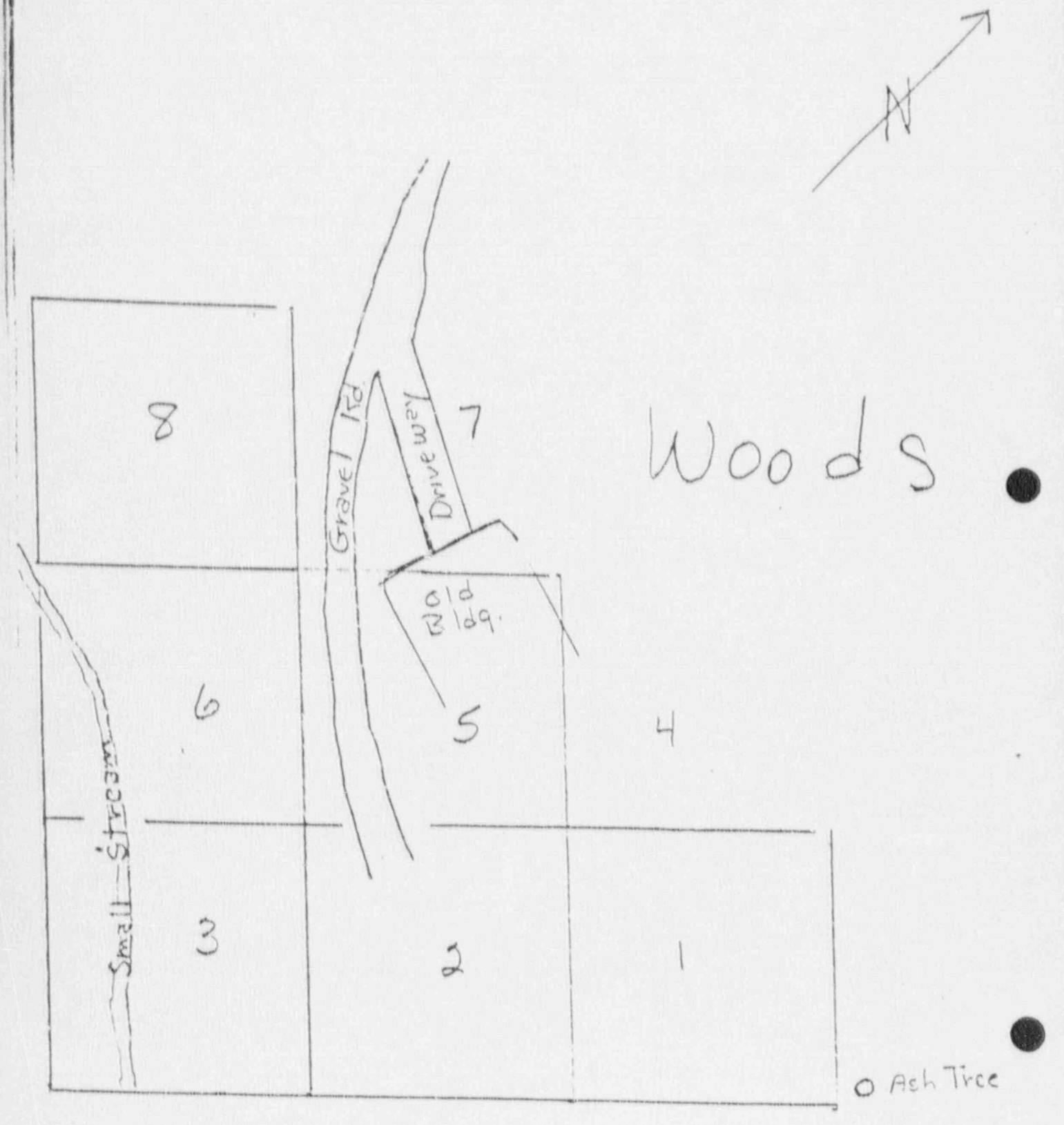
Note: hand drawn map
not to scale used
before 1982 for quarterly
survey work by W&G

D and D 1990
by Joe/Bernie
meeting 2/8/90

W 8/82

The Old Pit. Revere Plant, Cabot Corp.

Each block 20 meters square.



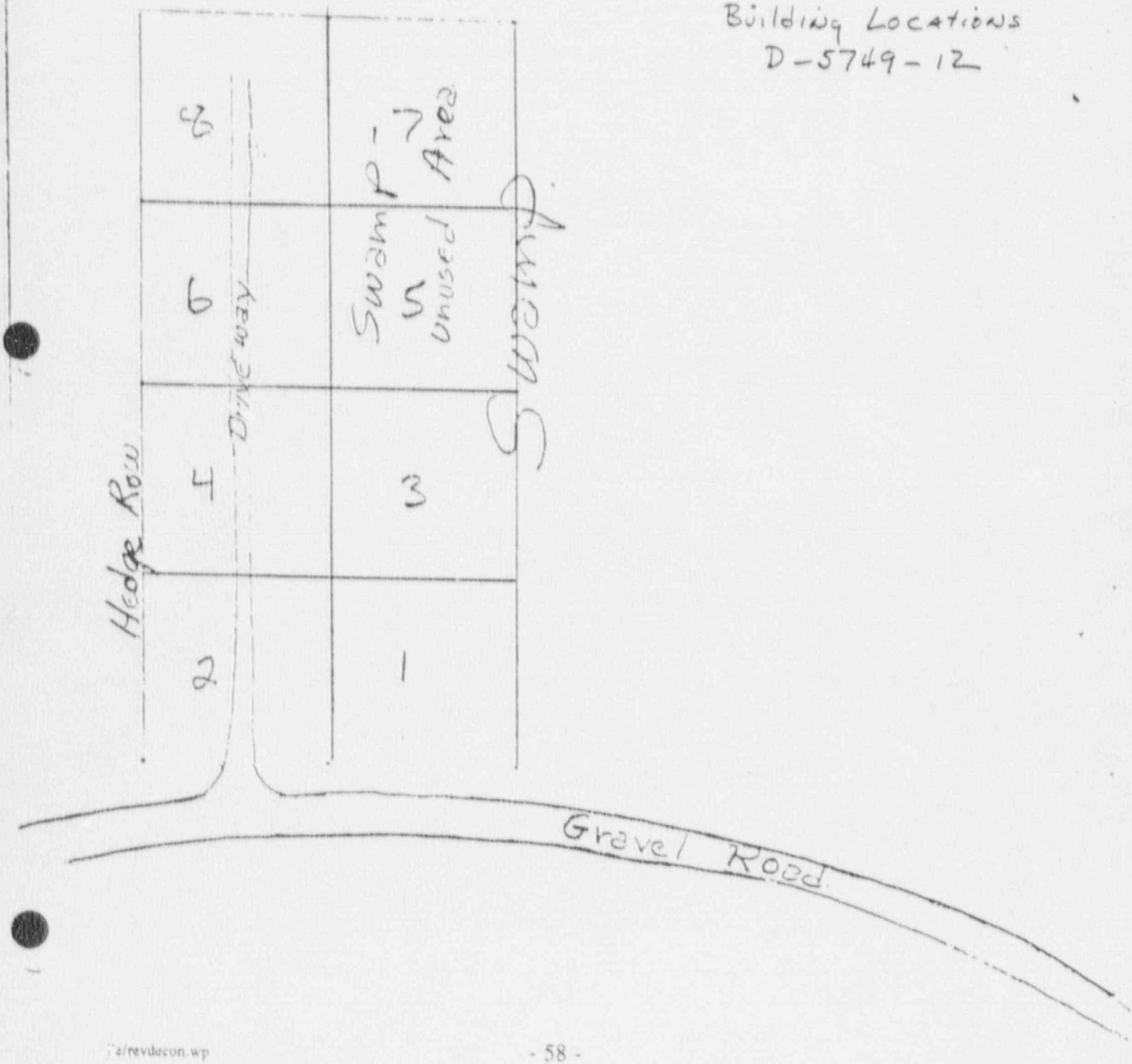
Key 1/of 31

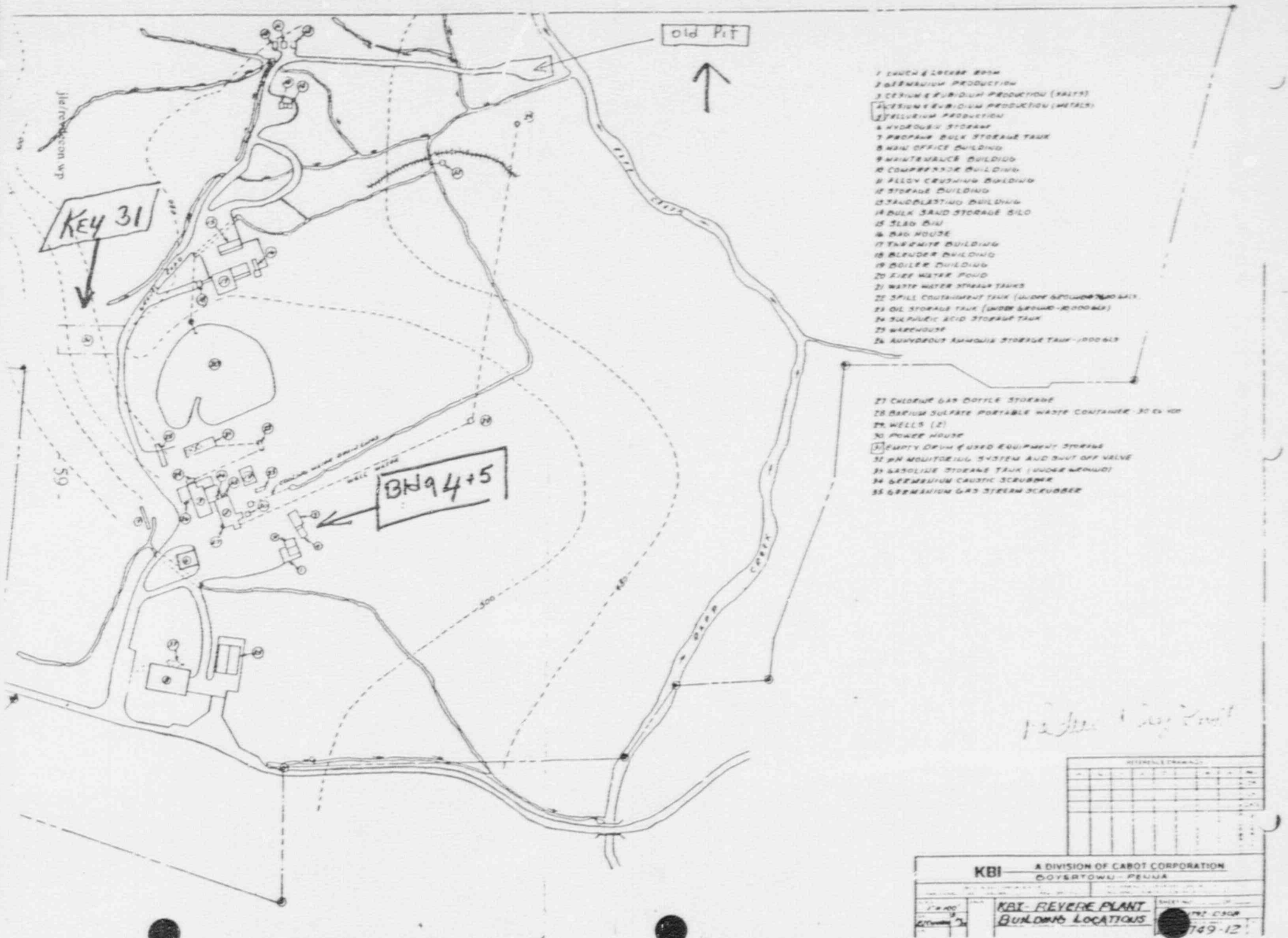
Empty Drum and used equptment area. No.31 on plant map.

Revere Plant. Cabot Corp.

Each block 20 meters square.

"SEE"
KBI REVERE PLANT
Building Locations
D-5749-12




Old Pit
KEY 31
BN94+5
1 LAUCH & LOCKER BOOM
2 SELENIUM PRODUCTION
3 CESIUM & RUBIDIUM PRODUCTION (SALTS)
4 CESIUM & RUBIDIUM PRODUCTION (METALS)
5 TELLURIUM PRODUCTION
6 HYDROGEN STORAGE
7 PROPANE BULK STORAGE TANK
8 MAIN OFFICE BUILDING
9 MAINTENANCE BUILDING
10 COMPRESSOR BUILDING
11 ALLOY CRUSHING BUILDING
12 STORAGE BUILDING
13 SANDBLASTING BUILDING
14 BULK SAND STORAGE SILO
15 SLAG BIN
16 BAG HOUSE
17 THICKENER BUILDING
18 BLENDER BUILDING
19 BOILER BUILDING
20 FIRE WATER POND
21 WASTE WATER STORAGE TANKS
22 SPILL CONTAINMENT TANK (UNDER GROUND-10,000 GAL)
23 OIL STORAGE TANK (UNDER GROUND-10,000 GAL)
24 SULFURIC ACID STORAGE TANK
25 WAREHOUSE
26 ANHYDROUS AMMONIA STORAGE TANK-1000 GLS
27 CHLORINE GAS BOTTLE STORAGE
28 BARIUM SULFATE PORTABLE WASTE CONTAINER 30 CU YDS
29 WELLS (2)
30 POWER HOUSE
31 EMPTY DRUM & USED EQUIPMENT STORAGE
32 pH MONITORING SYSTEM AND SHUT OFF VALVE
33 GASOLINE STORAGE TANK (UNDER GROUND)
34 SELENIUM CAUSTIC SCRUBBER
35 SELENIUM GAS STEAM SCRUBBER
Deep Creek
KBI A DIVISION OF CABOT CORPORATION
BOYERTOWN, PENNA
KBI - REVERE PLANT
BUILDING LOCATIONS
749-12

PAGES 60 - 72 LEFT BLANK

14 PICTURES DURING DECONTAMINATION

See following pages.

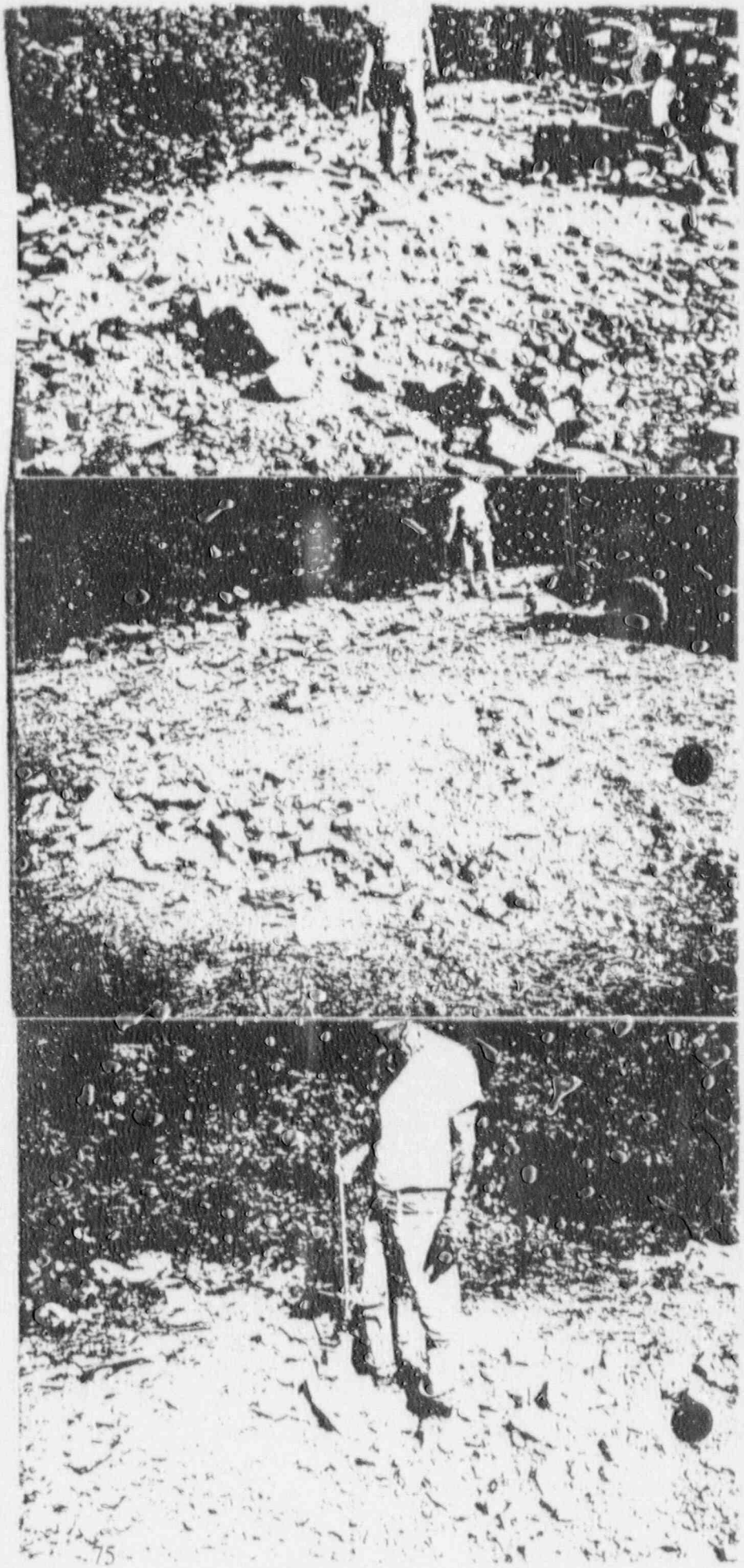
31
Slag for
Boyertown

31
Map 1 +
Map 3

31
Map 2 +
Map 4

jle/revdecon.wp
Received 10/22/90

31
Map 2 +
Map 4



31
Map 2 +
Map 4

31
Map 2 +
Map 4

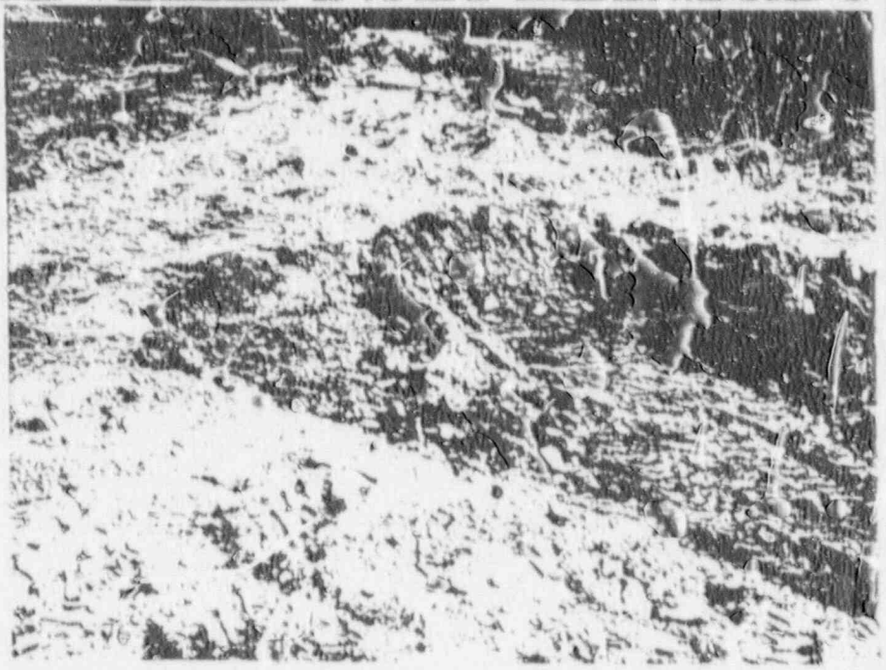
jle/revdecon.wp

Received 10/22/90

31
Map 2

31
Map 2

31
Map 3 +
Map 4



jle/revdec99.wp

Received 10/22/99

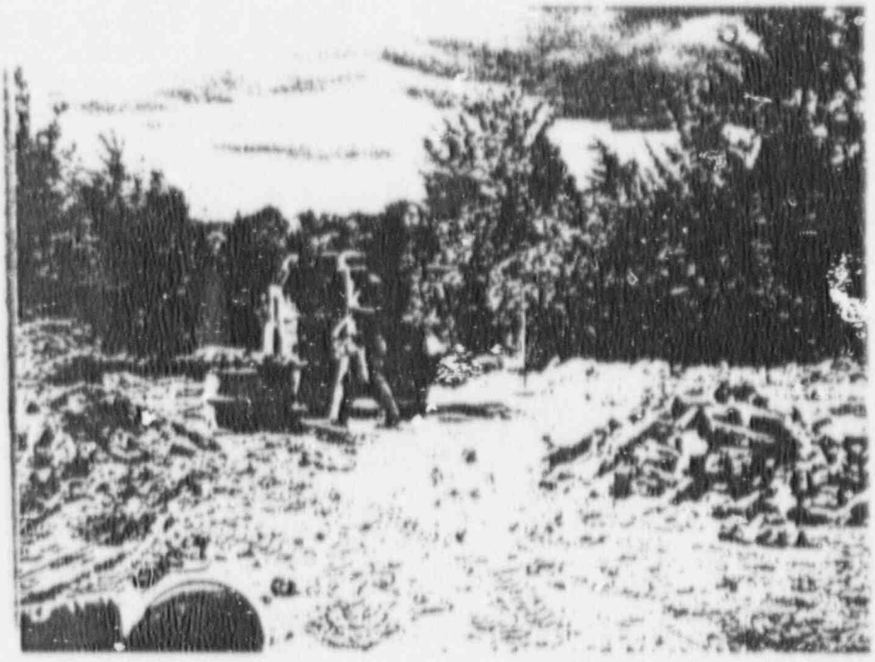
31
Map 3 +
Map 4

31
Map 3 +
Map 4

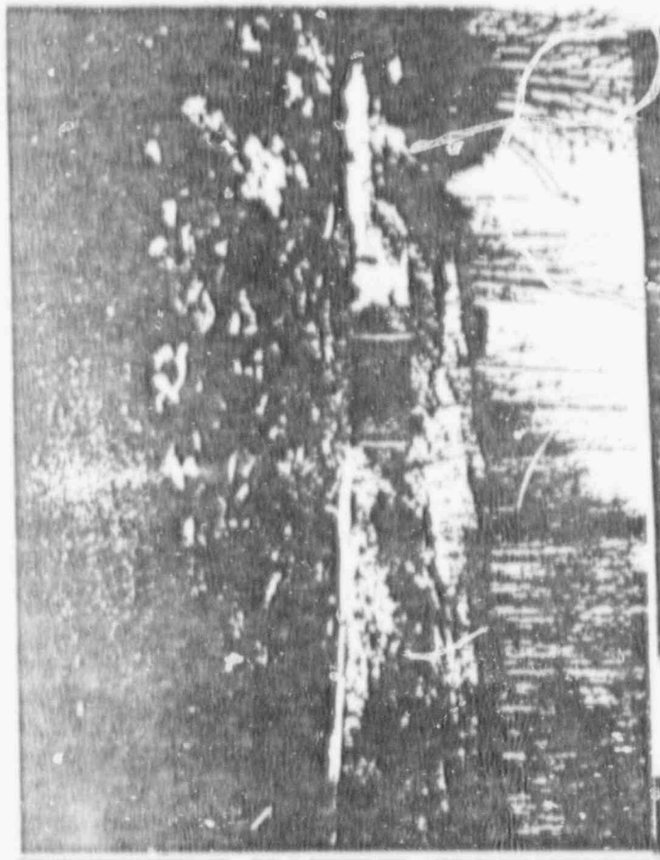
31
Slate for
Boyertown

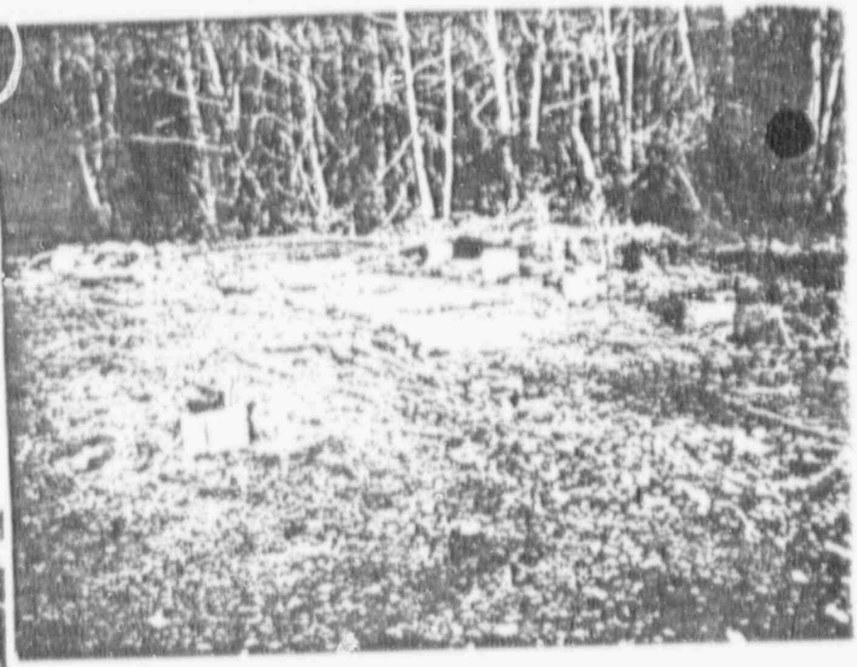
Bellevue Received 10/22/90

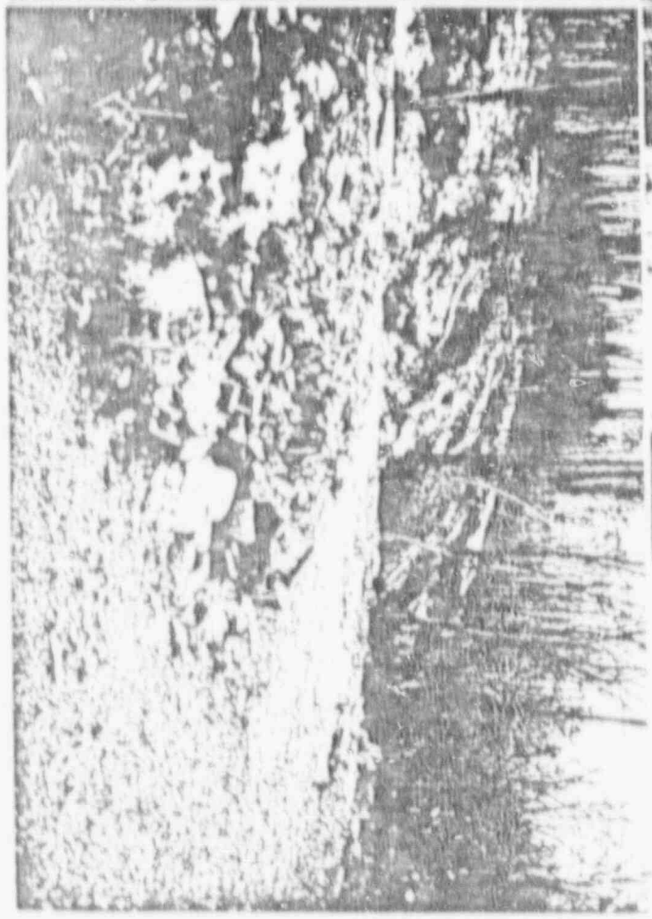
31
MAp 2

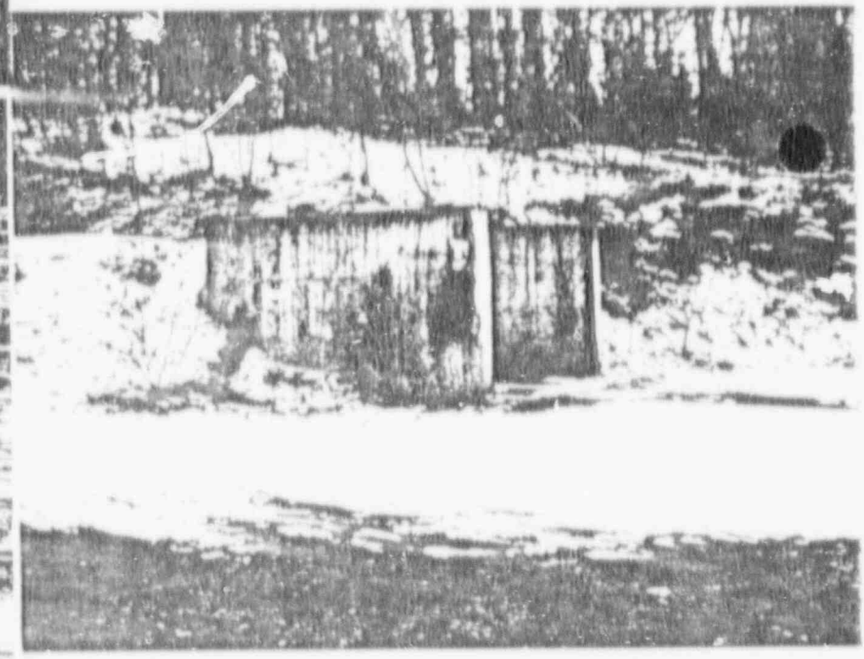


Received 10/22/90

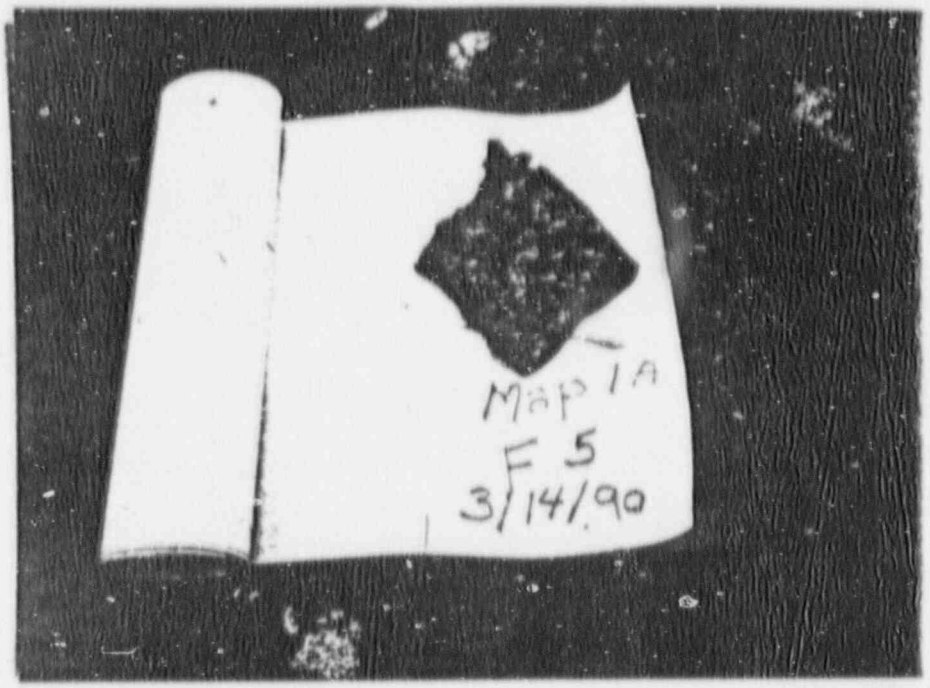


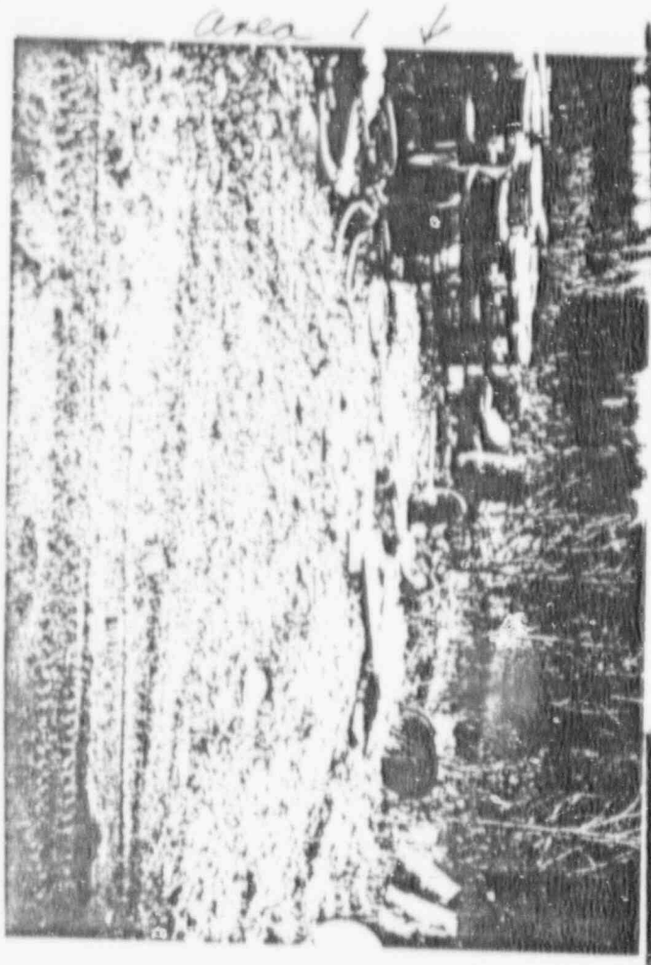


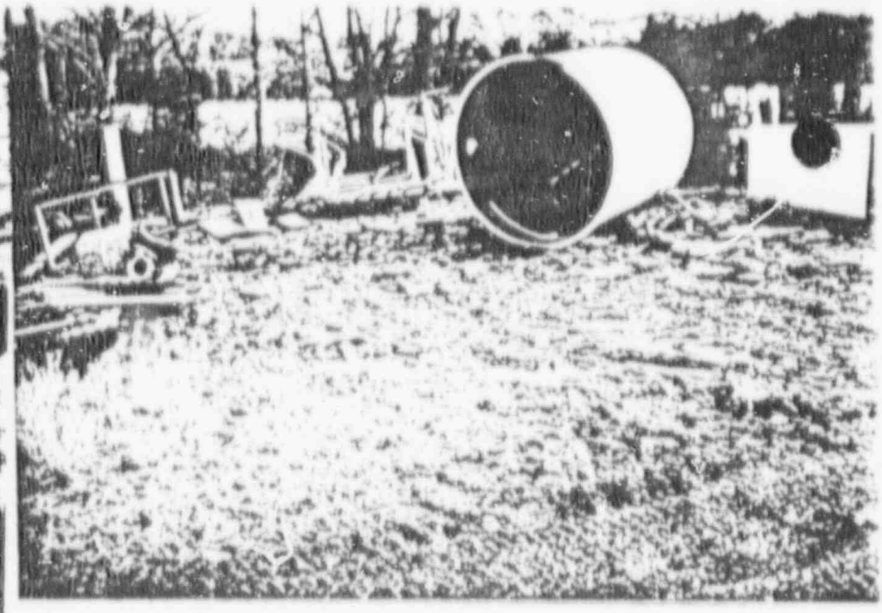




"The OLD Pit" area


MAP 1A
F 5
3/14/90

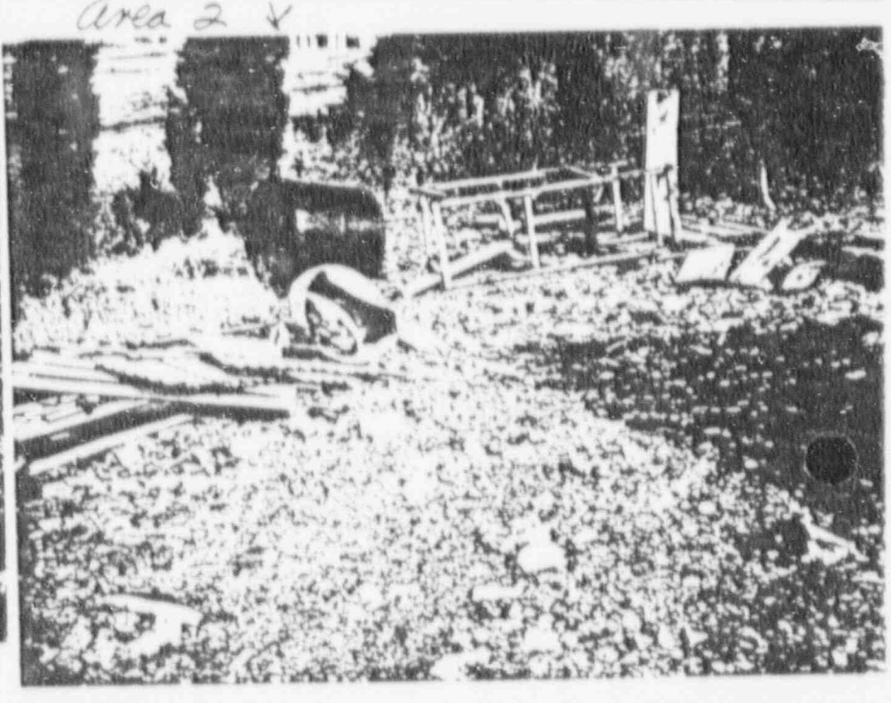




area 2 ↑

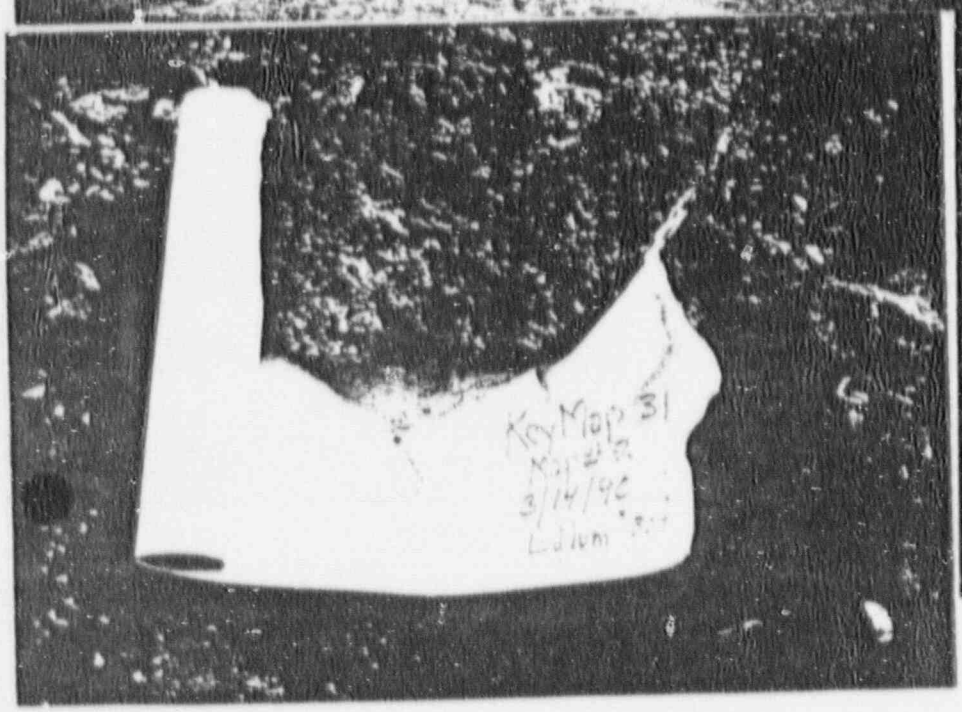
area 3 ↓

area 2 ↓



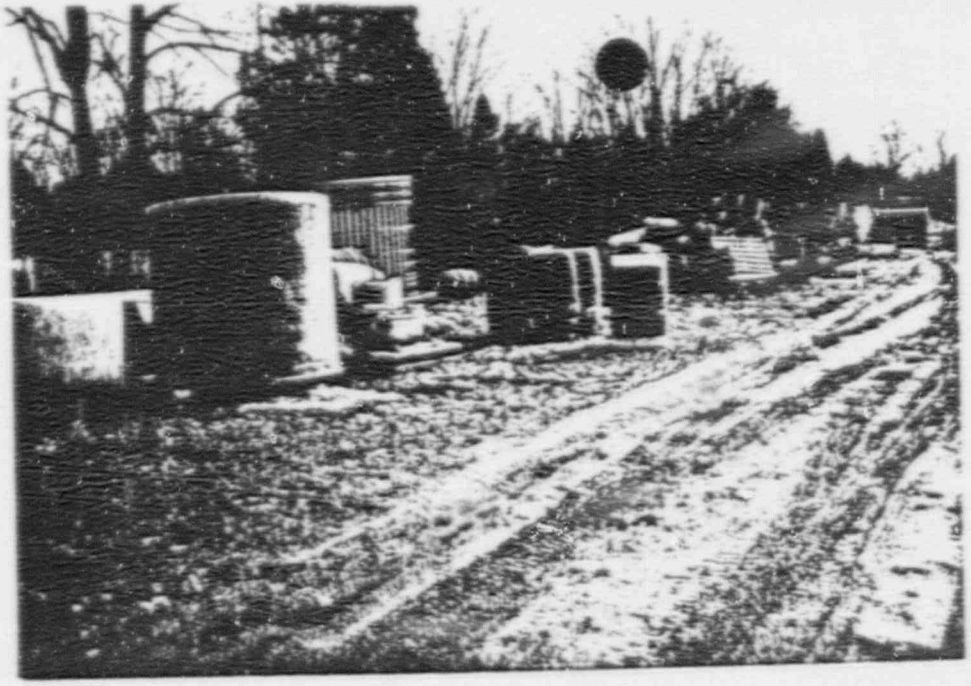
area 2

area 2



Key Map 31
3/14/96

Key 31



Map 31
area 4 + 6

jle/revdesm wp

15 CONTRACTOR CORRESPONDENCE AND GAMMA SCAN OF SAMPLES

See following pages.

BULLINGER'S MILL, INC.

RD 4 BOX 4363 RAPP RD. FLEETWOOD, PENNSYLVANIA 19522
(215) 944-8364

February 12, 1990

Cabot Corporation
County Line Road
Boyertown, PA. 19512
Attn: Mr. William Gannon

REF: Initial Survey at Penn Rare Metals Div., Cabot Corp.

Dear Mr. Gannon:

Bullinger's Mill, Inc., hereafter referred to as the Contractor, will provide to Cabot Corporation, hereafter referred to as the Company, the following, on a time and material basis:

Supervisor and one labor at the rate of $42.00 per hour.
Travel time at the rate of $30.00 per day per man.
Office time (maps, reports, etc.) at the rate of $20.00 per hour.

The Contractor will provide all usual hand tools.

The Company will provide all survey instruments.

The Contractor will maintain records of all surveys and submit maps, samples, and smears to the Company. The Contractor will work to the best of his ability, and to the best of the instruments furnished him by the Company, but he cannot guarantee his work.

Bullinger's Mill, Inc.
Joseph J. Bullinger,
President

jjb/revdecon.wp

Invoice 44-411 GrayLine SNAP-A-WAY® FORM

Invoice

BULLINGER'S MILL, INC.
Grade K.D. Native Hardwoods
RD 4 Box 4363 Rapp Rd.
FLEETWOOD, PENNSYLVANIA 19522

No.

Date April 16, 1990

Your Order No.

Sold To
- Cabot Corp.
- County Line Rd.
- Boyertown, Pa 19512

Shipped to
- Penn Rare Metals
- Revere, Pa.

Our Order No.	Salesman	Terms	F.O.B.	Date Shipped	Shipped VIA

Quantity Ordered	Quantity Shipped	Stock Number/Description	Unit Price	Unit	Amount
Feb 13		Travel Time - 2 men @ $30 ea			60 00
		2 men 7.5 hrs	42 00	hr	315 00
Feb 14		Office Time 2 hrs	20	hr	40 00
Feb 20		Travel Time 2 men @ 30 ea			60 00
		2 men 7.5 hrs	42	hr	315 00
March 14		Travel Time 2 men @ 30 ea			60 00
		2 men 7.5 hrs	42	hr	315 00
April 13		Office Time 4 hrs	20	hr	80 00
		Office expence - photo - Phone - Postage			17.60
		Total Due			1262.60

WilsonJones
GRAYLINE FORM 44-411 3-PART
©1985 - PRINTED IN U.S.A.

Original /Invoice

85

Received
4/18/90 WLG

BULLINGER'S MILL, INC.

RD 4 BOX 4363 RAPP RD FLEETWOOD, PENNSYLVANIA 19522
(215) 944-8364

April 16, 1990

Mr. William C. Gannon
Cabot Corporation
County Line Road
Boyertown, PA 19512

Dear Mr. Gannon:

The results of our survey at the Revere Plant are as follows:

February 13, 1990: A walk-around survey was done. A high reading was found behind Building #5. An elevated reading was found beside the warehouse - Building #25. At several spots in the empty-drum storage area, elevated readings were noted. First drafts of Key Maps were made, and one survey was completed at the Old Pit.

February 20, 1990: Survey was completed at the Old Pit and one survey was completed behind Building #5.

March 14, 1990: Sample and picture of same were taken behind Building #5. Survey of drum storage area, Key Map 31, was completed.

Enclosed please find survey maps and pictures. If I can be of additional assistance, please notify me.

Thank you,

Joseph J. Bullinger

Joseph J. Bullinger
President

jle/[illegible].wp

BULLINGER'S MILL, INC.

RD 4 BOX 4363 RAPP RD. FLEETWOOD, PENNSYLVANIA 19522
(215) 944-8364

Sept.13, 1990

Cabot Corp.
Beaver Run Road
Revere,Pa. 18953
Att: Mr. Joseph Casseralla

Report of cleanup at Revere Plant:

Sept.4,1990: Area on Map 1A. Clean up areas F5,E5, &C5. Map 1(The old pit) C1,C2,B2. About 2000# slag found in the above areas.

Time:

Equptment 10.5 hrs.
Labor 8
Travel 2 men

Sept. 5, 1990 Working on empty drum and used equpt. area. No.31 on plant map. Map #2. Areas E2,D1,D2,D3,&C3.

Time:

Equpt: 8 hrs.
Labor 8 hrs.
Travel 2 men

Sept.10,1990 Key 31. Map #2. E2,D1,D2,D3,C3,B1,B2,A1,A2. Map #4, E1,E2,D1,&D2. Cleaning above areas.

Time:

Equpt: 8.5 hrs.
Labor: 8.5 hrs.
Travel 2 men

Sept.11,1990 Key Map 3[illegible] Map #2. A1,A2,B1,B2. Map#4. E1,E2,D1&d2. Loadand haul appox. 5 [illegible]on slag to Boyertown.

Time:

Equpt 11 hrs.
Labor 7 hrs.
Travel 1 man.

Sept.12,1990. Map #2. D5. Map#1 D1.

Time:

Equpt: 8 hrs.
Labor: 8 hrs.
Travel: 2 men.

Large chunks of slag were found in all the above areas, with a reading of up to "200" on the Ludium Meter.

Joseph J. Bullinger.

Joseph J. Bullinger

cc William Gannon

BULLINGER'S MILL, INC.
RD 4 Box 4363 Rapp Rd.
FLEETWOOD, PENNSYLVANIA 19522

(215) 944-8364

0086

INVOICE DATE: Sept 13, 1990
SALESPERSON:

SHIP TO: Work @ Revere Plant. Cleanup

TO Cabot Corp.
Beaver Run Rd.
Revere, Pa. 18953

Att: J. Casseralla.

YOUR ORDER NO. | DATE SHIPPED | SHIPPED VIA | F.O.B. POINT

TERMS Due. 1.5% per mo. after 30 days

QTY. ORDERED	B/O	QTY. SHIPPED	DESCRIPTION	UNIT PRICE	TOTAL
46 hrs			Egypt. Labor	$34	$1564
39.5 hrs			Labor	$15	592.50
9 ea.			Travel Time	30	270.00
1 ea.			Office Time		28.00
			Batteries for meter		9.04
			Due.		$2458.59

MATH	2nd Check	Final OK
MH	AMW	

DATE

Accts. Charged

IBM ACCT. NO. 6173-0433

ORIGINAL

Thank You

BULLINGER'S MILL, INC.

RD 4 BOX 4363 RAPP RD. FLEETWOOD, PENNSYLVANIA 19522
(215) 944-8364

Sept.13, 1990

Cabot Corp.
Beaver Run Road
Revere,Pa. 18953
Att: Mr. Joseph Casseralla

Report of cleanup at Revere Plant:

Sept.4,1990: Area on Map 1A. Clean up areas F5,E5, &C5. Map 1(The old pit) C1,C2,B2. About 2000# slag found in the above areas.

Time:

Equptment 10.5 hrs.
Labor 8
Travel 2 men

Sept. 5, 1990 Working on empty drum and used equpt. area. No.31 on plant map. Map #2. Areas E2,D1,D2,D3,&C3.

Time:

Equpt: 8 hrs.
Labor 8 hrs.
Travel 2 men

Sept.10,1990 Kev 31. Map #2. E2,D1,D2,D3,C3,B1,B2,A1,A2. Map #4, E1,E2,D1,&D2. Cleaning above areas.

Time:

Equpt: 8.5 hrs.
Labor; 8.5 hrs.
Travel 2 men

Sept.11,1990 Key Map 31. Map #2. A1,A2,b1,B2. Map#4. E1,E2,D1&d2. Loadand haul appox. 5 ton slag to Boyertown.

Time:

Equpt 11 hrs.
Labor 7 hrs.
Travel 1 man.

Sept.12,1990. Map #2. D5. Map#1 D1.

Time:

Equpt: 8 hrs.
Labor: 8 hrs.
Travel: 2 men.

Large chunks of slag were found in all the above areas, with a reading of up to "200" on the Ludium Meter.

Joseph J. Bullinger. Joseph J. Bullinger.

cc Bill Forman

BULLINGER'S MILL, INC.

RD 4 BOX 4363 RAPP RD. FLEETWOOD, PENNSYLVANIA 19522
(215) 944-8364

Oct.1, 1990

Cabot Corp.
Beaver Run Rd.
Revere, Pa. 18953
Att. Mr. J. Casseralla.
Ref. Clean up at Revere Plant.

Sept.18,1990. Key Map 31. Map 1,A1. Map 3,E1&D1. Clean up heavy chunks of slag. Haul 4 tons to Boyertown.
Time: Equpt. 12 hrs.
Labor 8
Travel 1 man.
Sept.19,1990 Key map 31. Map 3, E1&D1. Map 4, E4,E5,D4&D5. Clean up heavy chunks of slag. Haul 5 tons slag to Boyertown.
Time: Egupt. 11hrs.
Labor 8
Travel 1 man.
Sept. 20,1990 Key Map 31. Map 4,E4,E3,&D3. Map 3, D2. Slag again. Haul 5 ton slag to Boyertown.
Time Equpt. 10.5 hrs
Labor 8
Travel 1 man
Sept.24,1990 Key Map 31,Map 3, D1. Finish area. Haul 5 tons slag to Boyertown.
Time: Equpt. 10.5 hrs.
Labor 8
Travel 1 man
Sept.25,1990. Key Map 31. Map 6, A5. Clean up area. 4 drums loose material removed. D1. Loose slag on surface removed. Map 5, C1,C2,D1&D2. Slag removed. C1, remove surface slag. Map 6, D1&E1. Clean area.Haul 4 drums &2 ton slag to Boyertown.
Time: Equpt: 10 hrs.
Labor 8
Travel 1 man
Sept.26,1990 Haul equpt. home.
Time: Equpt. 3 hrs.

A finial survey will be made when finish grading is completed by the company.

Joseph J. Bullinger for Bullinger's Mill, Inc.
Joseph J. Bullinger Pres

cc William Gannon.

Received
10/22/90

BULLINGER'S MILL, INC.

RD 4 BOX 4363 RAPP RD FLEETWOOD, PENNSYLVANIA 19522
(215) 944-8364

Oct. 19,1990

Cabot Corp.
Bever Run Road.
Revere, Pa. 18953
Att: Mr. Joseph Casseralla.

The results of our finial survey at the Revere Plant are as follows:

Oct.17,1990.All areas that were cleaned up were survead. (See enclosed maps.) All areas were well under the approved limits. Three small drums of slag were foumd at the drum storage area. (Key map 31,C4). These were hauled to Boyertown.

We can find no further evidence of any elevated readings on the site.
Drum storage area has been graded.

Enclosed please find survey maps and pictures. If I can be of additional assistance, please contact me.

Thank you.

Joseph J. Bullinger

Joseph J. Bullinger

cc Bill Gannon.

TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 06/05/90

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE 1
3-2519	7002-0303	05/11/90	06/13/90	

MR W C GANNON
ABBOT CORP
EPI DIVISION
COUNTY LINE RD
BOYERTOWN PA 19512

SOLIDS

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
02290	SLAG / REVERE PA		04/09				U-235	2.7 +-0.4 E 01		05/24			4
							TH-234	5.7 +-0.6 E 02		05/24			4
							RA-226	5.3 +-0.5 E 02	> 530	05/24			4
							PB-214	6.6 +-0.7 E 02		05/24			4
							BI-214	5.7 +-0.6 E 02		05/24			4
							AC-228	3.0 +-0.3 E 02		05/24			4
							PB-212	2.6 +-0.3 E 02		05/24			4
							TL-208	2.6 +-0.3 E 02		05/24			4
							K-40	2.0 +-0.6 E 01		05/24			4

LAST PAGE OF REPORT

APPROVED BY J. M. KING for 06/05/90

SEND 1 COPIES TO CA4155 MR W C GANNON

2 - GAS LAB. 3 - RADIO CHEMISTRY LAB. 4 - GE(LI) GAMMA SPEC LAB. 5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

jle/revdec90

TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 06/05/90

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE
3-2519	7002-0303	05/11/90	06/13/90	1

MR W C GANNON
ABOT CORP
EPI DIVISION
COUNTY LINE RD
BOYERTOWN PA 19512

S O L I D S

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
02290	SLAG / REVERE PA		04/09				U-235	2.7 +-0.4 E 01		05/24			4
							TH-234	5.7 +-0.6 E 02		05/24			4
							RA-226	5.3 +-0.5 E 02	> 530	05/24			4
							PB-214	6.6 +-0.7 E 02		05/24			4
							BI-214	5.7 +-0.6 E 02		05/24			4
							AC-228	3.0 +-0.3 E 02		05/24			4
							PB-212	2.6 +-0.3 E 02		05/24			4
							TL-208	2.6 +-0.3 E 02		05/24			4
							K-40	2.0 +-0.6 E 00		05/24			4

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TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 06/05/90

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE 1
3-2519	7002-0303	05/11/90	06/13/90	

MR W C GANNON
CABOT CORP
KPI DIVISION
COUNTY LINE RD
BOYERTOWN PA 19512

SOLIDS

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
02290	SLAG / REVERE PA		04/09				U-235	2.7 +-0.9 E 01		05/24			4
							TH-234	5.7 +-0.6 E 02		05/24			4
							RA-226	5.3 +-0.5 E 02		05/24			4
							PB-214	6.6 +-0.7 E 02		05/24			4
							BI-214	5.7 +-0.6 E 02		05/24			4
							AC-228	3.0 +-0.3 E 02		05/24			4
							PB-212	2.6 +-0.3 E 02		05/24			4
							TL-208	2.6 +-0.3 E 02		05/24			4
							K-40	2.0 +-0.6 E 01		05/24			4

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Copied
Teledyne
Revere Decon.

TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 06/12/90

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE 1
3-2641	7002-0303	05/21/90	06/23/90	

MR W C GANNON
CABOT CORP
KBI DIVISION
COUNTY LINE RD
BOYERTOWN PA 19512

SOLIDS

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
03235	REVERE ACTIVE SLAG		05/04				U-235	2.2 +-0.4 E 01		06/06			4
							TH-234	5.4 +-0.5 E 02		06/06			4
							RA-226	6.6 +-0.7 E 02	> 660	06/06			4
							PB-214	7.1 +-0.8 E 02		06/06			4
							BI-214	5.7 +-0.6 E 02		06/06			4
							AC-228	3.7 +-0.4 E 02		06/06			4
							PB-212	4.8 +-0.5 E 01		06/06			4
							TL-208	2.3 +-0.2 E 01		06/06			4
							K-40	3.7 +-1.1 E 01		06/06			4

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TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 06/12/90

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE 1
3-2641	7302-0303	05/21/90	06/23/90	

MR W C GANNON
CABOT CORP
KAT DIVISION
COUNTY LINE RD
BOYERTOWN PA 19512

SOLIDS

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
03235	REVERE ACTIVE SLAG		05/04				U-235	2.2 +-0.4 E 01		06/06			4
							TH-234	5.4 +-0.5 E 02		06/06			4
							RA-226	6.6 +-0.7 E 02	> 660	06/06			4
							PB-214	7.1 +-0.8 E 02		06/06			4
							BI-214	5.7 +-0.6 E 02		06/06			4
							AC-228	3.7 +-0.4 E 02		06/06			4
							PB-212	4.8 +-0.5 E 01		06/06			4
							TL-208	2.3 +-0.2 E 01		06/06			4
							K-40	3.7 +-1.1 E 01		06/06			4

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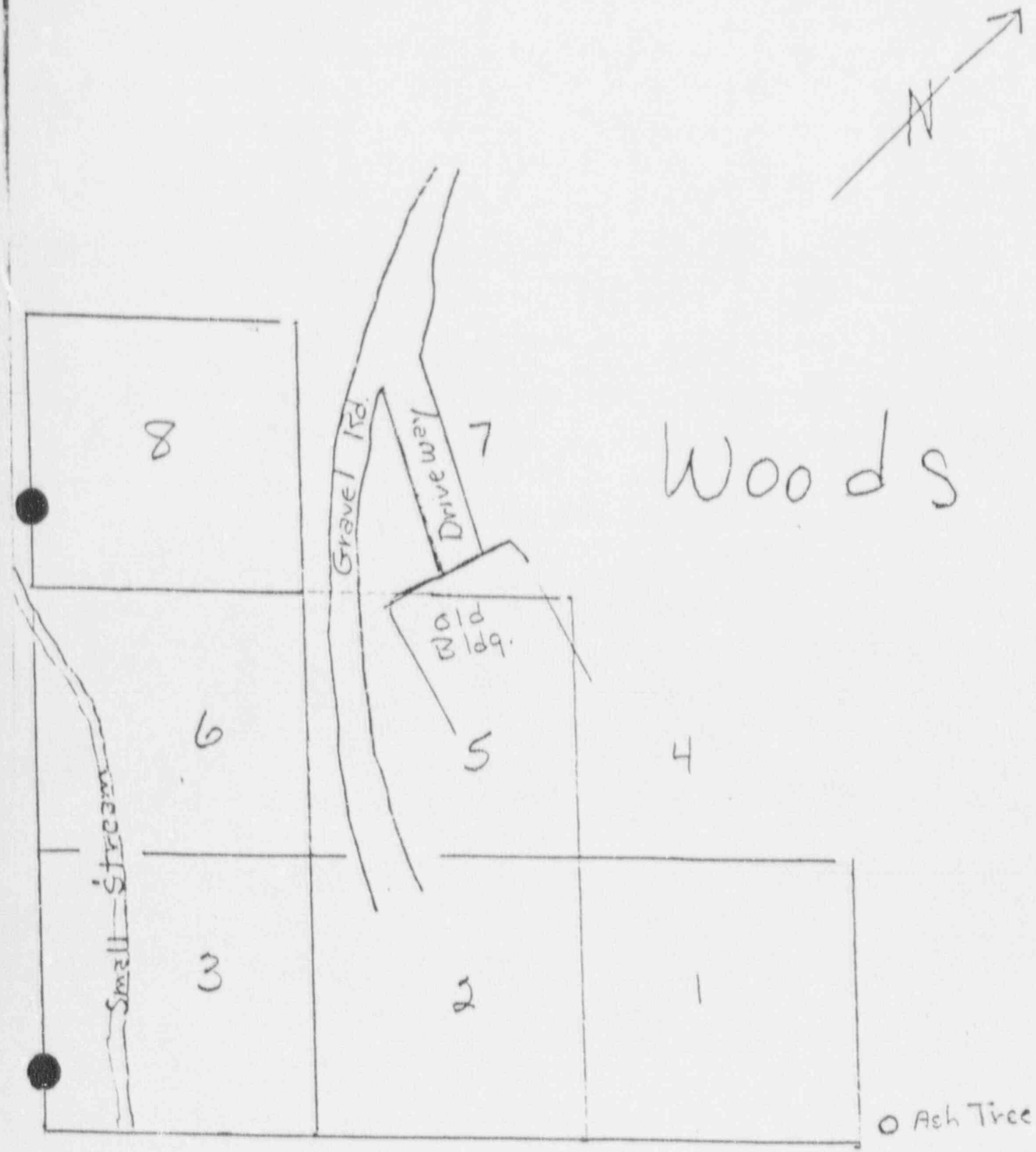
16 FINAL SURVEY AFTER CLEANING AND REMOVAL OF BURIED LUMPS - OCTOBER 17, 1990

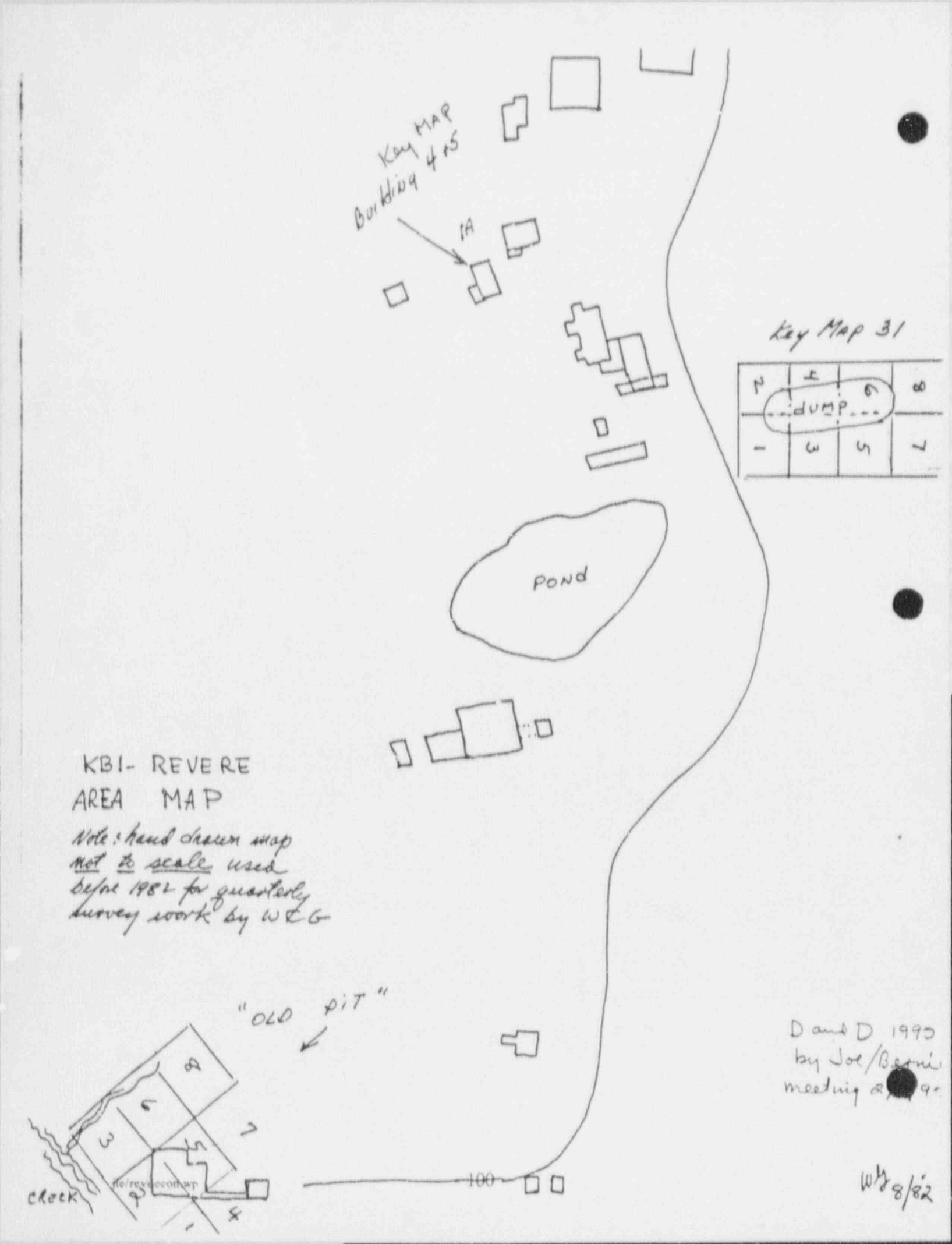
See following pages.

The Old Pit. Revere Plant. Cabot Corp.

Each block 20 meters square.



Rapp. Creek



KBI- REVERE
AREA MAP

Note: hand drawn map
not to scale used
before 1982 for quarterly
survey work by W&G

D and D 1990
by Joe/Bonnie
meeting 2/[illegible]90

WJ 8/82

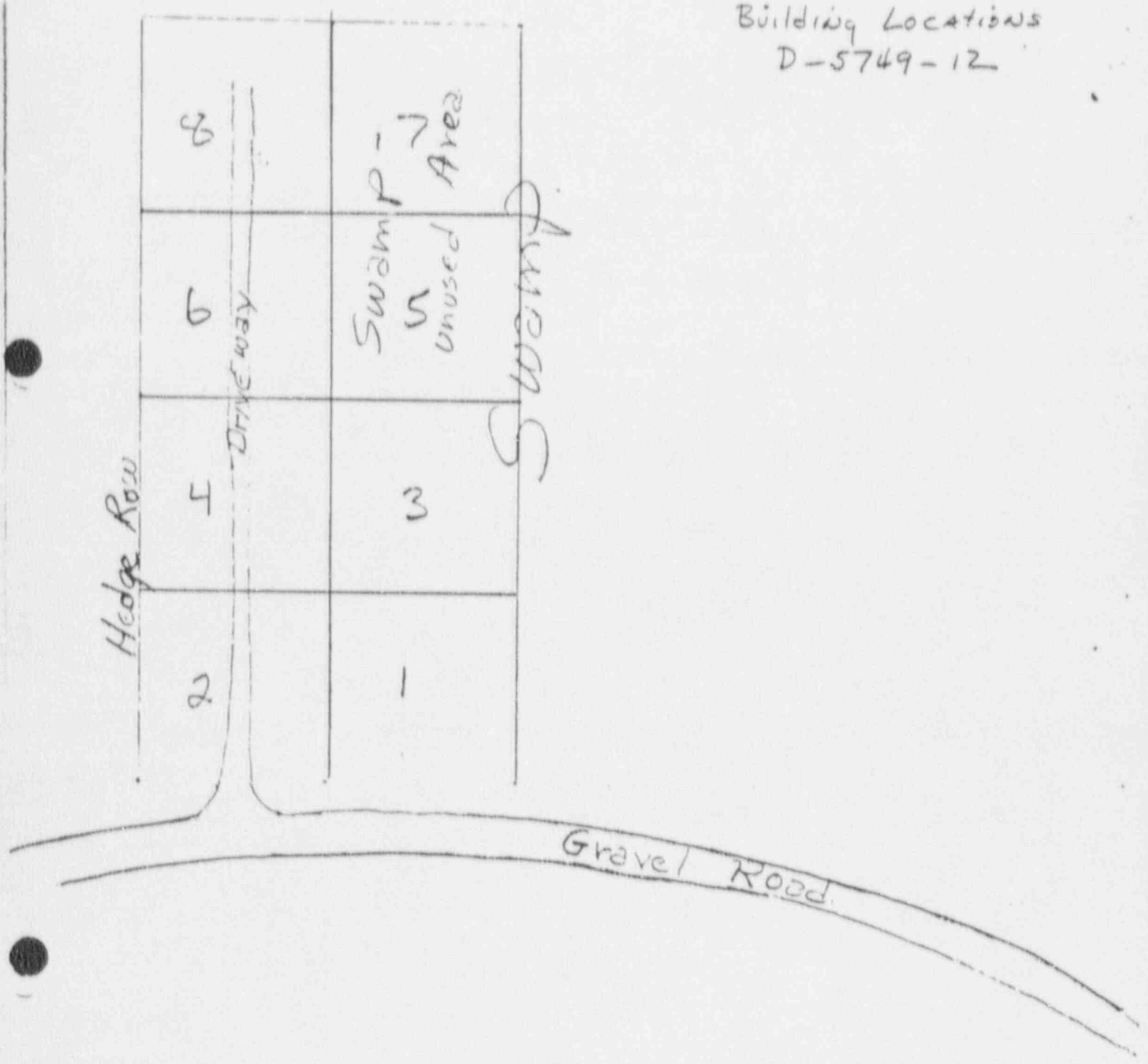
Key Map 31

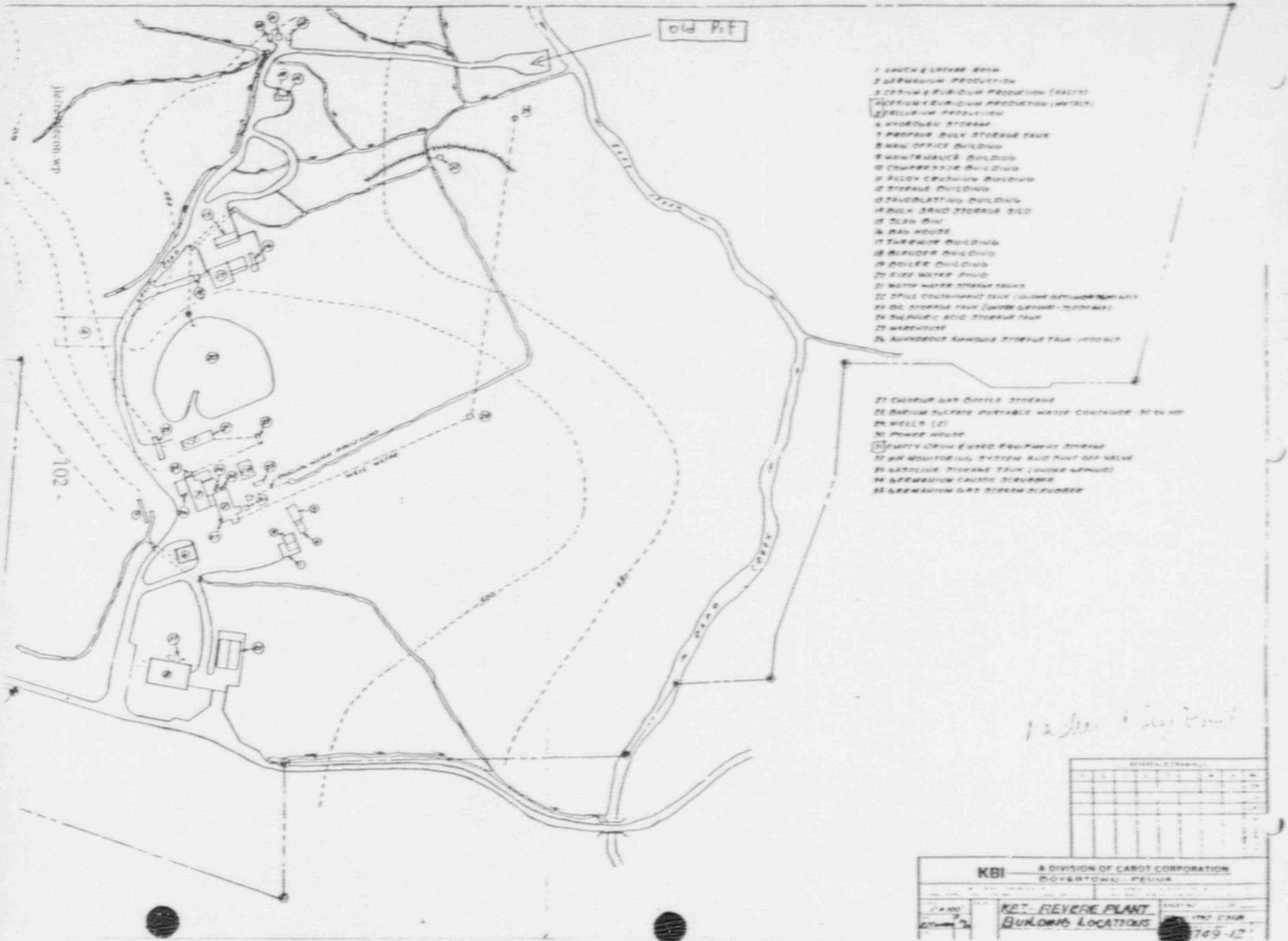
Empty Drum and used equptment area. No.31 on plant map.

Revere Plant. Cabot Corp.

Each block 20 meters square.

"SEE"
KBI REVERE PLANT
Building Locations
D-5749-12





KBI — A DIVISION OF CABOT CORPORATION
BOYERTOWN, PENNA

KBI - REVERE PLANT
BUILDING LOCATIONS

749-12

FINAL SURVEY

RMC

CERTIFICATE OF CALIBRATION

Radiation Management Consultants certifies that the instrument listed below was calibrated and inspected before shipment and has met the manufacturer's published specifications. RMC certifies that our calibration measurements are traceable to the National Bureau of Standards. Applicable corrections are made to correct to 22° C and 760 mmHg.

RMC SERVICE NO. 015951

INSTRUMENT IDENTIFICATION Ludlum (Manufacturer) #19 (Model) 87979 (Serial Number)

CALIBRATION SOURCE ID A-0009-6 130 Ci ^{137}Cs R59-10 10mCi ^{137}Cs

RANGE	CALIBRATION POINT	INSTRUMENT READING Before Adjustment	INSTRUMENT READING After Calibration
25	10 uR/hr	10.2 uR/hr	10.2 uR/hr
	20	20.0	20.0
50	10	10.2	10.2
	40	40	40
250	100	102	102
	200	200	200
*500	100	130	110
	200	230	210
	400	370	360
5000	1000	1100	1100
	2000	1850	1850
	4000	3350	3350

COMMENTS

*500 RANGE USED AS ELECTRONIC REFERENCE POINTS FOR LOWER RANGES AFTER SOURCE CALIBRATION
5000 RANGE HAS DETECTOR IN SATURATION

Calibration Performed by Harold W. Harkins Date April 27, 1990

I certify that the above information is correct.

Authorized Agent C. T. Mabe

Title RSO Date 4-27-90

(RMC is not responsible for damage incurred during shipment or use of this instrument)

DATE: 10/17/90

SURVEY MAP
CABOT CORPORATION

	BACKGROUND RADIATION	MICRO R
SURVEY METER: Ludlum	Sand Blast	3
AREA: 20 meters square	Bay House	6
BLOCKS: 4 meters square	Bird Feeder	6
CALIBRATION:	R+ 611	5
OPERATOR: J Bullinger		
APPROVED BY: WC Gannon		

REFERENCE MAP The OLD PIT

MAP # 1

(reading at three feet in circle)

	1	2	3	4	5
A	5 6 (6) 5 5 6				
B	7 9 (10) 11 8 9	10 6 (7) 7 8 6	5 6 (6) 5 6 6		
C	6 9 (8) 9 7 9	11 9 (9) 11 10 7	7 6 (6) 5 6 5	6 6 (5) 6 6 6	
D	7 10 (10) 12 8 7	9 7 (7) 6 6 6	5 5 (5) 5 5 5	5 5 (5) 5 6 7	
E	6 7 (6) 6 7 7	6 5 (5) 5 7 6	6 6 (6) 9 6 6	5 5 (5) 5 6 7	5 5 (6) 6 6 6

DATE: 10/17/90

SURVEY MAP
CABOT CORPORATION

	BACKGROUND RADIATION	MICRO R
SURVEY METER: Ludlum	Sand Blast	3
AREA: 20 meters square		
BLOCKS: 4 meters square	Bag House	6
CALIBRATION:	Bird Feeder	6
OPERATOR: J. Bullinger	Rt 611	5
APPROVED BY: W.C. Gannon		

REFERENCE MAP Key Map 31 MAP # 6
(reading at three feet in circle)

	1	2	3	4	5
A	5 6 (5) 4 4 4	5 6 (6) 6 6 7	5 7 (5) 5 6 6	5 11 5 5 11	8 6 (6) 6 5 5
B	3 4 (4) 4 4 6	5 5 (6) 6 6 7	6 6 (6) 5 6 9	6 6 (9) 10 8	4 5 (5) 5 10 5
C	6 6 (6) 7 5 6	6 7 (6) 6 5 6	7 8 (6) 7 6 7	10 7 (5) 5 6 7	6 5 (5) 5 5 6
D	6 6 (7) 7 6 7	6 6 (6) 7 6 6	6 6 (6) 6 6 6	7 6 (6) 6 6 7	5 5 (6) 6 6 7
E	6 6 (6) 6 6 7	7 6 (6) 7 6 7	6 6 (6) 6 6 6	6 7 (6) 7 6 7	7 6 (7) 6 6 7

DATE: 10/17/90

SURVEY MAP
CABOT CORPORATION

	BACKGROUND RADIATION	MICRO R
SURVEY METER: Ludlum	Sand Blast	3
AREA: 20 meters square	Bay house	6
BLOCKS: 4 meters square	Bird Feeder	6
CALIBRATION:	Rt 611	5
OPERATOR: J Bullinger		
APPROVED BY: WC Gannon		

REFERENCE MAP Key Map 31

MAP # 4
(reading at three feet in circle)

	1	2	3	4	5
A	6 7 (6) 6 6 7	7 6 (6) 7 7 7	6 6 (6) 6 7 7	7 7 (7) 7 7 7	7 7 (6) 7 7 7
B	7 7 (6) 6 6 7	7 7 (7) 7 8 8	7 7 (7) 7 9 8	7 7 (6) 7 14 7	7 7 (7) 7 6 7
C	7 7 (7) 7 8 11	8 8 (8) 9 9 9	8 8 (9) 10 8 9	9 7 (7) 8 8 7	8 7 (8) 6 6 8
D	10 9 (8) 8 9 10	9 9 (8) 9 7 8	8 9 (9) 10 8 9	9 8 (7) 8 8 7	8 7 (7) 7 8 9
E	11 9 (9) 9 9 9	7 8 (8) 8 8 9	8 8 (8) 8 7 9	9 9 (7) 7 7 9	8 8 (8) 8 8 8

DATE: 10/17/90

SURVEY MAP
CABOT CORPORATION

SURVEY METER: Ludlum
AREA: 20 meters square
BLOCKS: 4 meters square
CALIBRATION: _____
OPERATOR: J. Bullinger
APPROVED BY: WC Gannon

BACKGROUND RADIATION	MICRO R
Sand Blast	3
Bay House	6
Bird Feeder	6
Rt 611	5

REFERENCE MAP Key Map 31

MAP # 3
(reading at three feet in circle)

	1	2	3	4	5
A	6 6 (6) 6 7 7	6 7 (6) 6 6 6	9 10		
B	7 8 (7) 6 8 7	6 7 (6) 6 6 6	7 7	AMP	
C	7 13 (8) 7 7 8	7 8 (7) 7 8 8	8 SW 6		
D	8 8 (7) 8 8 7	7 7 (7) 7 8 6	6 7		
E	8 8 (8) 8 9 9	9 8 (7) 8 9 7	8 8		

DATE: 10/17/90

SURVEY MAP
CABOT CORPORATION

BACKGROUND RADIATION	MICRO R
Sand Blast	3
Bay House	6
Bird Feeder	6
Rt 611	5

SURVEY METER: Ludlum
AREA: 20 meters square
BLOCKS: 4 meters square
CALIBRATION: _____
OPERATOR: J Bullinger
APPROVED BY: WC Hannon

REFERENCE MAP Key Map 31

MAP # 2
(reading at three feet in circle)

	1	2	3	4	5
A	7 8 (7) 7 7 7	7 8 (8) 8 8 9	9 8 (8) 8 8 8	8 8 (8) 9 7 7	8 8 (7) 8 9 9
B	7 8 (7) 7 7 7	9 9 (8) 8 9 8	8 8 (8) 8 9 11	7 8 (8) 8 8 8	8 8 (7) 8 8 7
C	7 8 (7) 7 7 8	9 9 (8) 9 9 8	8 9 (9) 11 9 9	7 7 (8) 8 8 8	8 8 (8) 8 9 8
D	6 8 (7) 7 7 8	9 9 (8) 8 8 8	7 9 (8) 9 9 8	8 8 (6) 7 7 7	8 9 (8) 8 8 9
E	7 7 (7) 7 7 7	8 9 (7) 7 7 7	8 9 (8) 8 8 8	7 7 (7) 7 8 7	8 9 (7) 8 7 7

DATE: 10/17/90

SURVEY MAP
CABOT CORPORATION

	BACKGROUND RADIATION	MICRO R
SURVEY METER: Ludlum	Sand Blast	3
AREA: 20 meters square	Bag house	6
BLOCKS: 4 meters square	Bird Feeder	6
CALIBRATION:	Rt 611	5
OPERATOR: J Bullinger		
APPROVED BY: WC Gannon		

REFERENCE MAP Key Map 31 MAP # 1
(reading at three feet in circle)

	1	2	3	4	5
A	7 8 (7) 8 8 8	9 8 (7) 8 9 7	8 8		
B	8 8 (8) 8 8 9	7 7 (7) 8 8 6	7 7 SWAMP		
C	9 8 (8) 9 9 8	8 8 (7) 7 7 9	7 7		
D	9 9 (8) 10 9 8	9 8 (7) 8 7 8	8 7		
E	7 8 (8) 9 7 6	8 7 (7) 7 7 7	7 7		

DATE: 10/17/90

SURVEY MAP
CABOT CORPORATION

	BACKGROUND RADIATION	MICRO R
SURVEY METER: Ludlum	Sand Blast	3
AREA: 20 meters square	Bay House	6
BLOCKS: 4 meters square	Bird Feeder	6
CALIBRATION:	Rt 611	5
OPERATOR: J Bullinger		
APPROVED BY: WC Gannon		

REFERENCE MAP Key Map 4.5. MAP # 1A
(reading at three feet in circle)

	1	2	3	4	5
A					
B	PIPES 15 5		6 6 4 6	6 6 (6) 6 6 6	6 5 (5) 5 6 6
C	7 5 (5) 6 7 6	5 6 (6) 6 6 6	8 5 (6) 6 8 1	5 6 (5) 6 6 7	7 7 (7) 10 6
D	6 6 (5) 5 6 5	6 6 (5) 5 5 6	6 6 (5) 5 5 6	6 11 (6) 6 4 5	7 (6) 6 6 5
E	6 6 Debris 6 11	6 6 	6 6 6	6 6 4 6 7	6 6 7 6 6

Build #5

Build #4