RFK

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

April 30, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139-

Dear Mr Kelly:

As you requested on this date I am forwarding the survey data we made to define our problem in the area contaminated by ore unloading operations.

You should have in your files the result of the New York State survey made in December 1981 which resulted in a citation for failure to meet licensing requirements. Your survey may be more accurate than ours.

In order to expedite this matter, I am attaching our internal design memo describing the problem and our alternates for solution This memo should be considered Union Carbide confidential information released to your department in answer to questions which you have raised related to the citation

The detailed cost estimates have been deleted from this copy but are summarized on Page 9 You can see we have adopted the permanent solution alternative requiring the highest expenditure of funds, contrary to the engineers' recommendation In addition, our costs have escalated to $400,000 from the $335,000 estimate in the memo

The information you require for the gamma probes is on Page 3. A drawing of the entire suspect area is enclosed with gamma survey readings on 10 foot centers.

Chemical analysis of "grab" samples were made and a table is displayed converting to pCi/gram. These samples were taken primarily to determine the extent and depth of both thorium and uranium contamination since, at the time, we did not know the source of the original spillage The high thorium is a definite signature that the source was primarily columbium bearing ores

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Table III shows that sampling for chemical analysis was done at depth for the areas displaying the highest surface contamination. Activity decreases dramatically with depth so we are certain we have no long standing problem and a fix can be made

We intend to do in-house monitoring while the work is in progress. We will not complete our efforts until (1) an independent survey is made, and (2) your department conducts it's own survey on the decontaminated area. Our independent surveyors have not as yet been hired but the paper work for purchase and work scope agreements is in preparation We will keep you informed.

Please feel free to call me about our progress or any other details you require. I will continue to send you status reports.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs W C Thurber w/a
L G. Evans
R. A Crago/R E DeWeese - Elkem

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Union Carbide Corporation
Metals Division
Technology Department - Engineering
Niagara Falls, New York

File No. 11309

DESIGN MEMORANDUM
SPONSOR. T. J. KAGETSU

PROJECT. Soil Decontamination - South of Building 166, Niagara

BY L. G. Evans/D. R. Brosnahan

DATE. May 20, 1983

Design Memo No. 1
Revision 0
Subject. Radiological Survey, Cleanup Options and Cost Estimates

1.0 INTRODUCTION

1.1 Scope

To include an engineering evaluation of the alternatives available for disposal of the radioactive contaminants from areas south of Building 166.

1.2 History

The U. S. Department of Energy performed surveys in 1976 to assess the radiological status of facilities utilized under Manhattan Engineer District contract during the period 1943-1946. UCC's Metals Division at Niagara was one of those sites. They discovered contamination South of Building 166 and notified Union Carbide and New York State.

As a result, New York State Department of Labor performed a follow up survey on December 1, 1981 and cited UCC for violation of its New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access to employees

Later, thorium was found to be a major radioactive contaminate indicating that the radiation is unrelated to the Manhattan Engineer Project.

This problem is further complicated by the divestiture of the ferroalloys business and anticipated eventual ownership of the property by Elkem Metals Company.

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2.0 DISCUSSION

2.1 General

All phases of a waste clean up project are directly affected by the quantity of waste to be handled. Therefore, the first priority was to develop a reasonably good estimate of the volume.

A gamma radiation survey was performed over the entire fenced area behind Building 166 to determine the area of involvement excluding areas covered by asphalt or concrete. Soil samples were obtained from several areas and analyzed for % U_3O_8 and % ThO_2. Samples were extracted at various levels in five holes to determine depth of involvement. Samples were also taken to obtain a rough correlation between gamma readings and uranium/thorium content.

2.2 Cleanup Criteria

2.2.1 General

The cleanup criteria is dependent upon the use or future use of the property. New York State Regulations would apply with continuance of license. NRC Regulations would apply for delicensing.

2.2.2 New York State Regulations

NYS requires restriction of access to areas where the radioactive contaminants exceed 500 ppm of source materials. Below 500 ppm radioactive materials can be stored with unrestricted access.

To facilitate a comparison of this limit to the NRC limits a conversion to pCi/gm is made assuming a 2 1 (thorium uranium) ratio. (See calculations attached).

These limits for unrestricted access are the total of the following

$\leq$36 pCi/gm Thorium
$\leq$57 pCi/gm Uranium

These limits are used only for determination of compliance with our license for restricted or unrestricted access.

If the State is approached by UCC for criteria for delicensing they probably will require compliance with NRC Regulations due to Agreement State principles

2.2.3 NRC Regulations

The NRC proposed regulations[1] provide four options for burial and delicensing. A fifth option deals with continuing the license.

[1] Federal Register/Vol. 46 No. 205/Friday Oct. 23, 1981, Notices (attached)

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Option 1 $\leq$10 pCi/gm Thorium and/or 10 pCi/gm Uranium - unrestricted use and delicensing. (Burial not required).

Option 2&3 $\leq$50 pCi/gm Thorium and 40 pCi/gm Uranium - deed amendment and delicense, restricted access by burial with minimum four foot cover. No residential building. Option 2 specifies thorium and Option 3 uranium.

Option 4 $\leq$500 pCi/gm Thorium and 200 pCi/gm Uranium - much more restricted use of the land than Options 2 and 3. No excavation or building.

Option 5 of the Regulation deals with on-site storage of higher concentrations pending the availability of space at an approved repository. No burial is permitted.

2.3 Radiological Survey

2.3.1 Gamma Survey

The survey was performed with a portable gamma ray spectrometer, Model GR-410 manufactured by Geometries Exploranium and detector Model No. GPX-21 employing a sodium iodide thallium activated crystal as a scintillation phosphor.

All of the area south of Building 166 and bounded by the chain link fence was surveyed except areas covered by concrete or asphalt. The actual area surveyed was approximately 26,000 ft.^{2}. Concrete and asphalt cover 63,000 ft.^{2}.

A 10' x 10' grid was established and readings were taken at the intersection points. Extra readings were taken along the west track center line and near the edge of the concrete on both sides.

A resurvey of a 400 ft.^{2} area was done using a 2' x 2' grid to assess the reliability of the general survey The location of this area is shown on Drawing SF-7902 as Detail 1. The data are also displayed in Figure I (attached).

All gamma meter readings were reduced to the number of times background and are reported on Drawing SF-7902

2.3.2 Analytical Survey

Soil Samples - The physical samples were essentially 'grab' samples No systematic sampling technique was used The analytical work was performed by Elkem's laboratory at Niagara Falls. The results are shown in Table III (attached) and on Drawing SF-7902

The chemical analyses of the surface soil samples ranged from 0 006% to 0.40% ThO_2 and from 0.002% to 0.17% U_3O_8.

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2.4 Survey vs Regulations

The following Table I is a comparison of the surface soil sample analyses converted to pCi/g and the gamma radiation readings (times background). Below the table is a guide comparing gamma readings to cleanup or storage criteria. The gamma range is estimated based on the analyses of Table III (attached).

TABLE I

GAMMA X BKG	URANIUM pCi/gm	THORIUM pCi/gm	SAMPLE NO.	CONTAMINANTS PPM
1	3	2	11	20
3	11	11	9	131
5	6	6	8	70
6	11	19	2	210
8	8	22	5	228
9	14	40	1	401
12	26	61	3	650
13	8	12	10	140
17	26	66	4	674
21	42	105	12	1094
26	57	164	14	1664
33	82	201	13	2091
83	466	382	15	4957

GAMMA RANGE	NYS/NRC REQUIREMENTS
1 - 5	Will meet NRC proposed regulations for delicensing and unrestricted land use NRC Option 1 (Sec. 2.3.3) - no burial required.
6 - 9	NYS allows unrestricted access and continue license NRC allows burial and delicensing Options 2 and 3 - burial required
10 - 60*	NYS requires restricted access NRC allows burial and delicensing - Option 4
>60	NYS requires restricted access NRC requires restricted access and storage until space is available at an approved repository, e g , Barnwell, SC.

*Interpolated

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2.5 Contamination Volume

2.5.1 General

The gamma survey, surface and subsurface soil analyses and the guide above are combined to estimate the quantity of material of each class in each area.

The depth of contamination varies throughout the area of involvement, but is generally less than six inches. However, to expedite cleanup, the rails and ties must be removed, requiring a minimum removal depth of eight inches.

2.5.2 High Concentration Area

This area contains material which exceeds NRC burial limits and must be disposed of (eventually) at an approved repository. Gamma readings are above 60 times background. This area is the most heavily contaminated both in radiation level and depth of contamination. Contamination can be found 12 inches below the surface.

Volume = 400 $ft.^2$ x 1 ft. deep = 400 $ft.^3$

2.5.3 Medium Concentration Area

This area contains material which requires restricted access. Gamma readings are 10-60 times background.

Volume = 6400 $ft.^2$ x 2/3 ft. deep = 4267 $ft.^{3*}$

*Approximately 30% of the area found to be low concentration on the general survey (10' x 10' Grid) was found to be medium concentration upon resurvey (2' x 2' Grid). See Drawing SF-7902 or Figure I. This volume is included.

2.5.4 Low Concentration Area

This area contains material which must be removed to delicense but which can remain with unrestricted access under current license Gamma readings are 6-9 times background.

Volume = 2200 $ft.^2$ x 2/3 ft. deep = 1467 $ft.^3$

2.5.5 Summary

The following summarizes the above volumes including a 15 percent contingency

BOX SIZE

High Concentration	- 230 ft^3
Medium Concentration	- 4900 $ft.^3$
Low Concentration	- 1700 $ft.^3$
TOTAL	6830 $ft.^3$

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NOTE: No exploration was done beneath any of the concrete or asphalt pads. The depth of involvement and the location of contamination along the railroad tracks indicates the radioactive materials were spilled during handling from rail cars and contamination under the pads is unlikely.

3.0 DESCRIPTION OF CLEANUP ALTERNATIVES

3.1 Summary

Five cleanup alternatives are considered in this memorandum. The major factors influencing final selection of an alternative are term of solution (short or long), delicensing, property transfer to Elkem, compliance with NYS Regulations, and cost.

Table II below summarizes the alternatives opposite these factors.

TABLE II

ALTERNATIVE NO.	DESCRIPTION	TERM	DELICENSE*	TRANSFER PROPERTY TO ELKEM	COST $000
1	Fence in place	Short	No	No	10
2	Remove & fence on Elkem Property	Short	No	No	65
3	Remove & fence on UCC Property	Medium	No	Yes	120**
4	Remove & bury - UCC Niagara	Long	Yes	Yes	175
5	Remove & ship to repository	Permanent	Yes	Yes	335

* Assumes that this is the only contaminated area in the plant.

**If a concrete pad is available the cost would be $90,000.

3.2 Alternative No. 1 - Fence in Place

Simply enclose the contaminated area thus restricting access.

Requirements - 400 feet of fence.

Advantages - Quick solution to come into compliance with NYS
- Minimum cost.

Disadvantages - Contamination remains requiring future action.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

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3.3 Alternative No. 2 - Remove and Fence on Elkem Property

As mentioned earlier, much of the area South of Building 166 is covered with concrete and asphalt. The material (soil) could be removed and stored on an existing pad in the Southeast corner of the property. The pad and a plastic covering would provide stability and a fence would provide restricted access until final disposal.

Requirements
- Removal of railroad tracks.
- Disposal of scrap and debris**.
- 100 ft. fence required - S & E corner site.
- Concrete/asphalt pad - already available.
- Replacement of railroad track.

Advantages
- Consolidation of contaminants.
- Access can be restricted.
- This work is required for ultimate disposal in any event.

Disadvantages
- Short term solution.
- 1/10 acres of land would not be available for Elkem use.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

**This includes
- Three flat bed railroad cars loaded with induction furnaces.
- Stacks of deteriorating 55 gallon drums.
- Stacked wooden boxes containing steel shot, etc.
- Numerous 5' x 5' x 5' steel boxes.
- Various ladles, furnaces, carbon electrodes, etc.

3.4 Alternative No. 3 - Remove and Fence on UCC Property

The work required here is essentially the same as in 3.3 above. Costs increase and extra care must be taken to avoid contamination of other areas of the plant. However, the property can then be released for transfer to Elkem. An area in the Niagara Plant has been designated by plant personnel for possible use.

Requirement
- Same as 3.3 except more fence and a new concrete pad may be required.

Advantage
- Same as 3.3 except it has the additional advantage of not interfering with Elkem property use. Property can be transferred to Elkem.

Disadvantage
- Medium term solution.

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3.5 Alternative No. 4 - Remove and Bury - UCC Niagara

Burial on Union Carbide owned property was explored for the Marietta TaCb cleanup project. The main problems are finding a suitable burial site, getting State and Local approval, future use or transfer of the burial site is restricted, and long term monitoring of the site is necessary.

Requirements
- Remove and replace railroad tracks.
- Dispose of scrap and debris at approved repository.
- A suitable burial site.
- Containers (55 gallon drums) may be required.
- Dispose of 400 ft.^{3} soil at approved repository.

Advantages
- Long term solution.
- Delicense.

Disadvantages
- Use of the burial site will be restricted - no construction.

3.6 Alternative No. 5 - Remove and Ship to Repository

This alternative is permanent. Once the material is received at the repository, the host state becomes owner and the licensee's accountability ends. However, this is the most expensive alternative.

Requirements
- Remove and replace railroad tracks.
  Disposal of scrap and debris at approved repository.
  Containers.
  Loading system.

Advantage
- Permanent solution.

Disadvantage
- Highest cost.

3.7 Remove and Ship to Uravan

This alternative was selected for the TaCb residue cleanup project in Marietta. The uranium content of the TaCb residue was 0.13% U_3O_8 and processing to recover uranium values was feasible and acceptable to the Colorado Department of Health. The material (soil) analyses at Niagara indicate 0.01% U_3O_8. Therefore, transfer to Uravan cannot be considered.

4.0 COST ESTIMATES

As discussed in Section 2.4, the radiological survey indicates three levels of contamination above NRC delicensing limits. They are 6-9 x BKG (background), 10-60 x BKG and greater than 60 x BKG. Volumes were calculated

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for each area with the thought that some alternatives would not require the removal of the combined total volume but only those areas with the highest concentrations. However, to simplify costings and cost comparison, only the total volume of Section 2.5.5 is considered. All medium and high concentration material requires fencing or removal. The low concentration material adds an additional 25% to the volume, but adds only 10% to the cost. The volume for cost estimating is then 6830 ft.^{3}.

Cost Estimates No. 6342 through 6346 are attached.

Cost Estimate No. 6342	Fence in Place	$ 10,000
Cost Estimate No. 6343	Remove and Fence - Elkem	$ 65,000
Cost Estimate No. 6344	Remove and Fence - UCC Niagara	$120,000
Cost Estimate No. 6345	Remove and Bury - UCC Niagara	$175,000
Cost Estimate No. 6346	Remove and Ship to Barnwell	$335,000

Note. Costs do not reflect removal of debris which is assumed to be Elkem's accountability.

5.0 RECOMMENDATIONS

Removal and relocation of the contaminated soil to the Niagara plant as described in Alternative No. 3 is recommended based on the following:

1. The property will be deeded to Elkem Metals Company.

2. Any restriction to the use of the property behind Building 166, or any potential cleanup liability to Elkem, is unacceptable.

3. EPA and NRC regulatory uncertainties exist concerning burial. (Perpetual maintenance costs are not included in the estimate for Alternative No. 4.) Burial also makes the material unavailable for disposal at an approved repository as discussed below. New York state may ban all burial within the state in the near future.

4. Disposal at Barnwell, SC is too costly and there is reason to believe that a new repository will be opened in the Northeast by 1986 which may reduce the cost of that option.

Any remedial effort must be approved by the State of New York, Department of Labor. For the material to be left on-site, Radioactive Materials License No. 950-0139 must be amended. This amendment or some form of approval should be received prior to the beginning of any cleanup.

TABLE III

SAMPLE NO.	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm — DEPTH IN INCHES									GAMMA X BKg SURFACE
	0	3	6	9	12	15	21	24	26	
1	14/40									9
2	11/19									6
3	26/61									12
4	26/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/<1		<3/2					33
14		57/164		<7/<8		<7/3	7/2		3/3	26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm
THORIUM 37 pCi/gm (See report for calc.)

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

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UMETCO MINERALS CORPORATION
Internal Correspondence

39 Old Ridgebury Road
Danbury, CT 06817

July 7, 1986

To: Messrs.
R. G. Tisch
L. E. Barron

cc: J. F. Frost
D. J. Hansen
F. V McMillen (w/o attach.)

Re: Niagara Falls
Environmental Issues

Gentlemen:

Richard spoke to me regarding Umetco's action plan to address the environmental issues at Niagara Falls identified in the corporate audit. I indicated there is no official detailed action plan but that we are addressing the issues as covered under the Stratcor environmental agreement. I have attached a copy of Schedule A of that agreement as well as numerous memos and reports addressing the various issues. We plan to have a written agreement with Stratcor when each item on Schedule A is complete.

Briefly, the status of the items on Schedule A is as follows:

A. All PCB replacement, retrofitting or disposal etc., has been completed and we are awaiting completion of the three month power test to totally complete this item.

B. The scrubber is complete, has been tested and operated well. A minor modification to a fume hood is needed to totally complete this item and should be done shortly.

C. Complete and acknowledged by Stratcor.

D. Quotes are being obtained for removal of this asbestos as well as asbestos in Bldg. 111, the Niacet boilers and associated piping (Bldg. 4A) and some incidental asbestos in storage. It is expected to let a contract (+ $50M) for that work in 2 or 3 weeks.

E. Complete and acknowledged by Stratcor.

F. More than 50% complete and should be totally complete within one month.

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G. Has been tested as non-hazardous and currently being disposed of in local landfill.

H. Yard has been tested and found to have no hazardous waste and a radioactive survey has been completed and any radioactive material removed.

I. Lake is drained and is currently being filled and graded by El-Tech and Umetco. Should be completed within one month.

J. All radioactive areas have been cleared and cleanup material is being disposed of through appropriate channels and at approved disposal sites. This entire activity including H above has been coordinated with and approved by N.Y. State, with the objective of terminating all radioactive licenses at the old Umetco site. When that is completed will depend upon the states' schedule.

If you have any questions about the attachments or other issues please contact me. We will forward copies of the completion acknowledgements with Stratcor for all Schedule A items when they are completed.

Very truly yours,

D. G. Millenbruch

DGM:er
0069e

UCCNHT0000561

Schedule A

Niagara Falls, New York

Description of the Work

Work to be Done	Estimated Cost M$	Estimated Completion Date
A. Replace, retrofill or dispose of PCB containing transformers, capacitors and dispose of cleanup materials.	200-250	8/86
B. Complete halide scrubber.	100	8/86
C. Dispose of chrome oxide	8-10	6/86
D. Remove globar elevator asbestos.	12-15	8/86
E. Dispose of hi antimony tungsten.	15-25	10/86
F. Dispose of sample cans	15-25	10/86
G. Sample, test and dispose of, if necessary, supersucker dust.	5-75	10/86
H. Yard area sampling and cleanup, if necessary.	25- ? (big)	3/87
I. Drain and fill Lake Linde	25-50	12/86
J. Clean up radioactive areas of plant.	25-50	8/86

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D. G. MILLENBRUCH—EXT 4538
DANBURY
H1378

5/13

+ return

Frank — in sections A + B where Don says we will use Cleanup + slag as fill — Don has now talked to Kelly's boss Mr Bradley + has agreed to dispose of material in a local hazardous waste disposal site — which I believe is better.

Don

ok Frank

5/16

UNION CARBIDE
OLD RIDGEBURY ROAD, DANBURY, CT 06817

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

MAY 12 1986

May 9, 1986

Mr. Robert F. Kelly
Associate Radiophysicist
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Mr. Kelly:

Thank you for taking the time on Wednesday, May 7, 1986 to discuss with Bob Beverly and me our plans to complete the cleanup of radioactive material found in the Niagara Plant. After my letter of March 25 to you, we obtained samples of the areas in question and submitted these to EDA Instruments Inc. in Colorado for radiochemical analyses. That results shown in Table 1 were the basis for our discussion

I was concerned that we may have been misinterpreting Industrial Code Rule 38 but you kindly gave us a copy of an Inter-Office memo from Dr. Bradley to you dated March 26, 1982 which specified the limits for source material. This memo is appended.

Below I have summarized the topics we discussed and outlined the actions we plan to take.

A. Material from Pit in Building 24

A gamma radiation level of 170 µR/hr prompted us to remove the illmenite sand that had been used to backfill a 9'-6" x 10' concrete pit in Building 24. The pit was much deeper than anticipated and we filled one hundred twenty-five 55-gallon drums before reaching a depth of 9 feet. Subsequently when we received the results of the analyses (Samples 40-6 and 40-7) it was evident that the material contained less than 500 parts per million of combined uranium and thorium. This, coupled with a gamma radiation level well below 250 µR/hr, led to the conclusion that this material did not exceed the "Limits for Uncontrolled Areas" as specified in Table 5 of Code Rule 38. You concurred with this conclusion.

As we discussed, I plan to use this material as partial fill for a low area in the yard east of No. 6 Furnace Building. The pit will be backfilled with fresh soil or sand. However, as agreed, I will not proceed with this plan until after May 15 to allow you time to think more about it and possibly confer with Dr. Bradley.

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B. Slag East of No. 6 Furnace Building

This is what you refer to as the "rock area" in your Investigative Report of March 26 (appended). Since that date we were able to move the slag pile and found that it was the slag itself and not the ground that was radioactive. As we discussed I was puzzled at the relatively high reading of Th-230 in Samples 40-3 and 40-4. Because the Th-230 is in the decay chain of U-238 I would have expected the uranium analyses to be appreciably higher. The explanation is probably that some uranium oxide impurity was inadvertently introduced to a few vanadium aluminum furnace heats and the uranium passed on to the metal and the thorium went with the slag.

As Bob Beverly discussed, although the Th-230 analyses were 299 and 466 ρCi/g, these represent very small quantities of the pure nuclide (1.53×10^{-8} and 2.39×10^{-8} grams of Th-230 per gram of slag). The calculations are included as Appendix 3.

Again, since this material contains much less than .05% source material and the radiation is less than 250 μR/hr it need not be controlled. I also plan to dispose of it as fill in the yard east of Furnace Room 6.

C. Slag and Soil Contamination South of Furnace No. 30

will ship to barnwell

Sample 40-5 was taken from the slag that had been splattered south of Furnace No. 30. Years ago this furnace had been used to prepare ferrocolumbium. As can be seen, the uranium at 389 μg/g is approaching the 500 μg/g limit and the Th-232 at 241 pCi/g is well above the 55 ρCi/g limit. Seventeen (17) 55-gallon drums of material were removed from around the furnace. Samples 41-2 and 41-3 taken after the cleanup are well within the uncontrolled limits:

D. Sample from North of Furnace No. 30

As can be seen from the analyses of Sample 41-1 (Th-232 at 139 ρCi/g) the cleanup was not complete in this area. An additional three 55-gallon drums of material were removed and the gamma radiation dropped from 120 μR/hr to about about 35 to 40 μR/hr. I am convinced we have successfully reduced the radiation to limits for uncontrolled areas. I will defer backfilling until you, as a representative for the Department of Labor, take confirmation samples.

I plan to immediately begin the paper work to secure space and a permit for burial, either at Barnwell, SC or Richland, WA. We will dispose of the material removed from the area surrounding Furnace No. 30 as well as the samples in cans that you refer to in your report of March 1986.

UCCNHT0000565

As you know, we are quite anxious to obtain the results of the wipe tests and soil samples taken on Elkem property that hopefully will allow termination of License 210-0090 and License 950-0139. I was pleased to hear that you will have them designated as top priority and will communicate the results to me as soon as you obtain them.

Again I want to thank you for a very pleasant and helpful meeting.

Very truly yours,

Donald J. Hansen

cc: Mr. R. G. Beverly
Mr. F. V. McMillen

mau/369h
Attachments

BLIND COPIES: Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch
R. L. Miller
W. D. Smith
C. T. Wentzel

UCCNHT0000566

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

	Sample No.	Description	Analyses: URANIUM SERIES Uranium µg/g	URANIUM SERIES Th-230 pCi/g	THORIUM SERIES Th-232 pCi/g	THORIUM SERIES Th-228 pCi/g	Gamma Radiation µR/hr*
Book 2446		Code Rule 38 Limit	[500]	**	[55]	***	[250]
A	40-6	Bldg. 24 (VA1) Top of Pit	28.9	12±2	16±2	17±2	170
	40-7	Bldg. 24 7' Depth in Pit	44.3	22±2	37±2	39±3	150
B	40-3	Dark Slag-Yard East of Fce. Bldg.	20.2	299±7	16±2	40±9	150
	40-4	Light Slag-Yard East of Fce. Bldg.	18.6	466±9	37±3	14±2	200
C	40-5	Slag Before Digging South of Furnace 30	389	186±6	241±7	241±7	200-420
	41-2	Sample in Front of Fce. 30 After Cleanup	68.4	19±2	35±3	35±3	40
	41-3	Sample from Southwest of Furnace 30 After Cleanup	24.9	6.2±1.1 5.9±1.1	9.6±1.3 8.5±1.3	9.5±1.3 9.2±1.33	30
D	41-1	Sample from North Support of Fce. 30 After Cleanup	122	76±4	139±5	145±5	120
		Area of North Support of Fce. 30 After Second Cleanup	-	-	-	-	35-40

*Ludlum Model 19 Micro R Meter - Reading at surface of location where sample was taken.
**pCi/g equivalent to .05% (500 ppm) calculated to be 9.7×10^6
***pCi/g equivalent to .05% (500 ppm) calculated to be 4.1×10^{11}

UCCNHT0000567

APPENDIX 1

NEW YORK STATE DEPARTMENT OF LABOR

INTER-OFFICE MEMORANDUM

To R. Kelly — Date March 26, 1982, Office RHU

From F.J. Bradley — Office RHU

Subject Union Carbide/Niagara Falls

Based on your survey of December 1, 1981 and the attached results, issue supplemental Notice of Inspection Findings and include our survey results. Require clean up to Table 5 limits within a specified time span. Contact Radiation Safety Officer to arrive at mutually agreable clean up time schedule.

Union Carbide's internal memo dated October 31, 1981 confirms our results and that they are aware of their responsibilities. All we need now is a clean up schedule.

Code Rule 38, Table 5 limits are as follows:

U-nat: 200pCi, $\frac{\text{U-nat}}{\text{gram of soil}}$

Th-nat: 55 pCi, $\frac{\text{Th-nat}}{\text{gram of soil}}$

and external surface dose levels
250 $\frac{\mu R}{hr}$ on surface.

We need to rely on their results with mixed U/Th contamination. I circled soil contamination values above 200 pCi/g (assuming all U-nat).

F.J. Bradley, Ph.D.
Principal Radiophysicist

FJB:bd

UCCNHT0000568

APPENDIX 2

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING
65 COURT STREET
BUFFALO, N Y 14202

RAMONA L GALLAGHER
Assistant Commissioner of Labor

INVESTIGATIVE REPORT

Umetco - 47th and Royal Avenues, Niagara Falls

Report prepared by Robert F. Kelly on 25 MAR 86.

Report reviewed by _____ on _____.

On 20 MAR 86 after obtaining soil samples on the Umetco property, Dr. Richard Hanson related to me possible "problem" areas when he performed an external radiation survey of the plant facilities a short time ago.

There are four possible problem areas; all seem minor since external readings almost at contact showed levels at about 3-5 times background.

These are described below:

A) "Rock area" outside Building 24 -- This area shows some potential for a bigger problem; rocks on frozen grounds showed the readings mentioned above. Warmer weather will let facility determine what is under these piles.

B) Number 6 Furnace Room in Building 77 - Area shows slight contamination; its mainly on surface and doesn't seem to be a big problem.

C) Building 24 -- dust near furnace. Again doesn't seem to be a big hazard.

D) Samples in cans -- Now located in caged area in Building 25, they will be shipped as radioactive waste.

As related to Dr. Hansen, samples are to be analyzed in all three areas listed above and results sent to the Department. If within the limits, the Department will resurvey premises to insure compliance with Coderule 38.

Robert Kelly
Associate Radiophysicist

UCCNHT0000569

APPENDIX 3

Conversion of ρCi to g

$$\text{Specific Activity} = \frac{1.13 \times 10^{13}}{TA} \quad \text{curries per gram of pure nuclide}$$

Where T = half life in seconds
A = mass number

For Th-230:

$T = 8.0 \times 10^4$ years $= 8.0 \times 10^4 \times 3.15 \times 10^7 = 2.52 \times 10^{12}$ seconds

$A = 230$

$$\text{Specific Activity per Gram of Th-230} = \frac{1.13 \times 10^{13}}{2.52 \times 10^{12} \times 230} = .0195 \text{ Ci}$$

$$= .0195 \times 10^{12} = 1.95 \times 10^{10} \text{ ρCi}$$

Sample 40-3 299 ρCi/g:

$$\frac{299 \text{ ρCi/g}}{1.95 \times 10^{10} \text{ ρCi/g Th-230}} = 1.53 \times 10^{-8} \text{g Th-230/g}$$

Sample 40-4 466 ρCi/g:

$$\frac{466 \text{ ρCi/g}}{1.95 \times 10^{10} \text{ ρCi/g Th-230}} = 2.39 \times 10^{-8} \text{g Th-230/g}$$

UCCNHT0000570

→ D. R. Brosnahan -166
For your info., I will review with you, after 8/25/80, before responding to Dr. Mott.
CRA

RECEIVED
AUG 7 1980
SHEA DEPT.

Department of Energy
Washington, D.C. 20545

AUG 5 1980

Mr. C. R. Allenbach, Manager
Environmental Health and
Product Safety Affairs
Union Carbide Corporation
4625 Royal Avenue
P.O. Box 579
Niagara Falls, New York 14302

Dear Mr. Allenbach:

Enclosed is a copy of the survey report which we discussed during my recent visit. You will notice that Oak Ridge National Laboratories recommend additional surveys and soil samples at your site due to some readings slightly above background. We cannot conduct these surveys until some time in the future; however, as you suggested, this matter may be expedited and clarified if you would survey the area, take soil samples as recommended in the report, and send them to Oak Ridge National Laboratory. Oak Ridge National Laboratory will provide guidance on sampling techniques. In the interim, please review the survey report and provide us with any comments that you have on the report. If you have any questions or if you have any plans to perform remedial action on the affected area, please contact Mr. Arnold Abriss of my staff at (301) 353-3030.

Sincerely,

William E. Mott

William E. Mott, Director
Environmental and Safety
Engineering Division
Office of Environment

Enclosure

cc: F. Haywood, Oak Ridge National Laboratory

UCCNHT0000571

RECEIVED
AUG 7 1980
SHEA DEPT.

PRELIMINARY SURVEY OF ELECTROMET CORPORATION UNION CARBIDE METALS DIVISION NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

March 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

UCCNHT0000572

ELECTROMET CORPORATION
UNION CARBIDE METALS DIVISION
NIAGARA FALLS, NEW YORK

At the request of the Department of Energy (DOE, then ERDA), a preliminary survey was performed at the Electromet Division of the Union Carbide Corporation plant in Niagara Falls, New York (see Fig. 1), on August 24, 1976, to assess the radiological status of those facilities utilized under Manhattan Engineer District (MED) contract during the period 1943 through 1946. Robert D. Forgeng, Plant Manager, provided information about the contract operations and identified the former site of the one building (a cinder block and wood structure) utilized in the process. C. R. Allenbach and Don Hawkes also provided information as to the building location and project operations. Also, Bill Chyowith, an employee at the plant during the MED contract period, provided information about operational processes and assisted in identifying the location of the building which was demolished about 1958.

The project involved receiving Green Salt (UF_4) in drums from the Linde Air plant at Tonawanda, New York, melting down the Green Salt in induction furnaces, converting it to metal, and then recasting it into ingots of about 110 to 135 kg each. The building was formerly located where Building 166 now stands and just west of Building 163 (see Figs. 2 and 3) which existed at the time of the project. The former process building was constructed of wood and cinder block and was about 18 x 46 m at one end and 14 x 46 m at the opposite end. Waste from the operation was disposed at the Lake Ontario Ordnance Works depot. Residues of dolomite slag liners (MgF_2 slag), uranium chips, and crucible dross associated with the process were shipped to other sites for uranium recovery.

Present Use of Facilities

The building utilized in the MED project was washed, vacuumed, and, in some locations, the concrete floor and some wood platforms were removed (see Report NO4600). Following the project (post-1946), the building was used for zirconium processing from 1947 to 1948, and later titanium was processed prior to demolition. Building 166 (see Fig. 4)

UCCNHT0000573

was constructed on the site of the former process building, and it is currently used by Union Carbide's Metal Division operations.

Results of Preliminary Survey

The preliminary survey was performed by H. W. Dickson of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office (then ERDA). Accompanying Dickson and Thornton during the survey was C. R. Allenbach, Don Hawkes, and Bill Chyowith. Measurements taken at this site included external gamma-ray exposure rates taken at 1 m in height and beta-gamma dose rate taken at 1 cm from the surface. Results of the survey measurements were within background levels with the exception of slightly elevated background with maximum beta-gamma dose-rate readings of 0.1 mrad/hr at a location between Buildings 163 and 166. Survey measurements in sections of the old Union Carbide dump (200 to 300 acres and now owned by Niagara Recycling) located to the north of Pine Avenue (see Figs. 5 and 6) resulted in radiation levels that were not significantly above background levels. It was believed that some of the waste from the process and rubble from the demolition of the old building may have been discarded at this dump.

In view of the near background radiation measurements taken at this site, a comprehensive, formal survey will probably not be required. However, it is suggested as a precautionary measure to (1) obtain further measurements between Buildings 163 and 166 to define extent of elevated readings, (2) obtain a soil sample at location in (1) where maximum β-γ and external gamma measurements are observed, (3) drill core samples in the old Union Carbide dump to determine if any radioactive material has been deposited in this area.

A formal survey of this facility was performed as part of the dismantlement and decommissioning of Electromet by the Health and Safety Division of the AEC on August 11 and 14, 1953. The results of this survey are reported in the attached document.

UCCNHT0000574

R. L. Kirk, Director,
Production Division

September 28, 1953

W. B. Harris, Chief,
Industrial Hygiene Branch, Health & Safety Division

DISMANTLEMENT OF ELECTROMET CO.-CONTRACT NO. W-7405-ENG-14
DECONTAMINATION SURVEY OF AUGUST 11th and 14th, 1953.

SYMBOL: HSH:PBK

A resurvey of contamination was made by the Health and Safety Division in the standby green to metal plant of the Electromet Company, Niagara Falls, New York. This survey was made at the request of Mr. B. F. Fields, Electromet Plant Superintendent and our Administrative Operations and Legal Divisions in order to determine whether the radiation levels are being met before release from commission control.

On the visit of August 11, 1953, it was found that Electromet personnel were in the process of removing wooden structures around the vacuum casting furnaces, piping and other structural equipment. The results of the radiation survey of December 10-12 and the recommendations contained in the memo dated February 3, 1953, to F. M. Belmore from W. B. Harris re Decontamination were reviewed with Mr. Fields. In addition, decontamination procedures for removal of uranium contamination were discussed with plant personnel.

On August 14, 1953, a revisit to the plant was made to determine:

1. The degree of contamination of remaining equipment and the building proper.

2. Need for any additional recommendation for plant cleanup.

PROCEDURES

Direct radiation measurements were taken on all equipment, floors and walls of the plant using Eltronic and Detectron Beta-Gamma survey meters. Smear samples were taken from those locations and equipment at which high smears were found in the December, 1952 survey. The smears were taken over an area of 150 sq. cm. using 1-1/8" Whatman filter paper.

During cleanup operations and the contamination study general air samples were collected on 1-1/8" Whatman #41 filter paper, employing a universal sampler at 20 liters per minute as the basic equipment. The samples were taken in such former operations areas as the graphite burnout, vacuum casting as billet saw areas.

UCCNHT0000575

RESULTS OF SURVEY

Radiation target levels for decontamination have been revised since the December, 1952 survey due to a recommended increase in any beta exposures of five times the previous level. The criteria for decontamination which must be met by any buildings before release by NYOO are now:

1. The average gamma radiation at 3 feet from the floors or walls should not exceed 0.3 mr/hr. The average beta-gamma radiation measured in a like manner should not exceed 1.5 mrep/hr.

2. The maximum gamma radiation measured from the floors or walls should not exceed 0.6 mr/hr. The maximum beta-gamma radiation measured in a like manner should not exceed 3.0 mreps/hr.

3. No gamma radiation measured in contact with the floor should exceed 0.9 mr/hr. The maximum beta-gamma radiation measured in a contact with the floor should not exceed 4.5 mrep/hr.

Due to the nature of the survey instrument employed and the material measured, the field beta gamma intensities must be computed to the actual beta-gamma value using the expression:

$$\beta\gamma \text{ actual} = 2\beta\gamma \text{ Field} - \gamma \text{ Field}$$

The attached table which contains the results of the computed direct radiation measurements and smear samples taken on equipment, walls, floors and other building structures reveals the following:

(a) The highest gamma reading (0.1 mr/hr) was found on the floor of the old graphite burnout area. The concommitant $\beta\gamma$ measurement was only 1.7 mrep/hr.

(b) The highest beta gamma contamination (4.4 mreps/hr) was found on the racine cutting machine #931. Gamma contamination was negligible.

(c) Mechanical saw #1630 was found to be contaminated with 4.0 mreps/nr beta gamma.

(d) A high beta-gamma reading of 5.0 mreps/hr was found on the Lancaster mixer. Gamma contamination was negligible.

UCCNHT0000576

(e) Vacuum casting equipment wooden platforms, and the former green mixing equipment were removed from the building at the time of this survey. This equipment and contaminated wood partitions were checked and found to be uranium contaminated. It was agreed by Mr. Fields and Dr. Spedding, project leader, that the wood partitions would be burned and ashes buried. Other equipment, such as furnace casting equipment and parts was to be sent to LOSA for storage and disposal.

(f) All other equipment was found to meet the radiation target levels.

Of the eleven general air samples taken in the standby green to metal plant during cleanup operations only one sample (117 α d/m/M^3) exceeded the present acceptable level of 70 α d/m/M^3. However, the average general air concentration for the eleven samples was only 18 α d/m/M^3. The following table shows the average high and low general air concentrations found at specific locations:

Location	Concentration d/m/M^3 Average	High	Low	Number of Samples
Center of area 20 ft South of Machine Saw	12	25	2	4
Center of area 10' South vacuum casting area	7	14	3	3
At graphite burnout area	40	117	2	4

α d/m/M^3 = alpha disintegrations per minutes per cubic meter of air.

CONCLUSION

This survey shows that a negligible degree of contamination both to equipment and to building has been measured. Since this contamination study was made during such major cleanup operations as demolition of floor by air hammer, sweeping, etc., and inasmuch as the criteria for uranium contamination has still been met by the plant, it is recommended that the plant be released by the government.

Three pieces of equipment, namely the Racine Cutter, Mechanical Saw and Lancaster mixer found to contain beta-gamma up to 5.0 mreps/hr was scrubbed and sand blasted by Electromet personnel since this survey. Beta-gamma survey measurements by Dr. R. Spedding revealed no reduction in beta-gamma contamination.

UCCNHT0000577

The Electrometallurgical Co., according to Dr. Spedding, intends to use the aforementioned equipment in connection with their own radio metallurgy program. It is recommended that Electromet notify the NYOO they will agree not to sell the contaminated equipment to any third party and will not hold the NYOO responsible for any damage incurred by Electromet personnel in using this equipment.

Att:
Table of Radiation Readings and Smear Results.

cc: J. Quidor, Admin. Op.
J. Maffucci, Prop. Mgmt.
M. Medwin, Asst. Gen'l. Counsel

UCCNHT0000578

TABLE OF DIRECT RADIATION READINGS AND SMEAR RESULTS

Location	Direct Radiation βγ (mrep/hr)	Direct Radiation γ mr/hr	Smear Sample α d/m/sample
Entrance to Lab. 3' level	neg.	neg.	
Entrance to Lab. Floor (Kentile)	.04	neg.	74
Chem. Lab.-Lab Desk near door	.06	neg.	57
Chem. Lab. Cupboard	0.1	neg.	1.8
Chem. Lab. 3' level	neg.	neg.	
Chem. Lab.-Office Floor	.06	0.02	107
Chem. Lab. Office Wall	neg.	neg.	1.1
Corridor in front of Chem. lab. floor	neg.	neg.	
Vicinity Men's room-3' level	neg.	neg.	
Vicinity Men's room-floor	.06	neg.	52
Wall near men's room	0.1	neg.	72
Old graphite area-3' level	.18	neg.	
Old graphite area-floor	1.7	0.1	187
Floor inside graphite burnout area	0.16	.04	10
3' level between vacuum furnace and wall	.07	.03	
Floor between vac. furnace and wall	.55	.04	432
Wall between vac. furnace and wall	.27	.03	234
3' level-Main entrance to plant	.02	neg.	
Floor-Main entrance	.12	neg.	174
Floor around cut-off saw 931	.12	neg.	44
Floor around cut-off saw 1630	.11	.01	38
Saw area 3' level	.04	neg.	
Near storage room 3' level	neg.	neg.	
Near storage room-floor	neg.	neg.	216
Floor under former vac. furnace platform	.75	.05	234
3' level at former vac. furnace platform area	.29	.01	
Buffalo room 3' level	neg.	.01	
Near Buffalo room (floor entrance)	.09	neg.	338
Lancaster Room-3' level	.06	.01	
Lancaster room-Wall	neg.	neg.	
Lancaster room-floor	.09	.01	
Ice crusher room-3' level	neg.	neg.	
Ice crusher room-floor	.18	neg.	
Old GFF furnace	.42	.02	
Vicinity of old GFF furnace	.35	.01	657
Old bomb breakout room-floor	.11	.01	66
Old jolter area of old break-out room-floor	.10	.01	66
Old jolter area of old break-out room-wall	.09	.01	21
Near main entrance of old break-out room-3' level	1.54	.04	
Buffalo room-3' level	0.08	.01	
Buffalo room-floor	1.06	neg.	338

UCCNHT0000579

TABLE OF DIRECT RADIATION READINGS AND SMEAR RESULTS

Name of Item	Govt. No.	Direct Radiation βγ (mrep/hr)	Direct Radiation γ mr/hr	Smear Sample α d/m/sample
Lancaster mixer	--	5.0	neg.	
Mechanical Saw	1630	4.0	neg.	
Racine cutting machine	931	4.4	neg.	
Fire Blanket	481	.12	neg.	
Stretcher	804	0.2	neg.	
Hydraulic lifter	165	2.0	neg.	
Crusher	1025	0.1	neg.	140
Hydrowhirl	483	.8	neg.	36
Truck	1220	.24	.01	291
Piping to Buffalo Forge		.12	.02	41
Buffalo forge	83	.44	.02	283
Buffalo Forge canister		.10	neg.	60

UCCNHT0000580

R. L. Kirk, Director, Production Division — November 9, 1953

W. B. Harris, Chief, Industrial Hygiene Branch,
Health & Safety Division

DISMANTLEMENT OF ELECTROMET COMPANY - CONTRACT NO. W-7405-ENG-14

SYMBOL: HSH:PBK

This is to supplement and to clarify certain doubts in the memo Harris to Kirk dated August 28, 1953, re Electromet Decontamination.

1. The decontamination survey of Electromet was pursuant to Contract AT (30-1)-8-23 and the maximum tolerances as stated in the contract have been met and the property therefore recommended for release to Electromet.

2. It was stated in the memo that radiation target levels for decontamination have been revised since the December, 1952 survey due to a recommended increase in any beta exposure of 5 times the previous level. This does not mean, however, that the property we have released to Electromet exceeded the tolerance levels prescribed and is unsafe.

3. It was not known at the time the August 28th memo was written that the held harmless clause was included in the contract and therefore said clause was referred to in the "conclusion" of the memo.

cc: Asst. Gen. Counsel (Medwin)
J. S. Quidor, Dir., Adm. Op.
J. Maffucci, Adm. Op.

UCCNHT0000581

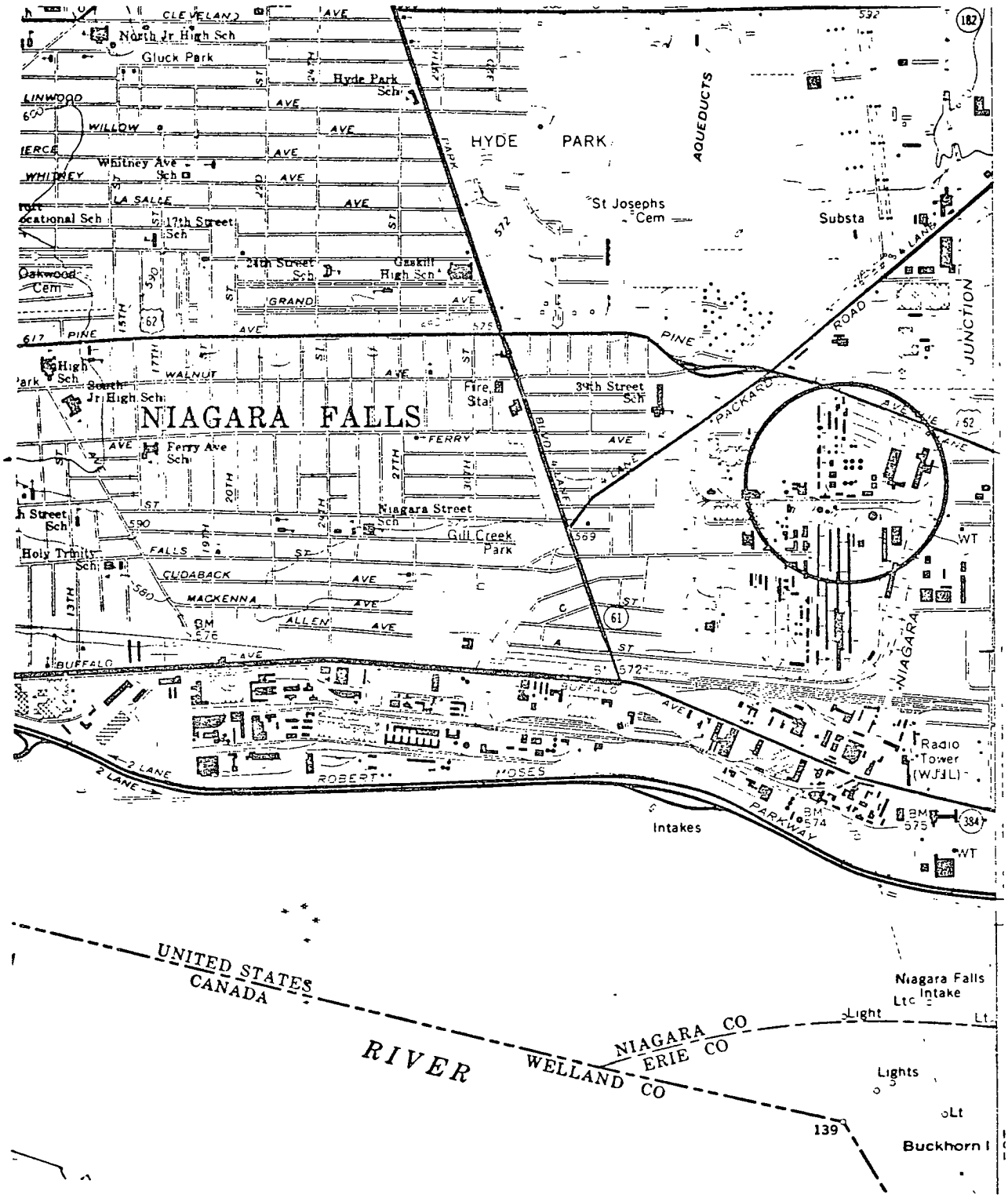

Fig. 1. Location of the Electromet Corporation - Union Carbide Metals Division site in Niagara Falls, New York.

UCCNHT0000582

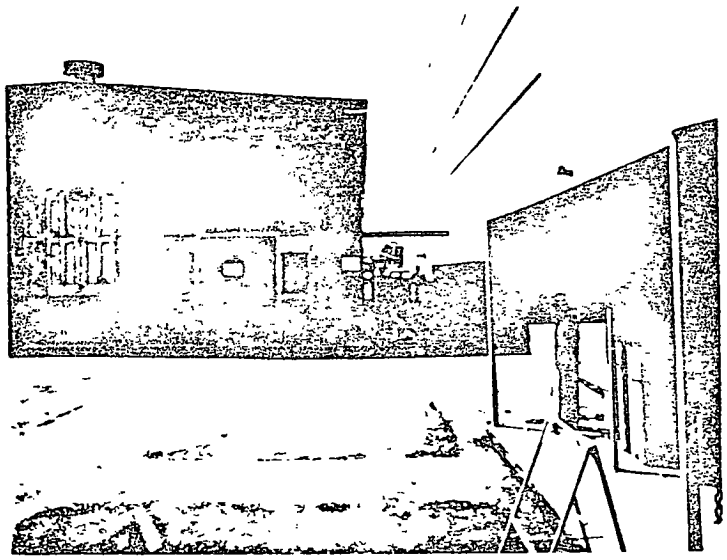

Fig. 2. North end of Building 163 and east side of Building 166.

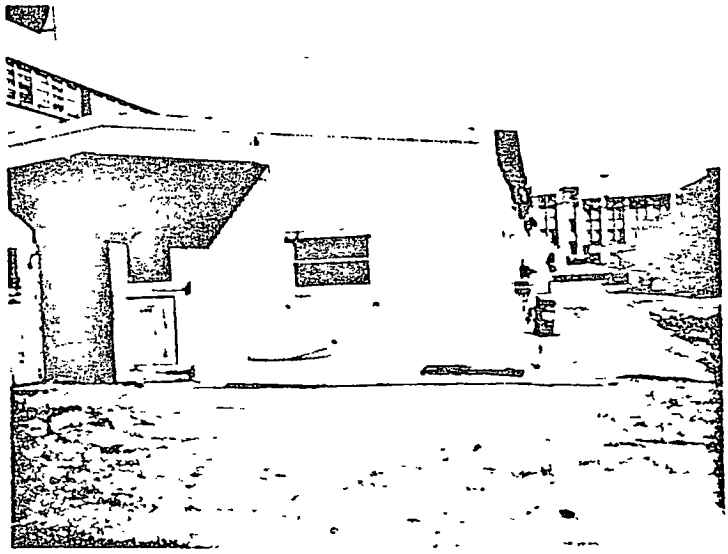

Fig. 3. South end of Building 163 and east side of Building 166.

UCCNHT0000583

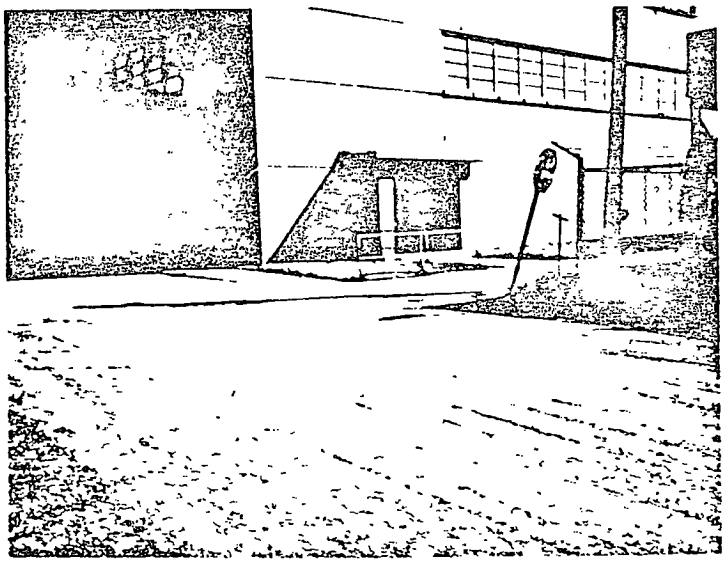

Fig. 4. Building 166.

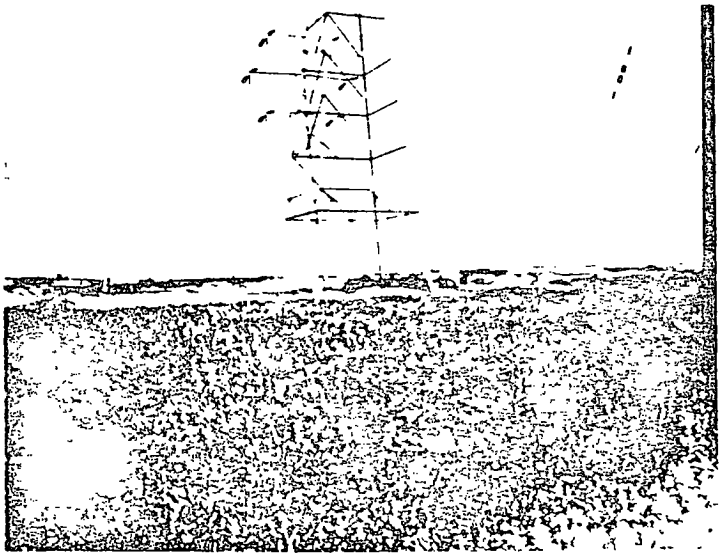

Fig. 5. Old Carbide Dump (now "Niagara Recycling").

UCCNHT0000584

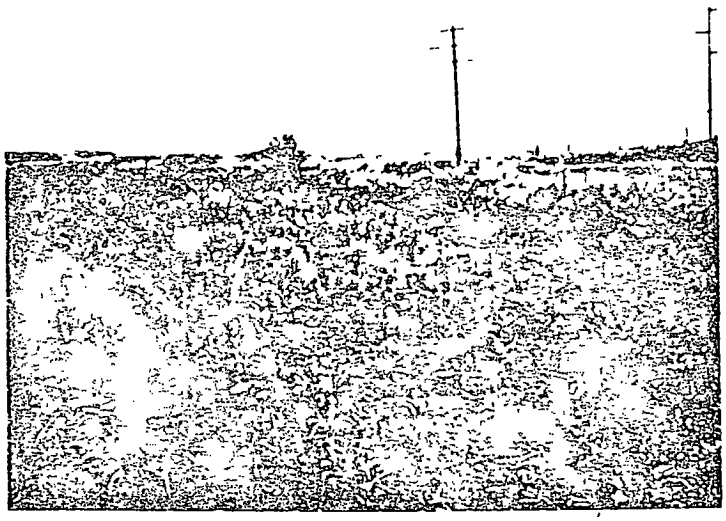

Fig. 6. Old Carbide Dump (now "Niagara Recycling").

UCCNHT0000585

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

MAY 9 1986

May 15, 1986

Dr. F. J Bradley
Principle Radiophysicist
New York State Department of Labor
Room 813
One Main Street
Brooklyn, NY 11202

Subject Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr Bradley

In our phone conversation of Tuesday, May 13 we discussed disposal of two low level radioactive materials that were discovered in a radiation survey of the Umetco property in Niagara Falls, NY. The first was illmenite sand (an iron titanium ore) that had been used to backfill a 10' x 10' concrete pit The second was an isolated quantity of slag (calcium-aluminum oxide) from the furnacing of ferrovanadium The illmenite sand was removed from the pit and currently is contained in 125 (one hundred twenty-five) 55-gallon drums I would estimate total weight at approximately 40 to 50 tons The slag is in lumps in a pile that I would estimate to contain 50 to 75 tons Analyses of the materials are presented in the following Table 1

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

Description	Analyses				
	URANIUM SERIES			THORIUM SERIES	
	Uranium µg/g	Th-230 pCi/g	Ra-226 pCi/g	Th-232 pCi/g	Th-228 pCi/g
Illmenite Sand - Top of Pit	28 9	12±2	19±2	16±2	17±2
Illmenite Sand - 7' in Pit	44 3	22±2	31±3	37±2	39±3
Dark Slag-Yard East of Fce Bldg	20 2	299±7	4 4±1 1	16±2	4±9
Light Slag-Yard East of Fce. Bldg	18 6	466±9	7 0±1 4	37±3	14±2

Industrial Code Rule 38, Table 5 "Limits for Uncontrolled Areas" limits source material to 0 05 percent by weight (500 µg/g or 500 ppm) For Thorium 232 this converts to 55 pCi/g. The concentrations of Th-232 reported in picocurries in Table 1 were converted to µg/g and added to the weight of uranium to determine the total source material present. This is shown in Table 2

UCCNHT0000586

The gamma radiation measured at the surface during excavation of the pit and within the slag pile is also reported in Table 2

TABLE 2

Weight of Source Material

Sample	Uranium µg/g	Th-232 µg/g	Total Source Material µg/g	Gamma Radiation µR/hr*
Illmenite-Top of Pile	28 9	145 5	174 4	170
Illmenite-7' In Pit	44 3	336 4	380 7	150
Dark Slag	20 2	145 5	165 7	150
Light Slag	18 6	336 4	355 0	200

*Ludlum Model 19 Micro R Meter - Reading at Surface

As we discussed the total source material in both materials is less than 500 µg/g, the limit for uncontrolled areas and the radiation is less than 250 µR, the limit for fixed surface contamination

Although technically the material was not sufficiently radioactive to be controlled you convinced me that it was not a good idea to use it to fill a low area in the yard If this were done then a rider would have to be appended to the lease that would restrict future building Since this is not an attractive option I propose to dispose of both the slag and illmenite in a local hazardous waste repository

Unless I misunderstood, you did not voice an objection to this during our phone conversation Therefore, I plan to immediately begin the paper work to initiate this course of action However I will not remove anything from the property before June to allow you time to reconsider. I will not expect to hear from you unless you disapprove

I enjoyed talking to you on Monday and I want to thank you again for the assistance you provided

Sincerely

Donald J Hansen

D. J. Hansen
Assistant Director - Technology

cc: Messrs
R. F. Kelly
R. G Beverly
F. V. McMillen

Blind Copies: Messrs
J F. Frost
T. J Kagetsu
D G. Millenbruch
R. L Miller
W D. Smith
C. T Wentzel

UCCNHT0000587

Dr. D. J. Hansen
Metals Division
Niagara Falls, NY

May 31, 1983

Design Memo No. 1
Radiological Survey, Cleanup
Options and Cost Estimates
File No. 11309

Dear Don:

Attached is Design Memo No. 1 "Radiological Survey, Cleanup Options and Cost Estimates" which was prepared per your request.

As you know, Union Carbide Corporation was cited on December 1, 1981 for violation of it's New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access.

Mr. D. R. Brosnahan, following up on the State's action, on July 7, 1982 requested an extention to their compliance deadline. No response has been received from the state to date.

Identification of the area and depth of involvement was accomplished by a radiological survey of the entire area south of Building 166 and random soil samples.

The results of the survey indicate that a soil volume of 5130 $ft.^3$ requires restricted access for compliance with New York State regulations. An additional 1700 $ft.^3$ must be considered for delicensing and unrestricted use.

The following five alternatives have been considered and cost estimates prepared as a part of the design memo.

Alternative	Description	Cost
1	Fence in Place	$ 95,000
2	Remove & Fence on Elkem Property	180,000
3	Remove & Fence on UCC Property	225,000
4	Remove & Bury - UCC Niagara	250,000
5	Remove & Ship to a Repository	410,000

Shipment to Uravan is not feasible and therefore no cost estimate has been prepared.

UCCNHT0000588

The recommendation is to proceed with Alternative No. 3. The reasons for this choice are:

1. The property behind Building 166 would be decontaminated and available for transfer to Elkem.

2. The cost is relatively moderate.

3. The material is available for implementing Alternative No. 4, "Bury on UCC Property", or Alternative No. 5, "Ship to an Approved Repository", in the future.

4. EPA and NRC regulatory uncertainties exist concerning burial. New regulations may be more favorable.

5. There is reason to believe that a new repository will be opened in the Northeast by 1986 which could reduce the cost of Alternative No. 5.

Far less expense is required for the alternative to "Fence in Place", which is recommended if transfer of property ownership does not change to Elkem Metals Company as expected.

L. G. Evans

LGE/MAU7
Attachment

UCCNHT0000589

STRATCOR

U S VANADIUM CORPORATION • A SUBSIDIARY OF
STRATEGIC MINERALS CORPORATION
137 47TH STREET, NIAGARA FALLS, NEW YORK 14302
TELEPHONE (716) 278 3123

July 30, 1986

Dr. D. J. Hansen
Asst. Director of Technology
Umetco Minerals Corporation
47th Street
Niagara Falls, New York 14303

RECEIVED
JUL 1 1986
D. J. HANSEN

Dear Don:

Re: Niagara Environment

Mr. Wentzel has requested that I respond to your letter of July 1, 1986, concerning the status of the five projects you noted that I was working on. Specific items covered were:

1. Completion of Halides Scrubber - The scrubber per se is now operational and appears to be working satisfactorily when Cells #3 and #5 are "blown back." However, work still needs to be completed on the tank cleaning station which will, in all probability, involve a hood in some form above the tank when it is cleaned. Our Plant Engineering Department under Mr. Wilber, along with Scrufari, is currently working on this phase of the project. In addition to this, it is currently expected that the cleaning station will have to be enclosed. I would anticipate that, by the end of October, this job will have been completed with total costs not exceeding the $100,000 initially budgeted for the project.

2. Disposal of "Supersucker" Dust - Approximately one week ago, I forwarded to you a memorandum noting that, following examination by myself of the area east of C5F and C6F, I believed that the Supersucker dust we had mutually agreed needed removing had been disposed of.

3. Disposal of Sample Cans - Per our discussions this morning, I have turned over to you a complete listing of all materials with accompanying can numbers currently in the Globar cage. In my opinion, this completes STRATCOR's portion of the can disposal project.

UCCNHT0000590

4. Radioactive Sources - The radioactive source cited in your July 1 letter has been forwarded to you and accepted by you for disposal, along with material found to be radioactive in the Globar cage.

5. Radioactive License No. 955-0139 - All information pertaining to your license, including our request for delicensing of the source, has been turned over to you for follow-up.

Very truly yours,

G. P. Parker

GPP:ew

cc.: J. F. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller
C. T. Wentzel

UCCNHT0000591

Umetco Minerals Corporation

APR 29 1986

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To (Name) Mr. J. F. Frost
Umetco Minerals Corporation
Division Grand Junction, CO

Location

Area

Copy to

Date April 24, 1986

Originating Dept TECHNOLOGY

Area

Answering Letter Date

Subject Niagara Radioactivity and Environmental Problems - Niagara

Jack Kagetsu suggested that I send you the enclosed copies of the activity on the radioactivity and environmental problems here at Niagara. In the future I will keep you posted as they develop

D. J Hansen

mau/362h
Enclosures

UCCNHT0000592

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To (Name) Mr D. G Millenbruch
Umetco Minerals Corporation
Division Danbury, CT

Location

Area

Copy to Messrs

R G Beverly/R Jones
L. G. Evans
T. J Kagetsu
F V McMillen
W D Smith

Date April 15, 1986

Originating Dept. TECHNOLOGY

Area

Answering Letter Date

Subject Niagara Plant Radioactive Material License 950-0139

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background

For your convenience, I am appending my letter of March 25, 1986 to Mr R F Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed

In cleaning up the area around No 30 furnace we filled seventeen 55-gallon drums We had Mr William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada The activity suggested the cleanup was not complete

The radiation in Building 24 (V-Al) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite This pit seemed endless; we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet In addition, the pit was found to extend beneath the floor of the V-Al operation

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons Even this amount presents problems in packaging for disposal

UCCNHT0000593

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time The gamma radiation increases from 200 µR/hr at the surface to about 600 µR/hr at a depth of one foot.

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses The sample identification and results are reported in the attached Table 1 Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license. Section 38 11, 38 29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified; all radioactive material must be shipped to an approved recipient; the premises must be decontaminated and surveyed to show decontamination took place; and the survey must be verified by the State Source material (uranium and thorium) must be reduced to 0 05 percent by weight to meet decontamination (This is 500 ppm or 500 µg/g) For non-source material for which we are not licensed, the levels are specific for each element e.g for radium the exempt concentration is 0 1 pico currie per gram

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in µg/g) 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm). Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination Looking at samples from each of the areas

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance We have made no attempt to determine the amount of soil that is contaminated

Slag Pile East of No 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226 The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally). This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag This falls into the category of non-licensed material and possibly we need a ruling on it.

Furnace No 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium

Sample 41-1 tells us we have more cleanup to do around the north furnace support This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports

UCCNHT0000594

TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY: EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34.7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33 8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No 6 Furnace Building	4 4±1 1	20.2	16±2	299±7	4.0± 9	17±2
2446-40-4	Light Slag - East of No. 6 Furnace Building	7 0±1 4	18 6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No 24, V-A1	19±2	28 9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No 24, V-A1	31±3	44 3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No 30 After Cleanup	42±3	68 4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No 30 After Cleanup	43±3	24 9	9 6±1 3 8 5±1 3	6 2±1 1 5 9±1.0	9 5±1.3 9 2±1.3**	

*Th229 (not positively identified)
**Duplicate Analyses

UCCNHT0000595

Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access

Pit in Building No. 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium However gamma radiation next to a drum will read 150 µR/hr. I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard The pit is still not completely clean with radiation of about 50 µR/hr above the pit and about 150 µR/hr. at the surface 9 feet down Background is about 9µR/hr.

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use. I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation

We are faced with the decision on how to proceed (1)Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc and would be unable to sell the property, (2)Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R F Kelly

Hopefully we can tackle this on your planned visit next week

Sincerely,

D J Hansen

mau/357h
Attachments

UCCNHT0000596

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr. Kelly

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No 950-0139.

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed

The location of the radioactivity and the levels of radiation observed are shown in Table I

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg 29 (#6 Fce Rm)	5-10 µR/hr		
	- I-beam south of 30 Fce		200 µR/hr.	20
	- Trunion support north of 30 Fce.		420 µR/hr	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr		
	- Area below dust collector		170 µR/hr	15
2/20/86	Yard East of #6 Fce. Rm	8-12 µR/hr		
	- 6' x 6' Areas near slag pile		200 µR/hr	20
2/20/86	Yard East of #6 Fce. Rm			
	- 2' x 2' area near Bldg 191		210 µR/hr	20

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The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984. (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986).

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce. Rm #6)	5-10 µR/hr	Area next to Fce 30 above background
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr.	Some sample cans >1mR/hr
	32 (#2 Packing)	8-10 µR/hr	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr	Area below Dust Coll above background
2/20/86	(Storage Shed N W. Corner of Umetco Property)	8-12 µR/hr	OK
2/25/86	7 (Storeroom)	8-10 µR/hr.	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr.	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr	OK
2/27/861	13, 14 (Aux Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr	OK
3/14/86	111 (Eng Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg)	7-8 µR/hr.	OK

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The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4 Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority

If you need more information please contact me If I do not hear from you I will proceed according to the plan outlined above

Very truly yours,

D J. Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G Millenbruch
R. C. Smith
R. G Tisch
C. T Wentzel

UCCNHT0000599

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38 11 Duration of licenses Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38 12 Renewal of licenses An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38 13 Amendment of licenses A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38 14 Suspension or revocation The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38 15 Additional requirements Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

UCCNHT0000600

timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38 27 Enclosed controlled areas Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38 28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38 29 Vacating installations and property (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferree or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

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TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits

(1) Alpha emitters

(i) Removable	$\frac{15\ pCi}{100\ cm} = \frac{33\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{45\ pCi}{100\ cm^2} = \frac{100\ dpm}{100\ cm^2}$	maximum
(ii) Total (fixed)	$\frac{450\ pCi}{100\ cm^2} = \frac{1000\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{2250\ pCi}{100\ cm^2} = \frac{5000\ dpm}{100\ cm^2}$	maximum
	$0\ 25\ \frac{mrem}{hr}$ at 1 cm	

(2) Beta-Gamma emitters

(i) Removable (all beta gamma emitters except Hydrogen 3)	$\frac{100\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{500\ pCi}{100\ cm}$	maximum
Removable (Hydrogen 3)	$\frac{1000\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{5000\ pCi}{100\ cm^2}$	maximum
(ii) Total (fixed)	0 [illegible]	surface

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

UCCNHT0000602

TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

UCCNHT0000603

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 ($T_{1/2}$ = 9 2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0000604

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

UCCNHT0000605

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

UCCNHT0000606

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

** μc/gm for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2, the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41, Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides, the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed "one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \leq 1$$

UCCNHT0000607

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To [Name] Mr. F. V. McMillen
Division Umetco Minerals Corporation
Danbury, CT

Location

Area

Copy to

Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch

Date July 2, 1986

Originating Dept TECHNOLOGY

Area

Answering Letter Date

Subject Environmental at Niagara

On Wednesday, June 25, 1986, Jack Kagetsu and I met with Don Millenbruch to bring him up-to-date on the environmental and other issues in which we are involved. This letter is intended to give you the status of the activities at Niagara Falls; Jack Kagetsu will report on the other locations.

I am enclosing the "hand-out" that was used as the basis of our discussion. It contains both the status summary and proposed action. In addition, I am enclosing Schedule A which lists those items addressed in the "Environmental Agreement (Niagara Falls)" between Stratcor and Umetco which was also used in our discussion with Don.

The following comments pertain to decisions made at the meeting and to information received since June 25.

1. I have received the Transportation Permit Number from the South Carolina Department of Health and Environmental Control. I can now proceed to make arrangements for disposing of the radioactive material through Chem Nuclear.

2. Disposal of the "Super Sucker" dust was discussed. It appeared that Stratcor, by asking SCA to bid on the disposal, was treating the material as a hazardous waste. This would cost us more for disposal. I have sent you a copy of a letter to George Parker that addresses this and other items.

3. Since the 25th we have received the second bid to remove the asbestos from the Niagara Plant. This bid was for $88,000 (Frontier Insulation Contractors) compared to the $49,700 (Niagara Insulations). Unfortunately neither bid included the approximately 900 feet of 8-inch steam line which is supported on a rack which carries the pipe from Niacet to where it enters the ground. Rebids have been requested.

UCCNHT0000608

4. Don Millenbruch said that a cash flow analysis would not justify removal of the boilers from the building on Niacet property. Therefore it was decided to only arrange for dismantling of the two stacks. Because one of the guy wires is broken it was suggested that we proceed with this at once.

5. Craig Wentzel and I have discussed filling in the pond east of No. 6 Furnace Room (Linde Lake) . We have not agreed to a satisfactory plan at this time.

6. It was decided that as each item is completed I would draft a letter to Stratcor (or Elkem) which they would sign signifying the work was completed to their satisfaction. These letters would be included in the appropriate files.

I will keep you posted on the progress of the various items.

D. J. Hansen

mau/
Enclosures

UCCNHT0000609

June 25, 1986

STATUS OF ENVIRONMENTAL, RECLAMATION AND TECHNICAL PROBLEMS AT THE NIAGARA FALLS FACILITY

D. J. Hansen

1.0 TERMINATION OF RADIOACTIVE LICENSE

1.1 License 210-0090 (Technology) Radioactive Sources

Status: All radioactive sources, Thorium chemicals and crucibles, have been disposed of. Letter to New York State Department of Labor, with accompanying documentation, requesting termination of the license were mailed to Dr. Kasyk on February 7, 1986. Robert Kelly visited the site and took wipe tests on February 28, 1986.

Action: Inform Elkem Metals of wipe test results when available.

1.2 License 950-0139 (Plant) Processing Columbite Ores

Status: Contaminated soil south of Building 166 on the Technology Complex was sent to Barnwell, SC and Uravan, CO. - Letter documenting receipt of material and requesting termination was mailed to Robert Kelly on August 17, 1985. A second request for termination was made to Dr. Bradley on January 31, 1986. Robert Kelly attempted to obtain confirmation samples on February 28, 1986 but was unsuccessful due to the ground being frozen. He returned on March 20, 1986 and successfully obtained samples of the area.

Action: When State completes analysis of the samples we will be able to proceed with reclamation of the area (see Elkem below). However the license may not be terminated until additional radioactive waste is disposed of (see radioactive waste below.)

1.3 License 955-0139 (Plant) Radioactive Sources

Status: Cs source for Bin Level indicator was returned to the manufacturer in 1st half of 1985 by George Parker. State was notified.

Action: License still in Umetco's name. Should request a wipe test be completed to assure termination of License. (Note: Stratcor still has a source to calibrate VAl X-ray unit).

UCCNHT0000610

2.0 RECLAIM ELKEM PROPERTY

Status: R. J. Klotzbach wrote a letter to John Oxaal on August 6, 1984 agreeing to re-excavate areas behind Building 166, install permeable liner, and backfill with gravel.

Action: When State gives the okay to allow unrestricted use of the area the above work should be contracted and completed. A letter should be written to Elkem indicating our intentions.

3.0 REMOVE LOW LEVEL RADIOACTIVE WASTE FROM NIAGARA SITE

3.1 VAl Slag - East of No. 6 Furnace Room

Status: 75.5 tons of material was sent to the SCA Hazardous Waste Disposal Site on June 18, 1986 at a cost of $179/ton = $13,500.

Action: (a) Letter to NY State Department of Labor with documentation.
(b) Later in the year the NY State Hazardous Waste Tax must be paid.

3.2 Radioactive Illmenite

Status: One hundred thirty (130) 55-gallon drums of illmenite was sent to SCA on June 19 and 20, 1986 at a cost of $14,200.

Action: (a) Letter to NY State Department of Labor with documentation.
(b) Later in the year the NY State Hazardous Waste Tax must be paid.

3.3 Slag and Soil from No. 30 Furnace plus Radioactive Samples

Status: A check for $500 along with a Proof of Liability was sent to the State of South Carolina to obtain a Transportation Permit. Paper work was initiated to alter the UCC Contract with Chem Nuclear Systems Inc. to enable them to act as brokers for this work.

Action: After the Transportation Permit is obtained, arrange for Chem Nuclear to send a Broker to Niagara Falls (probably mid-August) to prepare the material for transport to Barnwell. Forward documentation of receipt of the material to the New York State Department of Labor.

UCCNHT0000611

4.0 ESTABLISH BASELINE ENVIRONMENTAL CONDITION OF YARD - EAST AND NORTH OF THE NIAGARA PLANT

4.1 Radiation Survey

Status: Memo issued May 15, 1986.

Action: None required.

4.2 Soil Sample Analysis

Status: Nine composite soil samples were analyzed for EP Toxicity, 13 Priority Pollutants, and PCB's. A memo was issued June 15, 1986.

Action: None required.

4.3 Lake "Linde"

Status: Water samples were analyzed. V. L. Gustavson was informed in a letter dated April 23, 1986 that the quality was okay. Samples of silt from the lake bed showed no pollution (memo June 15, 1986).

Action: L-Tec has begun to grade the area with fill from higher ground. Arrangements must be made to drain the section on Umetco property and to grade in conjunction with L-Tec.

5.0 ASBESTOS REMOVAL

Areas include Elevator Shaft, Building 111, old Boiler House and Storeroom for asbestos.

Status: Bids have been solicited. Two have responded.

Niagara Insulations - $49,700.
Frontier - Pending

Action: Arrange and supervise removal by low bidder.

6.0 REMOVAL OF STACKS AND BOILERS FROM NIACET

Status: Quote from Niagara Insulations to remove and scrap two boiler stacks was $1,400.

Quotation on boiler removal is pending.

Action: To arrange and supervise removal. (Note: One guy wire has snapped and the removal of the stack should proceed immediately.)

UCCNHT0000612

7.0 SURPLUS EQUIPMENT

7.1 Laboratory Equipment and Office Equipment

Status: Equipment and office supplies stored in Building 111 and the garage was let for bids on "take all, as is, where is" basis. J. Mercer of Buffalo agreed to $10,000 for equipment but dropped to $3000 after learning that the high bidder had withdrawn. Investment Recovery decided not to accept.

Action: Continue to cooperate with Investment Recovery.

7.2 Surplus Automobiles

Status: Requested forms from Investment Recovery.

8.0 PATENTS

Status: Transfer of patents to Stratcor is completed. Patent Applications on Roasting and Heap Leaching of UCAR Vanadium Ore have been written and submitted.

Action: Prepare final draft of Patent Application on "Burning Flexicoke" in conjunction with N. Balmer in early July. Answer objections from Patent Examiner on above and recent application by D. O. Skiles.

9.0 FILES

9.1 Technology Technical Files

Status: Personal files (Niagara and Grand Junction) and Marketing and Sales Development departmental files have been combined according to topic.

The uranium section has been incorporated into the Niagara Falls Technology files and is boxed for shipment to Grand Junction.

Action: Gold and silver will be completed and boxed by July 15. Vanadium and tungsten require considerable work.

9.2 Active Files

Status: Files on environmental and radioactive licenses are still on-going.

Action: Files must be maintained until license termination and then should be transferred to J. Frost at Grand Junction.

UCCNHT0000613

Schedule A

Niagara Falls, New York

Description of the Work

Work to be Done	Estimated Cost M$	Estimated Completion Date
A. Replace, retrofill or dispose of PCB containing transformers, capacitors and dispose of cleanup materials.	200-250	8/86
B. Complete halide scrubber.	100	8/86
C. Dispose of chrome oxide Completed!	8-10	6/86
D. Remove globar elevator asbestos.	12-15	8/86
E. Dispose of hi antimony tungsten. Completed	15-25	10/86
F. Dispose of sample cans	15-25	10/86
G. Sample, test and dispose of, if necessary, supersucker dust.	5-75	10/86
H. Yard area sampling and cleanup, if necessary. Completed	25- ? (big)	3/87
I. Drain and fill Lake Linde	25-50	12/86
J. Clean up radioactive areas of plant.	25-50	8/86

Clean Up Complete
Disposal of Radioactive material pending

UCCNHT0000614

Copy FAR OK

UNION CARBIDE **INTERNAL CORRESPONDENCE**

METALS DIVISION • P O BOX 579 4625 ROYAL AVE , NIAGARA FALLS, NEW YORK 14302

To (Name) Dr. D. J. Hansen
Division
Location NIAGARA

Date June 17, 1982
Originating Dept Minerals Technology
Answering letter date

Copy to Messrs. R. G. Beverly
L. G. Evans
T. K. Kagetsu
R. J. Klotzbach
F. T. Temple
R. G. Woolery

Subject Technology Decontamination Requirements

In pursuing the State of New York for more of their radiological analyses, I have learned that in fact all nine areas sampled behind Bldg. 166 are out of compliance - not just the four cited. The inspector had assumed that the source material was natural uranium, allowing a maximum activity of 200 pCi/g. The source material is thorium, which due to a lower activity per unit weight, must be reduced to 55 pCi/g to be in compliance with the <0.05% (<500 ppm) requirement.

The state's analyses are as follows:

	Gross Activity - Raw pCi's		pCi/g	
Area	Surface	2 - 2-1/2" Deep	Surface	2 - 2-1/2" Deep
1	5.8	9.5	31.4	132.0
2	2.6	41.7	25.4	107.5
3	6.3	9.5	101.1	136.8
4	47.0	15.2	215.9	108.5
5	37.4	6.0	176.3	45.9
6	1400.6	861.2	3413.3	4056.5
7	34.6	35.8	312.3	207.8
8	17.3	72.9	154.7	249.5
9	9.6	16.6	50.6	98.9

Chemical analyses of surface samples I removed from Areas 5 and 8 are as follows:

	% U_3O_8	% ThO_2
Area 5	0.021	0.23
Area 8	0.039	0.48

Spectrographic analyses of these two areas and Area 6 are attached. The Ta, Cb, and Th contents indicate that the contamination is a residue of ferrocolumbium production and not from the former Area Plant.

Listed below are four possible actions which may bring us into compliance with state regulations:

UCCNHT0000615

Case	Action
1	Decontaminate east track to permit track usage requested by Elkem. Relocate residue within west track and Area 6. Fence and post to control access.
2	Decontaminate along both tracks and Area 6. Relocate residue to neighboring UCC property. Fence and post.
3	Decontaminate as in 2. Ship residue to Barnwell, SC for burial.
4	Decontaminate as in 2. Ship residue to Uravan, CO for processing and disposal as tailings.

Case 1 is the least expensive, but also a short term arrangement due to the change in property ownership. Case 2 offers the following: 1) Intermediate term solution allowing time to fully investigate disposal alternatives, including the possibility of a dump in the Northeast necessary by 1986 when present dumps can ban waste from outside states. 2) Frees Technology property for change in ownership. 3) Any additional material, such as may be found during any follow-up surveys, can be handled. This case, however, is subject to approval by the State Department of Labor by amendment of our Radioactive Materials License No. 950-0139 - ,the license authorizing possession of 6000 lb of thorium obtained for ferrocolumbium production.

Cases 3 and 4 would result in a permanent solution, but would be very expensive.

To obtain preliminary cost information, Lee Evans was consulted. Based on an assumption of 2000 cubic feet of contaminated material, the ballpark costs for Case 2 would be on the order of $100,000. Cases 3 and 4 both would be roughly double this figure. The burial costs at Barnwell in Case 3 approximately equal the increased costs of transportation to Uravan for Case 4. Scrap such as railroad ties must go to Barnwell in any event. It must be emphasized that these values are dependent upon the volume to be relocated, which at present is unknown. A program to delineate the surface areas and depths of contamination is necessary for a realistic estimate.

The deadline for cleanup is July 2, 1982, though I was informed by the state inspector that we can request an extention at that time. A statement of our decontamination plan will be appropriate with such a request.

D. R. Brosnahan
Radiation Safety Officer

DRB:jk

Attach.

UCCNHT0000616

OPTICAL EMISSION SPECTROGRAPHIC ANALYSES OF SAMPLES FROM SELECTED AREAS SOUTH OF BLDG 166 - %*

	Al	B	Ba	Be	Ca	Cb	Ce	Co	Cr	Cu	Fe	Ga	Hf	La	Mg	Mn	Mo
Area 5, Surface	2.4	.024	.03	.0024	2.4	.6	.9	.03	2.4	.03	3	.03	.024	.24	2.4	.3	.024
Area 6, Surface	.6	.012	.024	.0024	.6	M	1.2	.012	.12	.006	6	-	.03	.24	.12	.24	-
Area 6, 6" Deep	3	.009	.006	.0012	.6	.6	-	.024	.9	.009	3	-	-	-	M	.12	-
Area 8, Surface	2.4	.03	.06	.0024	2.4	2.4	2.4	.06	.24	.03	3	.06	.03	.24	.6	6	.012

	Na	Ni	P	Pb	Sc	Si	Sn	Sr	Ta	Th	Ti	U	V	W	Y	Yb	Zr
Area 5, Surface	.24	.06	.06	.06	-	M	.6	.03	3	.24	.6	-	.06	.9	.06	-	.24
Area 6, Surface	-	.009	-	.3	.24	2.4	.9	.024	M	2.4	M	2.4	.024	.24	3	.24	.06
Area 6, 6" Deep	.12	.024	-	.09	.024	M	.6	-	M	.24	.6	-	.024	-	.6	.06	.03
Area 8, Surface	.3	.06	.24	.024	-	M	.6	.024	3	.3	.6	-	.06	2.4	.06	-	.6

* The following elements were looked for but not detected: - Ag, As, Au, Bi, Cd, Ge, Hg, In, Ir, Li, Os, Pd, Pt, Re, Rh, Ru, Sb, Te, Tl, Zn.

To include probable error, divide by three for lower limit, and multiply lower limit by ten for upper limit.

Dash indicates none detected; M indicates >10%.

UCCNHT0000617

OCT 6 1986 ⁊ 2.6

Umetco Minerals Corporation

PO BOX 66, 137 47th STREET • NIAGARA FALLS, NEW YORK 14302

October 2, 1986

Mr. C. T. Wentzel
Stratcor
P. O. Box 66
Niagara Falls, NY 14302

Subject: Decontamination of Plant and Disposal of Radioactive Waste

Dear Craig:

I am enclosing a copy of the manifest I received from Barnwell Waste Management Facility (Attachment 1). This acknowledges receipt and disposal of the nineteen 55-gallon drums of radioactive slag and soil from No. 30 Furnace and the one 55-gallon drum containing the radioactive samples from the Globar area. The area immediately adjacent to No. 30 Furnace has been backfilled with crushed stone. An invoice from Dube Construction Company (Attachment 2) requesting payment for the completed job is enclosed.

The low level radioactive ilmenite from the pit in Building 24 and the low level radioactive slag, both of which contained less than .05% combined uranium and thorium, were disposed of by Chemical Waste Management, Inc. on June 18, 19 and 20. Copies of the respective invoices (Attachments 3 and 4) are enclosed. The pit in Building 24 was backfilled with crushed stone by Dube Construction Company on May 21 and 22. The invoice for the completed work (Attachment 5) is enclosed.

This concludes the removal of radioactive material and decontamination of the area within the Niagara Plant. This fulfills Item i of Exhibit E, Environmental Agreement (Niagara Falls) between Umetco Minerals and Strategic Minerals Corporation which reads:

(i) "Plant Buildings. Umetco further agrees to assume the cost of decontaminating the three areas of the plant which have been determined to be radioactive based upon Umetco's radiation survey of the plant."

Would you and Dr. Miller, as members of the Stratcor Environmental Coordination Committee for the Niagara Plant, acknowledge acceptance by signing the second copy of this letter and returning it to me.

Very truly yours,

Donald J. Hansen

ACCEPTED:

STRATCOR

By_____

Title_____

By_____

Title_____

/mau
Enclosures

cc: Messrs:
W. G. Beattie
J. F. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller

UCCNHT0000619

ATTACHMENT 1

BARNWELL WASTE MANAGEMENT FACILITY

Operated by CHEM NUCLEAR SYSTEMS INC
P O Box 726 Barnwell South Carolina 29812
(803) 259 1781
RADIOACTIVE SHIPMENT MANIFEST FORM

(1) GENERATOR NAME Umetco Minerals Corp
ADDRESS 137 47th Street
CITY Niagara Falls STATE NY
CONTACT DJ Hansen PHONE 716 286-4028

(2) consigned to
CHEM NUCLEAR SYSTEMS INC
PO BOX 726 OSBORN ROAD
BARNWELL SC 29812

(3) USE THIS NUMBER ON ALL CONTINUATION PAGES — VOLUME ALLOCATION NO 09-86-254A — PAGE 1 OF 3

CARRIER CNSI ADDRESS Barnwell, SC
TELEPHONE 803-259-1781 SHIPPING DATE 9-19-86
SHIPMENT TYPE Van SHIPMENT SURFACE EXPOSURE <.2 mR/hr
CASK IDENTIFICATION NO USA/ NA
SHIPMENT NO 86-28-25 LINER SERIAL NO NA
DRIVER SIGNATURE M North Craft DATE 9-19-86

(5) TOTAL FOR EACH CLASS NO OF PACKAGES	WEIGHT (POUNDS)	PROPER SHIPPING NAME & HAZARD CLASS (PER 49 CFR 172 101)	ID NUMBER
		Radioactive Material empty packages	UN2908
		Radioactive Material fissile, n.o.s. -Radioactive Material	UN2918
20	13,135	Radioactive Material low specific activity n.o.s. -Radioactive Material	UN2912
		Radioactive Material, n.o.s. Radioactive Material	UN2982
		Radioactive Material, limited quantity n.o.s. Radioactive Material	UN2910
		Radioactive Material special form n.o.s. Radioactive Material	UN2974
		Radioactive Material instruments and articles Radioactive Material	UN2911

(6) SHIPMENT TOTALS

DISPOSAL VOLUME (Cubic Feet)	TOTAL NO OF PACKAGES	ACTIVITY (10CFR20.311) Millicuries: ALL ISOTOPES	TRITIUM	C 14	Tc 99	1 129	SOURCE (Pounds)
150	20	~~2.14~~ 2.1401	NP	NP	NP	NP	32.807

(7) TOTAL SNM

ISOTOPE	GRAMS
U 233	NP
U 235	NP
TOTAL	NP

(8) TOTAL PALLET VOLUME (CU FT) 26.5

(9) MINIMUM % FILL FOR STABILIZATION PROCESS NA

(10) WASTE DESCRIPTION ore, slag, and ferro alloys mixed in soil/cement

(11) PHYSICAL FORM/ SOLIDIFICATION AGENT Solid - 19 drums soil, 1 drum cement

(12) CHEMICAL FORM AND NAME AND % OF CHELATING AGENT(S) OXIDE/ 0% Chel. Agent

(13) WASTE FORM CLASS ☑ AU ☐ AS ☐ B ☐ C

(14) (✓) Yes ( ) No THIS VEHICLE IS CONSIGNED EXCLUSIVE USE LOADING AND UNLOADING MUST BE ACCOMPLISHED BY CONSIGNOR OR CONSIGNEE OR HIS DESIGNATED AGENT

(15) IMPORTANT: This is to certify that the above named materials are properly classified, described, packaged marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

Signature Donald J Hansen
Company Umetco Minerals Date 9/19/86

(16) Certification is hereby made to the South Carolina Department of Health and Environmental Control that this shipment of low-level radioactive waste has been inspected in accordance with the requirements of South Carolina Radioactive Material License No 097 as amended and the Nuclear Regulatory Commission s License No 12 13536-01 as amended and the effective Barnwell Site Disposal Criteria within 48 hours prior to shipment and further certification is made that the inspection revealed no items of non-compliance with all applicable laws rules and regulations

Date 9/19/86 By Donald J Hansen
Title and Organization Consultant
Telephone No (716) 286-4028

CNSI USE ONLY

☑ This material meets all license requirements
☑ This material was disposed of in accordance with license
☐ Discrepancy

Date 9-26-86
Authorized Signature Denis R Niegowski Title H.P. SUP

UCCNHT0000620

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

ATTACHMENT 2

To [Name] Mr. K. E. Forrest
Umetco Minerals Corporation
Division Grand Junction, CO
Location -
Area

Copy to Mr. J. F. Frost

Date October 1, 1986
Originating Dept
Area
Answering Letter Date
Subject Dube Invoice
P. O. No. 250-07126

Dear Ken:

The enclosed invoice from Dube Construction Company is approved for payment. The work covers the backfilling around Furnace No. 30 where radioactive slag had been removed. Hopefully, this is the last time we will require Dube's services.

Regards,

Donald J. Hansen

/mau
Enclosure

UCCNHT0000621

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731-3635

Oct. 1986

Umetco Minerals Corp.
137 47th Street
Niagara Falls N. Y. 14302
Attn Mr. Donald Hansen
P.O. #250-07126

Job location:
#6 Furnace Room

9/12/86	Ticket #6325	
	Truck & driver 3 hrs. @ $32.00 per hr	$ 96.00
	Del. 10 tons of # 2 R.O.C. @ $4.75 per ton	$ 47.50
	Service truck	$ 20.00
	1 labor 3 hrs. @ $14.00 per hr	$ 42.00
	Small tools	N/C
		$ 215.50
	State tax (mat only)	$ 3.33
	Total due	$ 218.83
	Thank You!	

Approved for payment D.J. Hansen

TERMS 2% per month on unpaid balance

UCCNHT0000622

DUBE CONSTRUCTION CO
Truck – Back Hoe – Hylift Service
2267 Lockport Rd Sanborn, N Y 14132
Phones 731 3635 – 731 3616

Umetco 9/12/86

Job Location: #6 Furnance Rd	HOURS
TRUCK 1 TRUCK + DRIVER	3 hrs.
BACK HOE 10 TON 5 TONE	
HYLIFT SERVICE TRUCK + MAN	3 hrs
Small tree	
TOTAL	

DESCRIPTION	LOADS
TOTAL	

DRIVER _____

6325

RECEIVED BY _____

UCCNHT0000623

CHEMICAL WASTE MANAGEMENT, INC.
TECHNICAL SERVICE
P.O. Box 200
Model City, New York 14107

INVOICE

net 30 days

Ref. Cont. #250-07117
INVOICE NUMBER
00556 6/20/86

Umetco Minerals Corporation
Accounting Department
P.O. Box 1029
Grand Junction, Colorado 81502

ATTACHMENT 3

Disposal of 75.69 tons of vanadium slag removed from the Umetco site located at 137 47th St., Niagara Falls, NY on June 18, 1986

Approved for payment
[signature] 7/3/86
Charge # 34523-20301

RECEIVED
JUN 26 1986

REMIT TO ADDRESS
P.O. Box 8000 Dept. 660
Buffalo, NY 14267

PLEASE PAY THIS AMOUNT
$13,548.00

ORIGINAL INVOICE

SCA Chemical Services Inc
Model City Facility
P O Box 200
1550 Balmer Road
Model City New York 14107
716/754-8231

June 20, 1986

UMETCO MINERALS CORPORATION
Accounting Department
P.O. Box 1029
Grand Junction, Colorado 81502

Reference Cont.: #250-07117

Chemical Waste Management wishes to submit an invoice of $13,548.00 for the disposal of 75.69 tons of vanadium slag removed from the Umetco site located at 137 47th Street, Niagara Falls, New York, on June 18, 1986.

Attached please find three weight tickets verifying the tonnage of slag disposal at SCA/Chemical Waste Management, Model City, New York.

Sincerely,

SCA CHEMICAL SERVICES, INC.
MODEL CITY FACILITY

Gary Shirley
Technical Service Manager

GS:sls

JUN 26 1986

SCA CHEMICAL SERVICES, INC.
1550 Balmer Road
P O Box 200
Model City, New York 14107
(716) 754-8231

CUSTOMER UMETCO

GROSS ===75680 LB

WORK ORDER 106733

TARE ===35180 LB

PROFILE F00590

40,500 LB

HAULER Buffalo Fuel

TRUCK NUMBER 348 TRAILER NUMBER D49 NET

SCHEDULE TIME _____

RECEIVING: TIME IN 12.10 TIME OUT 12 15 INITIALS JC

EXPLANATION _____

LAB: TIME IN 1220 TIME OUT 1315 INITIALS AZ

EXPLANATION _____

PROCESSING: TIME IN 1320 TIME OUT 1511 INITIALS

EXPLANATION _____

OTHER: TIME IN _____ TIME OUT _____ INITIALS _____

EXPLANATION _____

DRIVER SIGNATURE J W Lewis DEPARTURE TIME 2.30 pm

PLANT MANAGER SIG. _____ DATE 6-4-86

TOTAL CHARGES TO BE BILLED

BASE PRICE _____

DETENTION (excess time _____) _____

SPOTTING (No. of Days _____) _____

WASHING _____

OFF SPECS ( ) (see attached) _____

OTHER _____

TOTAL _____

RECEIVED JUN 26 1986

CT-230

UCCNHT0000626

SCA CHEMICAL SERVICES, INC.
1550 Balmer Road
P O Box 200
Model City, New York 14107
(716) 754-8231

CUSTOMER Umetco

GROSS ::::72780LB

WORK ORDER 106734

TARE ::::30780LB

PROFILE F60590

42,000 lbs

HAULER BFC

TRUCK NUMBER 6564 TRAILER NUMBER D37 NET

SCHEDULE TIME _____

RECEIVING: TIME IN 12:30p TIME OUT 12 42p INITIALS [illegible]

EXPLANATION _____

LAB: TIME IN 1250 TIME OUT 1315 INITIALS [illegible]

EXPLANATION _____

PROCESSING: TIME IN [illegible] TIME OUT [illegible] INITIALS [illegible]

EXPLANATION _____

OTHER: TIME IN _____ TIME OUT _____ INITIALS _____

EXPLANATION _____

DRIVER SIGNATURE [illegible] DEPARTURE TIME 2.35 pm

PLANT MANAGER SIG. _____ DATE 6/18/86

TOTAL CHARGES TO BE BILLED

BASE PRICE _____

DETENTION (excess time _____) _____

SPOTTING (No. of Days _____) _____

WASHING _____

OFF SPECS ( ) (see attached) _____

OTHER _____

TOTAL _____

JUL -2 1986

RECEIVED
JUN 26 1986

CT-230

SCA CHEMICAL SERVICES, INC.
1550 Balmer Road
P O Box 200
Model City, New York 14107

(716) 754-8231

CUSTOMER Ametco

GROSS ::::98660LB

WORK ORDER 106735

TARE ::::29780LB

PROFILE F60590

68,880 lbs

HAULER BFC

TRUCK NUMBER 333 TRAILER NUMBER D53 NET

SCHEDULE TIME _____

RECEIVING: TIME IN 12 43p TIME OUT 12 47p INITIALS [illegible]

EXPLANATION _____

LAB: TIME IN 12 55 TIME OUT 13 15 INITIALS [illegible]

EXPLANATION _____

PROCESSING: TIME IN [illegible] TIME OUT _____ INITIALS [illegible]

EXPLANATION _____

OTHER: TIME IN _____ TIME OUT _____ INITIALS _____

EXPLANATION _____

DRIVER SIGNATURE [illegible] DEPARTURE TIME 2:55pm

PLANT MANAGER SIG. _____ DATE 6/18/86

TOTAL CHARGES TO BE BILLED

BASE PRICE _____

DETENTION (excess time _____) _____

SPOTTING (No. of Days _____) _____

WASHING _____

OFF SPECS ( ) (see attached) _____

OTHER _____

TOTAL _____

JUL -2 1986

RECEIVED
JUN 26 1986

CT 230

UCCNHT0000628

SCA
CHEMICAL WASTE MANAGEMENT, INC.
TECHNICAL SERVICE
P.O. Box 200
Model City, New York 14107

net 30 days

ALL PAST DUE AMOUNTS WILL BEAR INTEREST AT TWO PERCENT PER MONTH OR THE MAXIMUM RATE ALLOWED BY LAW WHICHEVER IS LESS

Umetco Minerals Corporation
Accounting Department
P.O. Box 1029
Grand Junction, Colorado 81502

CUSTOMER ACCOUNT NUMBER		
P.O. #250-07117		
INVOICE NUMBER	INVOICE DATE	PAGE
00558	6/30/86	

ATTACHMENT 4

Disposal of 125 drums of Illmenite removed from Umetco site located at 137 47th Street, Niagara Falls, New York on 6/19/86 and 6/20/86

RECEIVED
JUL 11 1986

7-21-86

REMIT TO ADDRESS
P.O. Box 8000 Dept. 660
Buffalo, New York 14267

PLEASE PAY THIS AMOUNT
$14,200

(PLEASE RETURN THIS COPY WITH YOUR REMITTANCE)

SCA Chemical Services, Inc
Model City Facility
P O Box 200
1550 Balmer Road
Model City, New York 14107
716/754-8231

June 30, 1986

Umetco Minerals Corporation
Accounting Department
P.O. Box 1029
Grand Junction, Colorado 81502

Dear Sir:

Chemical Waste Management wishes to submit an invoice of $14,200.00 against P.O.#250-07117 for the disposal of 125 drums of Illmenite, (Hazardous Waste Chemical), removed from the Umetco site located at 137 47th Street, Niagara Falls, New York, on 6/19/86 and 6/20/86.

Please do not hesitate to contact me if I can be of further assistance.

Sincerely,

SCA CHEMICAL SERVICES, INC.
MODEL CITY FACILITY

Gary Shirley
Technical Service Manager

GS:sls

JUL 1 1 1986

ATTACHMENT 5

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731-3635

Charge #14523-217-20301

Umeter Minerals Corp.
P.O. Box 66
137 47th St.
Niagara Falls, NY 14320

Job Location
Bldg. #24

5/21/86	Ticket #7312	Truck & Driver 5 hrs @ $25.00 per hr	$ 125.00
		Backhoe w/operator 5 hrs @ $30.00 per hr	150.00
		Deliver 48.66 ton of ROC @ $4.75 per ton	231.14
5/22/86	" #7311	Truck & Driver @$25.00 per hr -5 hrs	125.00
		Backhoe w/operator 8 hrs @ $30.00 per hr	240.00
		1 Labor 8 hrs @ $14.00 per hr	112.00
		Deliver24.31 ton of ROC @$4.75 per ton	115.47
		Tax on material only	24.27
		Total amount due	$ 1122.88

Thank you

approved for payment
6/4/86
RR Sullivan

RECEIVED
MAY 3 (illegible)
PURCHASING DEPARTMENT

TERMS 2% per month on unpaid balance

UCCNHT0000631

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

April 26, 1984

Mr. Robert F Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject Radioactive Materials License 950-0139 - Status Report

Dear Mr Kelly:

The area around the railroad tracks which contains low level radioactive ore contamination has been cleared permitting work to proceed. Clearance of railroad flat cars and other stored materials was completed on April 25, 1984

Detailed engineering for contractor work has begun with the release of engineering funding to an active project on April 17, 1984

Very truly yours,

R J Klotzbach

R. J Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber w/a
L. G. Evans
R E. DeWeese - Elkem w/a

UCCNHT0000632

TECHNOLOGY DEPARTMENT

REQUEST FOR SPECIAL ORDER

Refr'd to _____
For _____
REC'D APR 19 1984 RJK
Noted by _____
File
Subject _____

R&D	
Non-R&D	X

COPIES TJC
RJK

Dept. No.		Project Charge No.
520		20319

TITLE: SDL DECONTAMINATION - SOUTH OF BLDG 166, NIAGARA

SPECIFIC OBJECTIVE. ENSURE CONTAINMENT OF SDL & SHIP TO AK APPROVED FACILITY

$ 33,000 ENGINEERING

Estimated By: EJA

REQUESTED BY: L. [illegible] Date 4/17/84

APPROVED BY: [signature] Date

Accounting Use Only

BUDGET CLASSIFICATION:

CHECKED BY Timothy J Williams Date 4/17/84

INVOICE TO:

CLEAR TO:
84-615-885-10-100

DATE JOB CLOSED

UCCNHT0000633

Niagara Falls, New York
July 13, 1983

Design Memo No. 1

File No. 11309

JUL 16 1983

SUBJECT: Radiological Survey, Cleanup Options and Cost Estimates

DISTRIBUTION:

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NIAGARA FALLS, NY

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D. R. Brosnahan
L. G. Evans
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T. J. Kagetsu
R. J. Klotzbach
D. H. McGuire
C. G. Richardson
P. J. Sitzenstatter
F. T. Temple
R. G. Woolery

UCCNHT0000634

UCC 1403

INTERNAL CORRESPONDENCE

METALS DIVISION • P.O. BOX 97, NIAGARA FALLS, NY

To (Name) Mr. R. J. Klotzbach
Division UCC-Metals Division
Location Niagara Falls, NY

Date July 13, 1983

From (Name) L. G. Evans

Answering letter dated

Copy to See Attached Distribution

Subject Design Memo No. 1
Radiological Survey, Cleanup
Options and Cost Estimates
File No. 11309

Dear Bob:

Attached is Design Memo No. 1 "Radiological Survey, Cleanup Options and Cost Estimates".

Union Carbide Corporation presently is out of compliance with its New York Radioactive Materials License No. 950-0139 due to radioactive source concentrations in excess of 500 ppm behind Niagara Building 166, where access to employees is unrestricted. To identify the area and depth of contamination, the area south of Building 166 was surveyed by Mr. D. R. Brosnahan and the author. The results indicate that a soil volume of 5130 ft.^{3} must be restricted or removed for compliance with New York State regulations. An additional 1700 ft.^{3} must be removed for delicensing and unrestricted use.

The following five alternatives have been considered and cost estimates prepared as part of the design memo.

Alternative	Description	Cost
1	Fence in Place	$ 10,000
2	Remove & Fence on Elkem Property	65,000
3	Remove & Fence on UCC Property	120,000
4	Remove & Bury - UCC Niagara	175,000
5	Remove & Ship to a Repository	335,000

The recommendation is to proceed with Alternative No. 3, based primarily on the condition that the property will be deeded to Elkem Metals Company. The material remains available for implementing Alternative No. 4, "Bury on UCC Property", or Alternative No. 5, "Ship to an Approved Repository", in the future. An R & D effort can also proceed to investigate ways to reduce the volume. Far less expense is required for the alternative to "Fence in Place", which is recommended if property ownership does not change.

L. G. Evans

LGE/dac
Attachments

UCCNHT0000635

Union Carbide Corporation
Metals Division
Technology Department - Engineering
Niagara Falls, New York

File No. 11309

DESIGN MEMORANDUM
SPONSOR: T. J. KAGETSU

PROJECT: Soil Decontamination - South of Building 166, Niagara

BY: L. G. Evans/D. R. Brosnahan

DATE: May 20, 1983

Design Memo No. 1
Revision 0
Subject: Radiological Survey, Cleanup Options and Cost Estimates

1.0 INTRODUCTION

1.1 Scope

To include an engineering evaluation of the alternatives available for disposal of the radioactive contaminants from areas south of Building 166.

1.2 History

The U. S. Department of Energy performed surveys in 1976 to assess the radiological status of facilities utilized under Manhattan Engineer District contract during the period 1943-1946. UCC's Metals Division at Niagara was one of those sites. They discovered contamination South of Building 166 and notified Union Carbide and New York State.

As a result, New York State Department of Labor performed a follow up survey on December 1, 1981 and cited UCC for violation of its New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access to employees.

Later, thorium was found to be a major radioactive contaminate indicating that the radiation is unrelated to the Manhattan Engineer Project.

This problem is further complicated by the divestiture of the ferroalloys business and anticipated eventual ownership of the property by Elkem Metals Company.

UCCNHT0000636

2.0 DISCUSSION

2.1 General

All phases of a waste clean up project are directly affected by the quantity of waste to be handled. Therefore, the first priority was to develop a reasonably good estimate of the volume.

A gamma radiation survey was performed over the entire fenced area behind Building 166 to determine the area of involvement excluding areas covered by asphalt or concrete. Soil samples were obtained from several areas and analyzed for % U_3O_8 and % ThO_2. Samples were extracted at various levels in five holes to determine depth of involvement. Samples were also taken to obtain a rough correlation between gamma readings and uranium/thorium content.

2.2 Cleanup Criteria

2.2.1 General

The cleanup criteria is dependent upon the use or future use of the property. New York State Regulations would apply with continuance of license. NRC Regulations would apply for delicensing.

2.2.2 New York State Regulations

NYS requires restriction of access to areas where the radioactive contaminants exceed 500 ppm of source materials. Below 500 ppm radioactive materials can be stored with unrestricted access.

To facilitate a comparison of this limit to the NRC limits a conversion to pCi/gm is made assuming a 2:1 (thorium:uranium) ratio. (See calculations attached).

These limits for unrestricted access are the total of the following:

$\leq$36 pCi/gm Thorium
$\leq$57 pCi/gm Uranium

These limits are used only for determination of compliance with our license for restricted or unrestricted access.

If the State is approached by UCC for criteria for delicensing they probably will require compliance with NRC Regulations due to Agreement State principles.

2.2.3 NRC Regulations

The NRC proposed regulations[1] provide four options for burial and delicensing. A fifth option deals with continuing the license.

[1] Federal Register/Vol. 46 No. 205/Friday Oct. 23, 1981, Notices (attached).

UCCNHT0000637

Option 1 ≤10 pCi/gm Thorium and/or 10 pCi/gm Uranium - unrestricted use and delicensing. (Burial not required).

Option 2&3 ≤50 pCi/gm Thorium and 40 pCi/gm Uranium - deed amendment and delicense, restricted access by burial with minimum four foot cover. No residential building. Option 2 specifies thorium and Option 3 uranium.

Option 4 ≤500 pCi/gm Thorium and 200 pCi/gm Uranium - much more restricted use of the land than Options 2 and 3. No excavation or building.

Option 5 of the Regulation deals with on-site storage of higher concentrations pending the availability of space at an approved repository. No burial is permitted.

2.3 Radiological Survey

2.3.1 Gamma Survey

The survey was performed with a portable gamma ray spectrometer, Model GR-410 manufactured by Geometries Exploranium and detector Model No. GPX-21 employing a sodium iodide thallium activated crystal as a scintillation phosphor.

All of the area south of Building 166 and bounded by the chain link fence was surveyed except areas covered by concrete or asphalt. The actual area surveyed was approximately 26,000 ft.^{2}. Concrete and asphalt cover 63,000 ft.^{2}.

A 10' x 10' grid was established and readings were taken at the intersection points. Extra readings were taken along the west track center line and near the edge of the concrete on both sides.

A resurvey of a 400 ft.^{2} area was done using a 2' x 2' grid to assess the reliability of the general survey. The location of this area is shown on Drawing SF-7902 as Detail 1. The data are also displayed in Figure I (attached).

All gamma meter readings were reduced to the number of times background and are reported on Drawing SF-7902.

2.3.2 Analytical Survey

Soil Samples - The physical samples were essentially 'grab' samples. No systematic sampling technique was used. The analytical work was performed by Elkem's laboratory at Niagara Falls. The results are shown in Table III (attached) and on Drawing SF-7902.

The chemical analyses of the surface soil samples ranged from 0.006% to 0.40% ThO_2 and from 0.002% to 0.17% U_3O_8.

UCCNHT0000638

2.4 Survey vs Regulations

The following Table I is a comparison of the surface soil sample analyses converted to pCi/g and the gamma radiation readings (times background). Below the table is a guide comparing gamma readings to cleanup or storage criteria. The gamma range is estimated based on the analyses of Table III (attached).

TABLE I

GAMMA X BKG	URANIUM pCi/gm	THORIUM pCi/gm	SAMPLE NO.	CONTAMINANTS PPM
1	3	2	11	20
3	11	11	9	131
5	6	6	8	70
6	11	19	2	210
8	8	22	5	228
9	14	40	1	401
12	26	61	3	650
13	8	12	10	140
17	26	66	4	674
21	42	105	12	1094
26	57	164	14	1664
33	82	201	13	2091
83	466	382	5	4957

GAMMA RANGE	NYS/NRC REQUIREMENTS
1 - 5	Will meet NRC proposed regulations for delicensing and unrestricted land use. NRC Option 1 (Sec. 2.3.3) - no burial required.
6 - 9	NYS allows unrestricted access and continue license. NRC allows burial and delicensing. Options 2 and 3 - burial required.
10 - 60*	NYS requires restricted access. NRC allows burial and delicensing - Option 4.
>60	NYS requires restricted access. NRC requires restricted access and storage until space is available at an approved repository, e.g., Barnwell, SC.

*Interpolated

UCCNHT0000639

2.5 Contamination Volume

2.5.1 General

The gamma survey, surface and subsurface soil analyses and the guide above are combined to estimate the quantity of material of each class in each area.

The depth of contamination varies throughout the area of involvement, but is generally less than six inches. However, to expedite cleanup, the rails and ties must be removed, requiring a minimum removal depth of eight inches.

2.5.2 High Concentration Area

This area contains material which exceeds NRC burial limits and must be disposed of (eventually) at an approved repository. Gamma readings are above 60 times background. This area is the most heavily contaminated both in radiation level and depth of contamination. Contamination can be found 12 inches below the surface.

Volume = 400 $ft.^2$ x 1 ft. deep = 400 $ft.^3$

2.5.3 Medium Concentration Area

This area contains material which requires restricted access. Gamma readings are 10-60 times background.

Volume = 6400 $ft.^2$ x 2/3 ft. deep = 4267 $ft.^{3*}$

*Approximately 30% of the area found to be low concentration on the general survey (10' x 10' Grid) was found to be medium concentration upon resurvey (2' x 2' Grid). See Drawing SF-7902 or Figure I. This volume is included.

2.5.4 Low Concentration Area

This area contains material which must be removed to delicense but which can remain with unrestricted access under current license. Gamma readings are 6-9 times background.

Volume = 2200 $ft.^2$ x 2/3 ft. deep = 1467 $ft.^3$

2.5.5 Summary

The following summarizes the above volumes including a 15 percent contingency:

High Concentration	-	230 $ft.^3$
Medium Concentration	-	4900 $ft.^3$
Low Concentration	-	1700 $ft.^3$
TOTAL		6830 $ft.^3$

UCCNHT0000640

NOTE: No exploration was done beneath any of the concrete or asphalt pads. The depth of involvement and the location of contamination along the railroad tracks indicates the radioactive materials were spilled during handling from rail cars and contamination under the pads is unlikely.

3.0 DESCRIPTION OF CLEANUP ALTERNATIVES

3.1 Summary

Five cleanup alternatives are considered in this memorandum. The major factors influencing final selection of an alternative are: term of solution (short or long), delicensing, property transfer to Elkem, compliance with NYS Regulations, and cost.

Table II below summarizes the alternatives opposite these factors.

TABLE II

ALTER-NATIVE NO.	DESCRIPTION	TERM	DELICENSE*	TRANSFER PROPERTY TO ELKEM	COST $000
1	Fence in place	Short	No	No	10
2	Remove & fence on Elkem Property	Short	No	No	65
3	Remove & fence on UCC Property	Medium	No	Yes	120**
4	Remove & bury - UCC Niagara	Long	Yes	Yes	175
5	Remove & ship to repository	Permanent	Yes	Yes	335

* Assumes that this is the only contaminated area in the plant.

**If a concrete pad is available the cost would be $90,000.

3.2 Alternative No. 1 - Fence in Place

Simply enclose the contaminated area thus restricting access.

Requirements - 400 feet of fence.

Advantages - Quick solution to come into compliance with NYS.
- Minimum cost.

Disadvantages - Contamination remains requiring future action.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

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3.3 Alternative No. 2 - Remove and Fence on Elkem Property

As mentioned earlier, much of the area South of Building 166 is covered with concrete and asphalt. The material (soil) could be removed and stored on an existing pad in the Southeast corner of the property. The pad and a plastic covering would provide stability and a fence would provide restricted access until final disposal.

Requirements
- Removal of railroad tracks.
- Disposal of scrap and debris**.
- 100 ft. fence required - S & E corner site.
- Concrete/asphalt pad - already available.
- Replacement of railroad track.

Advantages
- Consolidation of contaminants.
- Access can be restricted.
- This work is required for ultimate disposal in any event.

Disadvantages
- Short term solution.
- 1/10 acres of land would not be available for Elkem use.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

**This includes
- Three flat bed railroad cars loaded with induction furnaces.
- Stacks of deteriorating 55 gallon drums.
- Stacked wooden boxes containing steel shot, etc.
- Numerous 5' x 5' x 5' steel boxes.
- Various ladles, furnaces, carbon electrodes, etc.

3.4 Alternative No. 3 - Remove and Fence on UCC Property

The work required here is essentially the same as in 3.3 above. Costs increase and extra care must be taken to avoid contamination of other areas of the plant. However, the property can then be released for transfer to Elkem. An area in the Niagara Plant has been designated by plant personnel for possible use.

Requirement
- Same as 3.3 except more fence and a new concrete pad may be required.

Advantage
- Same as 3.3 except it has the additional advantage of not interfering with Elkem property use. Property can be transferred to Elkem.

Disadvantage
- Medium term solution.

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3.5 Alternative No. 4 - Remove and Bury - UCC Niagara

Burial on Union Carbide owned property was explored for the Marietta TaCb cleanup project. The main problems are: finding a suitable burial site, getting State and Local approval, future use or transfer of the burial site is restricted, and long term monitoring of the site is necessary.

Requirements
- Remove and replace railroad tracks.
- Dispose of scrap and debris at approved repository.
- A suitable burial site.
- Containers (55 gallon drums) may be required.
- Dispose of 400 $ft.^3$ soil at approved repository.

Advantages
- Long term solution.
- Delicense.

Disadvantages
- Use of the burial site will be restricted - no construction.

3.6 Alternative No. 5 - Remove and Ship to Repository

This alternative is permanent. Once the material is received at the repository, the host state becomes owner and the licensee's accountability ends. However, this is the most expensive alternative.

Requirements
- Remove and replace railroad tracks.
- Disposal of scrap and debris at approved repository.
- Containers.
- Loading system.

Advantage
- Permanent solution.

Disadvantage
- Highest cost.

3.7 Remove and Ship to Uravan

This alternative was selected for the TaCb residue cleanup project in Marietta. The uranium content of the TaCb residue was 0.13% U_3O_8 and processing to recover uranium values was feasible and acceptable to the Colorado Department of Health. The material (soil) analyses at Niagara indicate 0.01% U_3O_8. Therefore, transfer to Uravan cannot be considered.

4.0 COST ESTIMATES

As discussed in Section 2.4, the radiological survey indicates three levels of contamination above NRC delicensing limits. They are: 6-9 x BKG (background), 10-60 x BKG and greater than 60 x BKG. Volumes were calculated

UCCNHT0000643

for each area with the thought that some alternatives would not require the removal of the combined total volume but only those areas with the highest concentrations. However, to simplify costings and cost comparison, only the total volume of Section 2.5.5 is considered. All medium and high concentration material requires fencing or removal. The low concentration material adds an additional 25% to the volume, but adds only 10% to the cost. The volume for cost estimating is then 6830 ft.^{3}.

Cost Estimates No. 6342 through 6346 are attached.

Cost Estimate No. 6342	Fence in Place	$ 10,000
Cost Estimate No. 6343	Remove and Fence - Elkem	$ 65,000
Cost Estimate No. 6344	Remove and Fence - UCC Niagara	$120,000
Cost Estimate No. 6345	Remove and Bury - UCC Niagara	$175,000
Cost Estimate No. 6346	Remove and Ship to Barnwell	$335,000

Note: Costs do not reflect removal of debris which is assumed to be Elkem's accountability.

5.0 RECOMMENDATIONS

Removal and relocation of the contaminated soil to the Niagara plant as described in Alternative No. 3 is recommended based on the following.

1. The property will be deeded to Elkem Metals Company.

2. Any restriction to the use of the property behind Building 166, or any potential cleanup liability to Elkem, is unacceptable.

3. EPA and NRC regulatory uncertainties exist concerning burial. (Perpetual maintenance costs are not included in the estimate for Alternative No. 4.) Burial also makes the material unavailable for disposal at an approved repository as discussed below. New York state may ban all burial within the state in the near future.

4. Disposal at Barnwell, SC is too costly and there is reason to believe that a new repository will be opened in the Northeast by 1986 which may reduce the cost of that option.

Any remedial effort must be approved by the State of New York, Department of Labor. For the material to be left on-site, Radioactive Materials License No. 950-0139 must be amended. This amendment or some form of approval should be received prior to the beginning of any cleanup.

UCCNHT0000644

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6342

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - FENCE IN PLACE (ALTERNATIVE 1)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	MATERIAL				
101	400' Fence (6 ft.) Along 1100N	-	8	8	-
	TOTAL		8	8	-
	TOTAL DIRECTS		8	8	-
	ENGINEERING			-	-
	CONTINGENCY			2	
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			-	-
	TOTAL			10	-

FRANGELORI/dac

cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000645

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6343

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE ELKEM (ALTERNATIVE 2)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3}	-	5	-	5
102	Fence 6 ft. - 100 ft.	-	2	-	2
	TOTAL		7		7
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
	TOTAL DIRECTS		40	23	17
	ENGINEERING			7	5
	CONTINGENCY			8	3
	RADIOLOGIST/HEALTH PHYSICS			2	-
	TOTAL			40	25

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000646

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6344

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE - UCC NIAGARA (ALTERNATIVE 3)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Concrete Pad - 60 cy.	-	30	30	-
103	Fence 6 ft. - 200 ft.	-	4	4	-
	TOTAL		44	34	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	-
	TOTAL DIRECTS		77	57	20
	ENGINEERING			9	6
	CONTINGENCY			10	2
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			14	2
	TOTAL			90	30

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000647

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6345

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND BURY - UCC NIAGARA (ALTERNATIVE 4)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Clay Lined Pit w/Drain System 40 ft.^{2} x 5 ft.	-	15	15	-
103	Clay Cap	-	15	15	-
	TOTAL		40	30	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation	-	1	-	1
302	Burial Fee (200 ft.^{3})	1	8	-	9
	TOTAL	1	9		10
	TOTAL DIRECTS	1	82	53	30
	ENGINEERING			8	8
	CONTINGENCY			15	5
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	SITE SELECTION			35	
	TOTAL			125	50

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000648

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6346

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND SHIP TO BARNWELL, SC (ALTERNATIVE 5)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove Soil 7000 ft.^{3} (haul)	-	5	-	5
102	Containers (80 boxes - 100 ft.^{3})	20	-	-	20
103	Loading Trucks (incl. Pallets, etc.)	5	4	-	9
	TOTAL	25	9		34
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation 1000_3$ (10 loads)	-	10	-	10
302	Burial Fee (8000 ft.^{3} incl Container)	-	160	-	160
	TOTAL		170		170
	TOTAL DIRECTS	25	212	23	214
	ENGINEERING			5	28
	CONTINGENCY			3	46
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	TOTAL			45	290

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000649

CALCULATIONS

New York State regulations require that access be restricted to areas where the source material exceeds 500 ppm. For the purpose of comparison with NRC regulations a Thorium/Uranium ratio of 2:1 is assumed.

Therefore, the maximum activities for unrestricted access are:

NYS maximum Thorium activity equals:

$$330 \text{ parts/million} \times 1.09 \times 10^5 \text{ pCi/gm} = 36 \text{ pCi/gm}$$

NYS maximum Uranium activity equals:

$$170 \text{ parts/million} \times 3.33 \times 10^5 \text{ pCi/gm} = 57 \text{ pCi/gm}$$

UCCNHT0000650

The Assistant Secretary finds that good cause exists for not publishing the supplement to the Puerto Rico State Plan as a proposed change and making the Regional Administrator's approval effective upon publication for the following reasons:

1. The standards are identical to the Federal standards which were promulgated in accordance with Federal law meeting requirements for public participation.

2. The standards were adopted in accordance with the procedural requirement of State Law and further participation would be unnecessary.

The decision is effective October 23, 1981.

(Sec. 18 Pub L. 91-596, 84 Stat. 1608 (29 U.S.C. 667))

Signed at New York City, New York, this 15th day of June 1981.

Roger A. Clark,

Regional Administrator

[FR Doc. 81-30745 Filed 10-22-81, 8:45 am]

BILLING CODE 4510-26-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards, Subcommittee on Callaway Plant; Location Change

The ACRS Subcommittee on Callaway Plant will hold a meeting on November 4 and 5, 1981, at the HOLIDAY INN-WEST, 1900 I-70 Drive Southwest, Columbia, MO instead of the Hilton Inn.

Notice of this meeting was published in the Federal Register on October 19, 1981 (46 FR 51329), and all other items remain the same except for the location change as indicated above.

Dated: October 19, 1981.

John C. Hoyle,

Advisory Committee, Management Officer.

[FR Doc. 81-30733 Filed 10-22-81, 8:45 am]

BILLING CODE 7590-01-M

Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Discussion of options for NRC approval of applications for disposal or onsite storage of thorium or uranium wastes; interim use and public comment.

SUMMARY: This notice discusses five options for NRC approval of disposal or onsite storage or thorium or uranium wastes from past nuclear operations. The options are contained in a Branch Technical Position for administration by the Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

DATES: Comments on the options for disposal or onsite storage of thorium or uranium are encouraged. Such comments will be considered in any subsequent revision of the Branch Technical Position. Comments are due December 22, 1981.

Note.—Comments received after the expiration date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments filed on or before that date.

FOR FURTHER INFORMATION CONTACT: Ralph G. Page, Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, telephone 301-427-4309.

SUPPLEMENTARY INFORMATION:

I. Introduction

Some of the sites formerly used for processing thorium and uranium are known today to be contaminated with residual radioactive materials. Some are currently covered by NRC licenses. Others were once licensed, but the licenses to possess and use material have expired. In many cases, the total amount of contaminated soil is large, but the activity concentrations of radioactive materials are believed sufficiently low to justify their disposal on privately owned lands or storage onsite rather than their transport to a licensed radioactive materials disposal (commercial) site. In many instances packaging and transporting these wastes to a licensed disposal site would be too costly and not justified from the standpoints of risk to the public health or cost-benefit. Furthermore, because of the total volume of these wastes, limited commercial waste disposal capacity, and restrictions placed on receipt of long-lived wastes at commercial sites, it is not presently feasible to dispose of these wastes at commercial low-level waste disposal sites.

Effective January 28, 1981, NRC regulations in 10 CFR 20, "Standards for Protection Against Radiation", were amended (45 FR 71761-71762) to delete § 20.304 which provided general authority for disposal of radioactive materials by burial in soil. Under the amended regulations, licensees must apply for and obtain specific NRC approval to dispose of radioactive materials in this manner under the provisions of 10 CFR 20.302. A case-by-case review was believed needed to assure that burial of radioactive wastes would not present an unreasonable health hazard at some future date.

The deleted provisions of § 20.304 previously permitted burial of up to 100 millicuries of thorium or natural uranium at any one time, with a yearly limitation of 12 burials for each type of material at each site. The only disposal standards specified were (1) burial at a minimum depth of four feet, and (2) successive burials separated by at least six feet. Thus a total of 1.2 curies of these materials were permitted to be disposed of each year by burial in a 12 foot by 18 foot or larger plot of ground.

Under the amended regulations, it is incumbent on an applicant who wants to bury radioactive wastes to demonstrate that local land burial is preferable to other disposal alternatives. The evaluation of the application takes into account the following information:

Types and quantities of material to be buried
Packaging of waste
Burial location
Characteristics of burial site
Depth of burial
Access restrictions to disposal site
Radiation safety procedures during disposal operations
Recordkeeping
Local burial restrictions, if any

For applications involving disposal of soils contaminated with low level concentrations of thorium and uranium (other than concentrations not exceeding EPA cleanup standards), the matters of principal importance are:

Concentrations of thorium and uranium (either in secular equilibrium with their daughters or without daughters present)
Volume of contaminated soil
Costs for offsite and onsite disposal
Availability of offsite burial space
Disposal site characteristics
Depth of burial and accessibility of buried wastes
State and local government views

II. Branch Technical Position

There are five acceptable options for disposal or onsite storage of thorium and uranium contaminated wastes. Applications for disposal or storage will be approved if the guidelines discussed under any option are met. Applications for other methods of disposal may be submitted and these will be evaluated on their own merits.

1. Disposal of acceptably low concentrations (which meet EPA cleanup standards) of natural thorium with daughters in secular equilibrium, depleted or enriched uranium, and

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uranium ores with daughters in secular equilibrium with no restriction on burial method.

er this option, the concentrations of natural thorium and depleted or enriched uranium wastes are set sufficiently low that no member of the public is expected to receive a radiation dose commitment from the disposed materials in excess of 1 millirad per year to the lung or 3 millirads per year to the bone from inhalation and ingestion, under any foreseeable use of the material or property. These radiation dose guidelines were recommened by the Environmental Protection Agency (EPA) for protection against transuranium elements present in the environment as a result of unplanned contamination (42 FR 60956–60959). In addition, the concentrations are sufficiently low so that no individual may receive an external dose in excess of 10 microroentgens per hour above background. This is compatible with guidelines EPA proposed as cleanup standards for inactive uranium processing sites (46 FR 2556–2563).

For natural uranium ores having daughters in equilibrium, the concentration limit is equal to that set by the EPA (46 FR 2556–2563) for radium-226 (i e., 5 pCi/gm, including background) and its decay products.

concentrations specified below are believed appropriate to apply. It is expected, however, that currently licensed operations will be conducted in such a manner as to minimize the possibility of soil contamination and when such occurs the contamination will be reduced to levels as low as reasonably achievable

Kind of material	Concentration (pCi/gm)
Natural thorium (Th-232 plus Th-228) if all daughters are present and in equilibrium	10
Depleted Uranium	35
Enriched Uranium	30
Natural Uranium Ores (U-238 plus U-234) if all daughters are present and in equilibrium	10

The analysis upon which the Branch Technical Position is based is available for inspection at the Commission's Public Document Room at 1717 H St., N W., Washington, D C.

The concentrations specified under this option may be compared with naturally occurring thorium and uranium ore concentrations of 1.3 pCi/gm in igneous rock and uranium cc ntrations of 120 pCi/gm in Florida phosphate rock and 50–80 pCi/gm in Tennessee bituminous shale Concentration limits for natural thorium and natural uranium ore wastes containing daughters not at secular equilibrium can be calculated on a case-by-case basis using the applicable isotopic activities data.

2. Disposal of certain low concentrations of natural thorium with daughters in secular equilibrium and depleted or enriched uranium with no daughters present when buried under prescribed conditions with no subsequent land use restrictions and no continuing NRC licensing of the material.

Under this option the concentrations of natural thorium and uranium are set sufficiently low so that no member of the public will receive a radiation dose exceeding those discussed under option 1 when the wastes are buried in an approved manner absent intrusion into the burial grounds. This option will require establishing prescribed conditions for disposal in the license, such as depth and distribution of material, to minimize the likelihood of intrusion. Burial will be permitted only if it can be demonstrated that the buried materials will be stabilized in place and not be transported away from the site.

Acceptability of the site for disposal will depend on topographical, geological, hydrological and meteorological characteristics of the site At a minimum, burial depth will be at least four feet below the surface. In the event that there is an intrusion into the burial ground, no member of the public will likely receive a dose in excess fo 170 millirems to a critical organ. An average dose not exceeding 170 millirems to the whole body for all members of a general population is recommended by international and national radiation expert bodies to limit population doses With respect to limiting doses to individual body organs, the concentrations are sufficiently low that no individual will receive a dose in excess of 170 millirems to any organ from exposure to natural thorium, depleted uranium or enriched uranium.

The average activity concentration of radioactive material that may be buried under this option in the case of natural thorium (Th-232 plus Th-228) is 50 pCi/gm, if all daughters are present and in equilibrium; for enriched uranium it is 100 pCi/gm if the uranium is soluble and 250 pCi/gm if insoluble, for depleted uranium it is 100 pCi/gm if the uranium is soluble and 300 pCi/gm if insoluble Natural uranium ores containing radium 226 and its daughters are not included under this option, because of possible radon 222 emanations and resultant higher than acceptable exposure of individuals in private residences if houses were built over buried materials.

3. Disposal of low concentrations of natural uranium ores, with all daughters in equilibrium, when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the specified land contains buried radioactive materials and are conditioned in a manner acceptable under state law to impose a covenant running with the land that the specified land may not be used for residential building. (There is no continuing NRC licensing of the material.)

Disposal will be approved if the burial criteria outlined in option 2 (including burial at a minimum of 4 feet) are met. Depending upon local soil characteristics, burials at depths greater than 4 feet may be required. In order to assure protection against radon 222 releases (daughter in decay chain of uranium 238 and uranium 234), it is necessary that the recorded title documents be amended to state in the permanent land records that no residential building should be permitted over specified areas of land where natural uranium ore residues (U-238 plus U-234) in concentrations exceeding 10 pCi/gm has been buried. Industrial building is acceptable so long as the concentration of buried material does not exceed 40 pCi/gm of uranium (i.e., Ra-226 shall not exceed 20 pCi/gm).

4. Disposal of land-use-limited concentrations of natural thorium or natural uranium with daughters in secular equilibrium and depleted or enriched uranium without daughters present when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the land contains buried radioactive material and are conditioned in a manner acceptable under state law to impose a covenant running with land that the land (1) may not be excavated below stated depths in specified areas of land unless cleared by appropriate health authorities, (2) may not be used for residential or industrial structures over specified areas where radioactive materials in concentrations higher than specified in options 2 and 3 are buried, and (3) may not be used for agricultural purposes in the specified areas. (There is no continuing NRC licensing of the disposal site.)

Under this option, conditions of burial will be such that no member of the public will receive radiation doses in excess of those discussed under option 1 absent intrusion into the burial ground Criteria for disposal under these conditions is predicated upon the assumption that intentional intrusion is less likely to occur if a warning is given

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in land documents of record not to excavate below burial depths in specified areas of land without clearance by health authorities; not to construct residential or industrial building on the site; and not to use specified areas of land for agricultural purposes. Because of this, we believe it appropriate to apply a maximum critical organ exposure limit of 500 millirems per year to thorium and uranium buried under this restriction instead of 170 millirems as used in options 2 and 3. In addition, any exposure to such materials is likely to be more transient than assumed (essentially continual exposure) under those options. These two factors combine to increase the activity concentration limits calculated under option 2 by about 10. Thus, the average concentration that may be buried under this option for thorium (Th-232 plus Th-228) is 500 pCi/gm if all daughters are present and in equilibrium, for enriched uranium it is 1000 pCi/gm if the uranium is soluble and 2500 pCi/gm if insoluble, and for depleted uranium it is 1000 pCi/gm if the uranium is soluble and 3000 pCi/gm if insoluble.

With respect to natural uranium with daughters present and in equilibrium, the concentration that may be buried under this option is 200 pCi/gm of U-238 plus U-234, i.e., 100 pCi/gm Ra-226. This concentration is based on a limited exposure of 2.4 hours per day to limit the radon dose to less than 0.5 working level month (WLM) which is equivalent to continuous exposure to 0.02 working level (WL). Depending upon local soil characteristics, burials at depths greater than 4 feet may be required.

SUMMARY OF MAXIMUM CONCENTRATIONS PERMITTED UNDER DISPOSAL OPTIONS

Kind of Material	Disposal Options			
	1 [a]	2 [b]	3 [c]	4 [d]
Natural Thorium (Th-232 + Th-228) with daughters present and in equilibrium	10	50		500
Natural Uranium (U-238 + U-234) with daughters present and in equilibrium	10		40	200
Depleted Uranium:				
*Soluble	35	100		1,000
*Insoluble	35	300		3,000
Enriched Uranium:				
*Soluble	30	100		1,000
*Insoluble	30	250		2,500

[a] Based on EPA cleanup standards.
[b] Concentrations based on limiting individual doses to 170 mrem/yr.
[c] Concentration based on limiting equivalent exposure to 0.02 working level or less.
[d] Concentrations based on limiting individual doses to 500 mrem/yr and, in case of natural uranium, limiting exposure to 0.02 working level or less.

5. Storage of licensed concentrations of thorium and uranium onsite pending the availability of an appropriate disposal site.

When concentrations exceed those specified in option 4, long term disposal other than at a licensed disposal site will not normally be a viable option under the provisions of 10 CFR 20.302. In such cases, the thorium and uranium may be permitted to be stored onsite under an NRC license until a suitable method of disposal is found. License conditions will require that radiation doses not exceed those specified in 10 CFR Part 20 and be maintained as low as reasonably achievable.

Before approving an application to dispose of thorium or uranium under options 2, 3, or 4, NRC will solicit the view of appropriate State health officials within the State in which the disposal would be made.

Dated at Silver Spring, Maryland this 19th day of October, 1981

Richard E. Cunningham,

Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

[FR Doc. 81-30808 Filed 10-22-81; 8:45 am]

BILLING CODE 7590-01-M

OFFICE OF PERSONNEL MANAGEMENT

Postponement of Application Deadline for Fund-Raising Privileges Among Federal Employees by Private Voluntary Organizations

Section 5 43 of the "Manual on Fund-Raising Within the Federal Service for Voluntary Health and Welfare Agencies" sets December 1 of each year as the deadline by which national voluntary agencies must submit applications for participation in the Combined Federal Campaign (CFC) to be conducted in the fall of the following year. This year's deadline is being postponed from December 1, 1981, to February 1, 1982. In June 1981, the U.S. Office of Personnel Management (OPM) announced that the eligibility criteria for participation in the 1982-83 CFC are being reviewed. The deadline date is being postponed to avoid national voluntary agencies having to revise their applications to meet eligibility criteria which may be changed.

Donald J. Devine,

Director.

[FR Doc. 81-30730 Filed 10-22-81; 8:45 am]

BILLING CODE 6325-01-M

OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

Resolution of Complaint of Price-Undercutting of Subsidized Cheese Imports

On October 1, 1981, the United States Trade Representative received a letter from the Secretary of Agriculture informing him of the Secretary's finding that imported Grade A Swiss type cheese produced in Finland has been offered for sale in the United States at duty-paid wholesale prices which are five cents per pound less than the domestic wholesale market price of similar cheese produced in the United States.

In accordance with Section 702(c)(2) of the Trade Agreements Act of 1979 (the Act) (19 U.S.C. 1202 note), the Office of the United States Trade Representative notified Finland of the price undercutting determination made by the Secretary of Agriculture, requested that corrective action be taken, and asked for appropriate assurances concerning the commitment made in the Arrangement Between the United States and Finland Concerning Cheese.

On October 14, 1981, Finland notified the United States Trade Representative that measures have been taken to ensure that the duty-paid wholesale price of imported Grade A Swiss type cheese produced in Finland will not be less than the domestic wholesale market price of similar cheese produced in the United States. In addition, Finland gave assurance that it will respect the price commitments in the Arrangement. Since the above notification by Finland has occurred within the 15-day period provided in Section 702(c)(3) of the Act, the United States Trade Representative has notified the Secretary of Agriculture of his belief that no further action is required.

William E. Brock,

United States Trade Representative

[FR Doc. 81-30884 Filed 10-22-81; 8:45 am]

BILLING CODE 3190-01-M

SECURITIES AND EXCHANGE COMMISSION

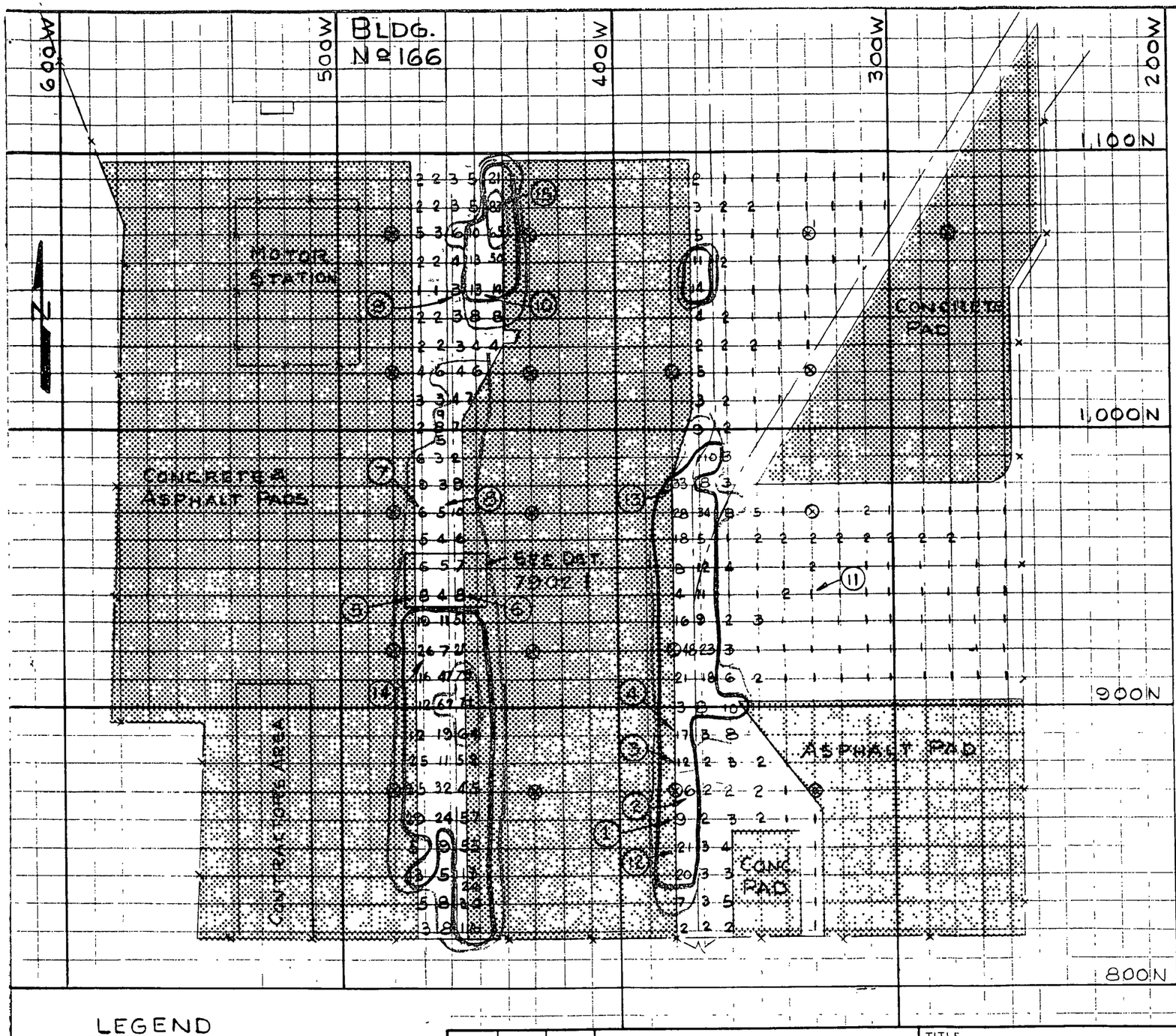
[Release No. 22236; 70-6650]

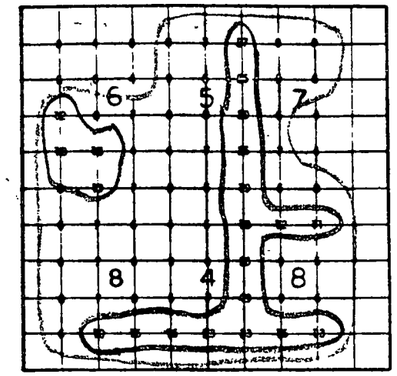
Arkansas Power & Light Co.; Proposed Issuance and Sale of First Mortgage Bonds

October 19, 1981.

Arkansas Power & Light Company

UCCNHT0000653





ENLARGED DETAIL 7902-1
2' x 2' GRID

SAMPLE NO	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm DEPTH IN INCHES 0	3	6	9	12	15	21	24	26	GAMMA X BKg SURFACE
1	14/40									9
2	11/19									6
3	26/61									12
4	25/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/1		<3/2					33
14		57/164		<7/8		<7/3	7/2		3/3	26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm (See report for calc)
THORIUM 37 pCi/gm

NRC PROPOSED REGULATIONS - BELLICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

> 1 Times Background
> .5 Times Background
> 9 Times Background
> 60 Times Background

LEGEND

⊗ - SURVEY STAKES
○ - SAMPLE NO.
READINGS - NO TIMES BACKGROUND @ SURFACE

REV	DATE	BY	DESCRIPTION

TITLE
RADIOLOGICAL SURVEY - BALL FIELD AREA

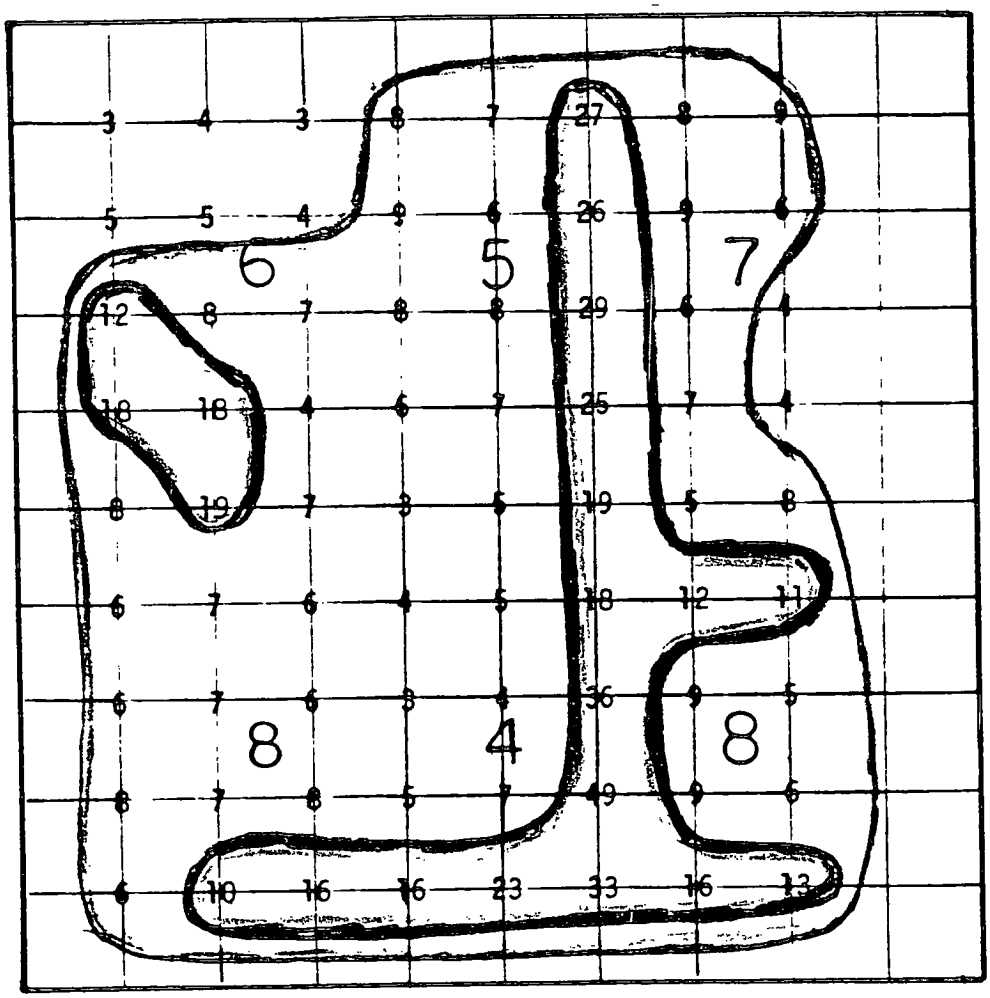
UNION CARBIDE CORPORATION
METALS DIVISION

PLANT	BLDG NO	DWN BY	CHKD BY	STAFF ENG	ACC ENG	EX	FILE NUMBER	930/256	DRAWING SCALE
NIAGARA		DGF			LJE				1" = 40'-0"

DATE	DRAWING NUMBER
1-14-83	SF-7902

UCCNHT0000654

FIGURE I



ENLARGED DETAIL 7902-1

2' x 2' GRID

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UCCNHT0000655

TABLE III

SAMPLE NO.	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm DEPTH IN INCHES									GAMMA X BKg SURFACE
	0	3	6	9	12	15	21	24	26	
1	14/40									9
2	11/19									6
3	26/61									12
4	26/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/<1		<3/2					33
14		57/164		<7/<8		<7/3	7/2		3/3	26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm
THORIUM 37 pCi/gm (See report for calc.)

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

UCCNHT0000656

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To (Name) Mr D G Millenbruch
Umetco Minerals Corporation
Division Danbury, CT

Location

Area

Date April 15, 1986

Originating Dept TECHNOLOGY

Area

Answering Letter Date

Subject Niagara Plant Radioactive Material License 950-0139

Copy to Messrs
R G Beverly/R Jones
L G Evans
T J Kagetsu
F V McMillen
W D Smith

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background

For your convenience, I am appending my letter of March 25, 1986 to Mr R F Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed

In cleaning up the area around No 30 furnace we filled seventeen 55-gallon drums We had Mr William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada The activity suggested the cleanup was not complete

The radiation in Building 24 (V-A1) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite This pit seemed endless, we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet In addition, the pit was found to extend beneath the floor of the V-A1 operation

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons Even this amount presents problems in packaging for disposal

UCCNHT0000657

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time The gamma radiation increases from 200 µR/hr at the surface to about 600 µR/hr at a depth of one foot

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses The sample identification and results are reported in the attached Table 1 Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license Section 38.11, 38 29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified; all radioactive material must be shipped to an approved recipient; the premises must be decontaminated and surveyed to show decontamination took place; and the survey must be verified by the State Source material (uranium and thorium) must be reduced to 0 05 percent by weight to meet decontamination (This is 500 ppm or 500 µg/g.) For non-source material for which we are not licensed, the levels are specific for each element e g. for radium the exempt concentration is 0.1 pico currie per gram

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in µg/g) 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm) Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination Looking at samples from each of the areas

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance We have made no attempt to determine the amount of soil that is contaminated

Slag Pile East of No 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226 The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally) This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag This falls into the category of non-licensed material and possibly we need a ruling on it

Furnace No 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium

Sample 41-1 tells us we have more cleanup to do around the north furnace support. This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports

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TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY. EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34 7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33 8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No 6 Furnace Building	4 4±1 1	20.2	16±2	299±7	4 0± 9	17±2
2446-40-4	Light Slag - East of No 6 Furnace Building	7 0±1 4	18 6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No. 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No 24, V-A1	19±2	28 9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No 24, V-A1	31±3	44 3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No. 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No 30 After Cleanup	42±3	68 4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No 30 After Cleanup	43±3	24 9	9 6±1 3 8 5±1 3	6 2±1 1 5 9±1 0	9 5±1.3 9.2±1 3**	

*Th229 (not positively identified)
**Duplicate Analyses

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Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access

Pit in Building No. 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium However gamma radiation next to a drum will read 150 µR/hr I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard The pit is still not completely clean with radiation of about 50 µR/hr above the pit and about 150 µR/hr at the surface 9 feet down Background is about 9µR/hr

? how low - below what -

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation

We are faced with the decision on how to proceed (1) Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc and would be unable to sell the property, (2) Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R F Kelly

Hopefully we can tackle this on your planned visit next week

Sincerely,

D J Hansen

mau/357h
Attachments

UCCNHT0000660

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No 950-0139

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed

The location of the radioactivity and the levels of radiation observed are shown in Table I

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce Rm)	5-10 µR/hr		
	- I-beam south of 30 Fce		200 µR/hr	20
	- Trunion support north of 30 Fce.		420 µR/hr	42
2/18/86	Bldg 24 (V-Al)	8-13 µR/hr		
	- Area below dust collector		170 µR/hr	15
2/20/86	Yard East of #6 Fce. Rm	8-12 µR/hr		
	- 6' x 6' Areas near slag pile		200 µR/hr	20
2/20/86	Yard East of #6 Fce. Rm			
	- 2' x 2' area near Bldg 191		210 µR/hr	20

UCCNHT0000661

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984 (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986)

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II More detailed information is contained in Laboratory Notebook 2446

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce Rm #6)	5-10 µR/hr	Area next to Fce 30 above background
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr	Some sample cans >1mR/hr
	32 (#2 Packing)	8-10 µR/hr	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr	Area below Dust Coll above background
2/20/86	(Storage Shed N W Corner of Umetco Property)	8-12 µR/hr	OK
2/25/86	7 (Storeroom)	8-10 µR/hr	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr	OK
2/27/861	13, 14 (Aux Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr	OK
3/14/86	111 (Eng Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg)	7-8 µR/hr.	OK

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The plan for decontamination that I reviewed with you was as follows

1. Remove and store the contaminated material in suitable containers

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4 Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No 30 (contaminated slag and soil were being placed into 55-gallon drums) This has been completed and we are now working on cleaning up the area in Building 24

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority

If you need more information please contact me If I do not hear from you I will proceed according to the plan outlined above

Very truly yours,

D. J Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R L. Miller
D. G Millenbruch
R. C. Smith
R. G. Tisch
C T Wentzel

UCCNHT0000663

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

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	- 6' x 6' Areas near slag pile		200 µR/hr.	20
2/20/86	Yard East of #6 Fce. Rm.			
	- 2' x 2' area near Bldg. 191		210 µR/hr	20

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APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38 11 Duration of licenses Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38 12 Renewal of licenses An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38 13 Amendment of licenses A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38 14 Suspension or revocation The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38 15 Additional requirements Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

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timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38 27 Enclosed controlled areas Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38 28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38 29 Vacating installations and property (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferee or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

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TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits			
(1) Alpha emitters			
(i) Removable	15 pCi / 100 cm	= 33 dpm / 100 cm	average over any one surface
	45 pCi / 100 cm²	= 100 dpm / 100 cm²	maximum
(ii) Total (fixed)	450 pCi / 100 cm²	= 1000 dpm / 100 cm²	average over any one surface
	2250 pCi / 100 cm²	= 5000 dpm / 100 cm²	maximum
	0 25 mrem at 1 cm / hr		
(2) Beta-Gamma emitters			
(i) Removable (all beta gamma emitters except	100 pCi / 100 cm²		average over any one surface
Hydrogen 3)	500 pCi / 100 cm		maximum
Removable (Hydrogen 3)	1000 pCi / 100 cm²		average over any one surface
	5000 pCi / 100 cm²		maximum
(ii) Total (fixed)	0 [illegible]	surface	

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

UCCNHT0000667

TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

UCCNHT0000668

situation, i.e. who's responsibility they are, but Umetco has been the UCC manager and, in any event, they are still owned by Union Carbide. The Niacet individual who showed me around is aware of that. He pointed out that the supports on two huge stacks on the top of the building are failing and if the stacks are not resupported or removed, they will fall down. The boilers themselves have asbestos insulation on the external piping and they may have asbestos insulation internally throughout the boilers. I have asked the fellows at Niagara to try and find drawings so that we can determine how severe the asbestos problem is. If we are legally responsible for these boilers, it may be necessary to either remove the asbestos, certainly to either support the stacks or tear them down, and possibly demolish the boilers. These are large units and the costs would be significant. I will ask our Legal Department to give me an opinion as to what our responsibilities are. This issue does not involve SAC except perhaps for a service agreement but may have to be resolved before Umetco can withdraw from Niagara Falls.

15. Under the agreement with SAC, Carbide has said that they will share the final and eventual reclamation costs of the site, if and when it is ever abandoned. To fix that liability now, we could get a demolition contractor to make an estimate now of demolishing and reclaiming the facility. However, the logical final solution would probably be to clean out and scrap the equipment and sell the buildings at that time. If the parties agree to resolve Items 1 through 14, I suggest the final buildings reclamation be left and the cost or credit be shared based on relative time of occupancy.

16. Miscellaneous - We touched on numerous other minor areas, such as underground tanks, and there are no problems there. We talked about bulk storage and although initially there appeared to be a caustic tank problem, it was tested and checked out okay. We talked about the 86 or so vanadium halide tanks scattered around the country, and they seem to be under control and all in good condition. There is no major waste oil problem, etc. There are no radiation sources on the site. I believe, Frank, that if the situations described in this memo are addressed, we can fairly well define the environmental liabilities of Union Carbide at Niagara Falls.

Very truly yours,

D. G. MILLENBRUCH

DGM:blb
0214b

UCCNHT0000669

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 ($T_{1/2}$ = 9 2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0000670

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

UCCNHT0000671

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

UCCNHT0000672

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

**μc/gm for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2, the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41, Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides, the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed "one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \cdots < 1$$

UCCNHT0000673

J F Frost

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

May 9, 1986

MAY 12 1986

Mr. Robert F. Kelly
Associate Radiophysicist
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Mr. Kelly·

Thank you for taking the time on Wednesday, May 7, 1986 to discuss with Bob Beverly and me our plans to complete the cleanup of radioactive material found in the Niagara Plant After my letter of March 25 to you, we obtained samples of the areas in question and submitted these to EDA Instruments Inc in Colorado for radiochemical analyses. That results shown in Table 1 were the basis for our discussion

I was concerned that we may have been misinterpreting Industrial Code Rule 38 but you kindly gave us a copy of an Inter-Office memo from Dr Bradley to you dated March 26, 1982 which specified the limits for source material This memo is appended

Below I have summarized the topics we discussed and outlined the actions we plan to take

A Material from Pit in Building 24

A gamma radiation level of 170 µR/hr prompted us to remove the illmenite sand that had been used to backfill a 9'-6" x 10' concrete pit in Building 24 The pit was much deeper than anticipated and we filled one hundred twenty-five 55-gallon drums before reaching a depth of 9 feet Subsequently when we received the results of the analyses (Samples 40-6 and 40-7) it was evident that the material contained less than 500 parts per million of combined uranium and thorium This, coupled with a gamma radiation level well below 250 µR/hr, led to the conclusion that this material did not exceed the "Limits for Uncontrolled Areas" as specified in Table 5 of Code Rule 38 You concurred with this conclusion

As we discussed, I plan to use this material as partial fill for a low area in the yard east of No 6 Furnace Building. The pit will be backfilled with fresh soil or sand. However, as agreed, I will not proceed with this plan until after May 15 to allow you time to think more about it and possibly confer with Dr Bradley

UCCNHT0000674

B. Slag East of No 6 Furnace Building

This is what you refer to as the "rock area" in your Investigative Report of March 26 (appended). Since that date we were able to move the slag pile and found that it was the slag itself and not the ground that was radioactive. As we discussed I was puzzled at the relatively high reading of Th-230 in Samples 40-3 and 40-4 Because the Th-230 is in the decay chain of U-238 I would have expected the uranium analyses to be appreciably higher The explanation is probably that some uranium oxide impurity was inadvertently introduced to a few vanadium aluminum furnace heats and the uranium passed on to the metal and the thorium went with the slag

As Bob Beverly discussed, although the Th-230 analyses were 299 and 466 ρCi/g, these represent very small quantities of the pure nuclide (1.53×10^{-8} and $2\ 39 \times 10^{-8}$ grams of Th-230 per gram of slag). The calculations are included as Appendix 3

Again, since this material contains much less than .05% source material and the radiation is less than 250 µR/hr it need not be controlled I also plan to dispose of it as fill in the yard east of Furnace Room 6.

C Slag and Soil Contamination South of Furnace No 30

Sample 40-5 was taken from the slag that had been splattered south of Furnace No. 30 Years ago this furnace had been used to prepare ferrocolumbium As can be seen, the uranium at 389 µg/g is approaching the 500 µg/g limit and the Th-232 at 241 pCi/g is well above the 55 ρCi/g limit Seventeen (17) 55-gallon drums of material were removed from around the furnace. Samples 41-2 and 41-3 taken after the cleanup are well within the uncontrolled limits

D Sample from North of Furnace No 30

As can be seen from the analyses of Sample 41-1 (Th-232 at 139 ρCi/g) the cleanup was not complete in this area An additional three 55-gallon drums of material were removed and the gamma radiation dropped from 120 µR/hr to about about 35 to 40 µR/hr I am convinced we have successfully reduced the radiation to limits for uncontrolled areas I will defer backfilling until you, as a representative for the Department of Labor, take confirmation samples

I plan to immediately begin the paper work to secure space and a permit for burial, either at Barnwell, SC or Richland, WA We will dispose of the material removed from the area surrounding Furnace No 30 as well as the samples in cans that you refer to in your report of March 1986

UCCNHT0000675

As you know, we are quite anxious to obtain the results of the wipe tests and soil samples taken on Elkem property that hopefully will allow termination of License 210-0090 and License 950-0139 I was pleased to hear that you will have them designated as top priority and will communicate the results to me as soon as you obtain them

Again I want to thank you for a very pleasant and helpful meeting

Very truly yours,

Donald J. Hansen

cc: Mr. R G. Beverly
Mr F. V. McMillen

mau/369h
Attachments

BLIND COPIES Messrs
J F. Frost
T. J. Kagetsu
D G. Millenbruch
R L. Miller
W D Smith
C T. Wentzel

UCCNHT0000676

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

Sample No		Description	Analyses: URANIUM SERIES Uranium µg/g	URANIUM SERIES Th-230 pCi/g	THORIUM SERIES Th-232 pCi/g	THORIUM SERIES Th-228 pCi/g	Gamma Radiation µR/hr*
Book 2446		Code Rule 38 Limit	[500]	**	[55]	***	[250]
A	40-6	Bldg 24 (VA1) Top of Pit	28.9	12±2	16±2	17±2	170
	40-7	Bldg. 24 7' Depth in Pit	44 3	22±2	37±2	39±3	150
B	40-3	Dark Slag-Yard East of Fce Bldg	20 2	299±7	16±2	40±9	150
	40-4	Light Slag-Yard East of Fce Bldg	18 6	466±9	37±3	14±2	200
C	40-5	Slag Before Digging South of Furnace 30	389	186±6	241±7	241±7	200-420
	41-2	Sample in Front of Fce 30 After Cleanup	68 4	19±2	35±3	35±3	40
	41-3	Sample from Southwest of Furnace 30 After Cleanup	24 9	6 2±1 1 5.9±1 1	9 6±1 3 8 5±1.3	9.5±1.3 9 2±1 33	30
D	41-1	Sample from North Support of Fce. 30 After Cleanup	122	76±4	139±5	145±5	120
		Area of North Support of Fce 30 After Second Cleanup	-	-	-	-	35-40

*Ludlum Model 19 Micro R Meter - Reading at surface of location where sample was taken
**pCi/g equivalent to 05% (500 ppm) calculated to be $9\ 7 \times 10^{6}$
***pCi/g equivalent to 05% (500 ppm) calculated to be $4\ 1 \times 10^{11}$

UCCNHT0000677

APPENDIX 1

NEW YORK STATE DEPARTMENT OF LABOR

INTER-OFFICE MEMORANDUM

To R. Kelly Date March 26, 1982
Office RHU

From F.J. Bradley Office RHU

Subject Union Carbide/Niagara Falls

Based on your survey of December 1, 1981 and the attached results, issue supplemental Notice of Inspection Findings and include our survey results. Require clean up to Table 5 limits within a specified time span. Contact Radiation Safety Officer to arrive at mutually agreable clean up time schedule.

Union Carbide's internal memo dated October 31, 1981 confirms our results and that they are aware of their responsibilities. All we need now is a clean up schedule.

Code Rule 38, Table 5 limits are as follows:

U-nat: 200pCi, $\frac{\text{U-nat}}{\text{gram of soil}}$

Th-nat: 55 pCi, $\frac{\text{Th-nat}}{\text{gram of soil}}$

and external surface dose levels
250 $\frac{\mu R}{hr}$ on surface.

We need to rely on their results with mixed U/Th contamination. I circled soil contamination values above 200 pCi/g (assuming all U-nat).

F.J. Bradley, Ph.D.
Principal Radiophysicist

FJB:bd

UCCNHT0000678

APPENDIX 2

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING
65 COURT STREET
BUFFALO N Y 14202

RAMONA L GALLAGHER
Assistant Commissioner of Labor

INVESTIGATIVE REPORT

Umetco - 47th and Royal Avenues, Niagara Falls

Report prepared by Robert F. Kelly on 25 MAR 86.

Report reviewed by _____ on _____.

On 20 MAR 86 after obtaining soil samples on the Umetco property, Dr. Richard Hanson related to me possible "problem" areas when he performed an external radiation survey of the plant facilities a short time ago.

There are four possible problem areas; all seem minor since external readings almost at contact showed levels at about 3-5 times background.

These are described below:

A) "Rock area" outside Building 24 -- This area shows some potential for a bigger problem; rocks on frozen grounds showed the readings mentioned above. Warmer weather will let facility determine what is under these piles.

B) Number 6 Furnace Room in Building 77 - Area shows slight contamination; its mainly on surface and doesn't seem to be a big problem.

C) Building 24 -- dust near furnace. Again doesn't seem to be a big hazard.

D) Samples in cans -- Now located in caged area in Building 25, they will be shipped as radioactive waste.

As related to Dr. Hansen, samples are to be analyzed in all three areas listed above and results sent to the Department. If within the limits, the Department will resurvey premises to insure compliance with Coderule 38.

Robert Kelly
Associate Radiophysicist

UCCNHT0000679

APPENDIX 3

Conversion of ρCi to g

$$\text{Specific Activity} = \frac{1.13 \times 10^{13}}{TA} \quad \text{curries per gram of pure nuclide}$$

Where T = half life in seconds
A = mass number

For Th-230

$T = 8.0 \times 10^4$ years $= 8.0 \times 10^4 \times 3.15 \times 10^7 = 2.52 \times 10^{12}$ seconds

$A = 230$

$$\text{Specific Activity per Gram of Th-230} = \frac{1.13 \times 10^{13}}{2.52 \times 10^{12} \times 230} = .0195 \text{ Ci}$$

$$= .0195 \times 10^{12} = 1.95 \times 10^{10} \text{ ρCi}$$

Sample 40-3 299 ρCi/g

$$\frac{299 \text{ ρCi/g}}{1.95 \times 10^{10} \text{ ρCi/g Th-230}} = 1.53 \times 10^{-8} \text{g Th-230/g}$$

Sample 40-4 466 ρCi/g

$$\frac{466 \text{ ρCi/g}}{1.95 \times 10^{10} \text{ ρCi/g Th-230}} = 2.39 \times 10^{-8} \text{g Th-230/g}$$

UCCNHT0000680

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To [Name] Mr D. G. Millenbruch
Umetco Minerals Corporation
Division Danbury, CT

Location

Area

Copy to Messrs

R G. Beverly/R Jones
L G. Evans
T. J Kagetsu
F. V McMillen
W D Smith

Date April 15, 1986

Originating Dept TECHNOLOGY

Area

Answering Letter Date

Subject Niagara Plant Radioactive
Material License 950-0139

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background

For your convenience, I am appending my letter of March 25, 1986 to Mr R F Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed.

In cleaning up the area around No 30 furnace we filled seventeen 55-gallon drums We had Mr. William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada The activity suggested the cleanup was not complete

The radiation in Building 24 (V-Al) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite This pit seemed endless; we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet In addition, the pit was found to extend beneath the floor of the V-Al operation.

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons Even this amount presents problems in packaging for disposal

UCCNHT0000681

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time The gamma radiation increases from 200 µR/hr at the surface to about 600 µR/hr at a depth of one foot

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses The sample identification and results are reported in the attached Table 1 Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license Section 38 11, 38 29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified; all radioactive material must be shipped to an approved recipient; the premises must be decontaminated and surveyed to show decontamination took place; and the survey must be verified by the State Source material (uranium and thorium) must be reduced to 0 05 percent by weight to meet decontamination (This is 500 ppm or 500 µg/g.) For non-source material for which we are not licensed, the levels are specific for each element e g for radium the exempt concentration is 0 1 pico currie per gram

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in µg/g) 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm) Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination Looking at samples from each of the areas·

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance We have made no attempt to determine the amount of soil that is contaminated

Slag Pile East of No 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226 The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally). This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag This falls into the category of non-licensed material and possibly we need a ruling on it

Furnace No 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium

Sample 41-1 tells us we have more cleanup to do around the north furnace support. This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports

UCCNHT0000682

TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No.	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34 7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33 8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No 6 Furnace Building	4 4±1.1	20 2	16±2	299±7	4 0±.9	17±2
2446-40-4	Light Slag - East of No 6 Furnace Building	7 0±1 4	18 6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No 24, V-A1	19±2	28 9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No. 24, V-A1	31±3	44 3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No 30 After Cleanup	42±3	68 4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No 30 After Cleanup	43±3	24 9	9 6±1 3 8 5±1 3	6 2±1 1 5 9±1 0	9 5±1 3 9 2±1 3**	

*Th229 (not positively identified)
**Duplicate Analyses

UCCNHT0000683

Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access

Pit in Building No. 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium However gamma radiation next to a drum will read 150 µR/hr. I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard The pit is still not completely clean with radiation of about 50 µR/hr above the pit and about 150 µR/hr. at the surface 9 feet down Background is about 9µR/hr

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use. I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation

We are faced with the decision on how to proceed (1)Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc and would be unable to sell the property, (2)Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R F Kelly.

Hopefully we can tackle this on your planned visit next week

Sincerely,

D. J Hansen

mau/357h
Attachments

UCCNHT0000684

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr Kelly·

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No 950-0139

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed

The location of the radioactivity and the levels of radiation observed are shown in Table I

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg 29 (#6 Fce Rm)	5-10 µR/hr		
	- I-beam south of 30 Fce		200 µR/hr	20
	- Trunion support north of 30 Fce		420 µR/hr	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr		
	- Area below dust collector		170 µR/hr	15
2/20/86	Yard East of #6 Fce. Rm	8-12 µR/hr		
	- 6' x 6' Areas near slag pile		200 µR/hr	20
2/20/86	Yard East of #6 Fce Rm			
	- 2' x 2' area near Bldg 191		210 µR/hr	20

UCCNHT0000685

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984 (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986)

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446.

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce Rm. #6)	5-10 µR/hr	Area next to Fce 30 above background
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr	Some sample cans >1mR/hr
	32 (#2 Packing)	8-10 µR/hr	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr	Area below Dust Coll above background
2/20/86	(Storage Shed N W Corner of Umetco Property)	8-12 µR/hr	OK
2/25/86	7 (Storeroom)	8-10 µR/hr	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr	OK
2/27/861	13, 14 (Aux Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr	OK
3/14/86	111 (Eng Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg)	7-8 µR/hr.	OK

UCCNHT0000686

The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers.

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No 30 (contaminated slag and soil were being placed into 55-gallon drums) This has been completed and we are now working on cleaning up the area in Building 24

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No 9, dated March 1979, expiration date November 1981 However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G Millenbruch
R. C Smith
R G Tisch
C. T Wentzel

UCCNHT0000687

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38 11 Duration of licenses Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38 12 Renewal of licenses An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38 13 Amendment of licenses A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38 14 Suspension or revocation The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38 15 Additional requirements. Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

UCCNHT0000688

timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38 27 Enclosed controlled areas Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38 28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38 29 Vacating installations and property (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferee or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

UCCNHT0000689

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits			
(1) Alpha emitters			
(i) Removable	15 pCi / 100 cm	= 33 dpm / 100 cm²	average over any one surface
	45 pCi / 100 cm²	= 100 dpm / 100 cm²	maximum
(ii) Total (fixed)	450 pCi / 100 cm²	= 1000 dpm / 100 cm	average over any one surface
	2250 pCi / 100 cm²	= 5000 dpm / 100 cm²	maximum
	0 25 mrem at 1 cm / hr		
(2) Beta-Gamma emitters			
(i) Removable (all beta gamma emitters except Hydrogen 3)	100 pCi / 100 cm²		average over any one surface
	500 pCi / 100 cm		maximum
Removable (Hydrogen 3)	1000 pCi / 100 cm²		average over any one surface
	5000 pCi / 100 cm²		maximum
(ii) Total (fixed)	0 [illegible]		surface

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

UCCNHT0000690

TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

UCCNHT0000691

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 (T ½ = 9 2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0000692

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

UCCNHT0000693

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}.	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

UCCNHT0000694

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

**μc/gm for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2 the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41, Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides, the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed "one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \cdots < 1$$

UCCNHT0000695

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To [Name] Mr. D. G. Mi lenbruch
Umetco Minerals Corporation
Division Danbury, CT

Location

Area

Copy to Messrs:
R. G. Beverly/R.Jones
L. G. Evans
T. J. Kagetsu
F. V. McMillen
W. D. Smith

Date April 15, 1986

Originating Dept TECHNOLOGY

Area

Answering Letter Date

Subject Niagara Plant Radioactive Material License 950-0139

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background.

For your convenience, I am appending my letter of March 25, 1986 to Mr. R. F. Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination.

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed.

In cleaning up the area around No. 30 furnace we filled seventeen 55-gallon drums. We had Mr. William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada. The activity suggested the cleanup was not complete.

The radiation in Building 24 (V-Al) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite. This pit seemed endless; we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet. In addition, the pit was found to extend beneath the floor of the V-Al operation.

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself. The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area. So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons. Even this amount presents problems in packaging for disposal

UCCNHT0000696

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time. The gamma radiation increases from 200 μR/hr at the surface to about 600 μR/hr at a depth of one foot.

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses. The sample identification and results are reported in the attached Table 1. Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license. Section 38.11, 38.29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One.

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified; all radioactive material must be shipped to an approved recipient; the premises must be decontaminated and surveyed to show decontamination took place; and the survey must be verified by the State. Source material (uranium and thorium) must be reduced to 0.05 percent by weight to meet decontamination. (This is 500 ppm or 500 μg/g.) For non-source material for which we are not licensed, the levels are specific for each element e.g. for radium the exempt concentration is 0.1 pico currie per gram

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in μg/g). 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm). Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination. Looking at samples from each of the areas:

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance. We have made no attempt to determine the amount of soil that is contaminated.

Slag Pile East of No. 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226. The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally). This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag. This falls into the category of non-licensed material and possibly we need a ruling on it.

Furnace No. 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area. As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium.

Sample 41-1 tells us we have more cleanup to do around the north furnace support. This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports.

UCCNHT0000697

TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY: EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No.	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34.7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33.8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No. 6 Furnace Building	4.4±1.1	20.2	16±2	299±7	4.0±.9	17±2
2446-40-4	Light Slag - East of No. 6 Furnace Building	7.0±1.4	18.6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No. 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No. 24, V-A1	19±2	28.9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No. 24, V-A1	31±3	44.3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No. 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No. 30 After Cleanup	42±3	68.4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No. 30 After Cleanup	43±3	24 9	9.6±1 3 8.5±1.3	6.2±1.1 5.9±1.0	9.5±1.3 9.2±1.3**	

*Th229 (not positively identified)
**Duplicate Analyses

UCCNHT0000698

Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access.

Pit in Building No. 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium. However gamma radiation next to a drum will read 150 µR/hr. I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard The pit is still not completely clean with radiation of about 50 µR/hr above the pit and about 150 µR/hr. at the surface 9 feet down. Background is about 9µR/hr.

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State. Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use. I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation.

We are faced with the decision on how to proceed. (1)Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc. and would be unable to sell the property, (2)Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination. If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R. F. Kelly.

Hopefully we can tackle this on your planned visit next week.

Sincerely,

D. J. Hansen

mau/357h
Attachments

UCCNHT0000699

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr. Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation. The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No. 950-0139.

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site. We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed.

The location of the radioactivity and the levels of radiation observed are shown in Table I.

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce. Rm)	5-10 µR/hr.		
	- I-beam south of 30 Fce.		200 µR/hr.	20
	- Trunion support north of 30 Fce.		420 µR/hr.	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr.		
	- Area below dust collector		170 µR/hr.	15
2/20/86	Yard East of #6 Fce. Rm.	8-12 µR/hr.		
	- 6' x 6' Areas near slag pile		200 µR/hr.	20
2/20/86	Yard East of #6 Fce. Rm.			
	- 2' x 2' area near Bldg. 191		210 µR/hr	20

UCCNHT0000700

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984. (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986).

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446.

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce. Rm. #6)	5-10 µR/hr.	Area next to Fce. 30 above background
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr.	Some sample cans >1mR/hr.
	32 (#2 Packing)	8-10 µR/hr.	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr.	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr.	Area below Dust Coll. above background
2/20/86	(Storage Shed N.W. Corner of Umetco Property)	8-12 µR/hr.	OK
2/25/86	7 (Storeroom)	8-10 µR/hr.	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr.	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr.	OK
2/27/861	13, 14 (Aux. Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr.	OK
3/14/86	111 (Eng. Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg.)	7-8 µR/hr.	OK

UCCNHT0000701

The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers.

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No. 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24.

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority.

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above.

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs:
M. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
R. G. Tisch
C. T. Wentzel

UCCNHT0000702

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38 11 Duration of licenses. Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38.12 Renewal of licenses An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38.13 Amendment of licenses. A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38.14 Suspension or revocation. The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38 15 Additional requirements. Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

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timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38.27 Enclosed controlled areas. Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38.28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38 29 Vacating installations and property. (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferree or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

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TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits			
(1) Alpha emitters			
(i) Removable	15 pCi / 100 cm²	= 33 dpm / 100 cm²	average over any one surface
	45 pCi / 100 cm²	= 100 dpm / 100 cm²	maximum
(ii) Total (fixed)	450 pCi / 100 cm²	= 1000 dpm / 100 cm²	average over any one surface
	2250 pCi / 100 cm²	= 5000 dpm / 100 cm²	maximum
	0 25 mrem at 1 cm / hr		
(2) Beta-Gamma emitters			
(i) Removable (all beta-gamma emitters except Hydrogen 3)	100 pCi / 100 cm²		average over any one surface
	500 pCi / 100 cm²		maximum
Removable (Hydrogen 3)	1000 pCi / 100 cm²		average over any one surface
	5000 pCi / 100 cm²		maximum
(ii) Total (fixed)	0 2		surface

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

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TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

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TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 (T ½ = 9 2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0000707

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

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TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te [illegible]		3×10^{-3}
			3×10^{-4}
			6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

UCCNHT0000709

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years .		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

** μc/gm for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2, the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41, Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides, the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed "one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \cdots < 1$$

UCCNHT0000710

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

App [illegible] 1028

To (Name) Mr. D. G. Millenbruch
Umetco Minerals Corporation
Division Danbury, CT

Date April 15, 1986

Originating Dept TECHNOLOGY

Location

Area

Area

Answering Letter Date

Subject Niagara Plant Radioactive Material License 950-0139

Copy to Messrs:

R. G. Beverly/R.Jones
L. G. Evans
T. J. Kagetsu
F. V. McMillen
W. D. Smith

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background.

For your convenience, I am appending my letter of March 25, 1986 to Mr. R. F. Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination.

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed.

In cleaning up the area around No. 30 furnace we filled seventeen 55-gallon drums. We had Mr. William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada. The activity suggested the cleanup was not complete.

The radiation in Building 24 (V-A1) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite. This pit seemed endless; we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet. In addition, the pit was found to extend beneath the floor of the V-A1 operation.

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself. The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area. So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons. Even this amount presents problems in packaging for disposal.

UCCNHT0000711

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time. The gamma radiation increases from 200 μR/hr at the surface to about 600 μR/hr at a depth of one foot.

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses The sample identification and results are reported in the attached Table 1 Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license. Section 38.11, 38.29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One.

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified; all radioactive material must be shipped to an approved recipient; the premises must be decontaminated and surveyed to show decontamination took place; and the survey must be verified by the State. Source material (uranium and thorium) must be reduced to 0.05 percent by weight to meet decontamination. (This is 500 ppm or 500 μg/g.) For non-source material for which we are not licensed, the levels are specific for each element e.g. for radium the exempt concentration is 0.1 pico currie per gram.

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in μg/g). 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm). Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination. Looking at samples from each of the areas:

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance. We have made no attempt to determine the amount of soil that is contaminated.

Slag Pile East of No. 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226. The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally). This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag. This falls into the category of non-licensed material and possibly we need a ruling on it

Furnace No. 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area. As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium.

Sample 41-1 tells us we have more cleanup to do around the north furnace support. This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports.

UCCNHT0000712

TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY: EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No.	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34.7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33.8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No. 6 Furnace Building	4.4±1.1	20.2	16±2	299±7	4.0±.9	17±2
2446-40-4	Light Slag - East of No. 6 Furnace Building	7.0±1.4	18.6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No. 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No. 24, V-Al	19±2	28.9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No. 24, V-Al	31±3	44.3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No. 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No. 30 After Cleanup	42±3	68.4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No. 30 After Cleanup	43±3	24.9	9 6±1.3 8.5±1.3	6.2±1.1 5.9±1.0	9.5±1.3 9.2±1.3**	

*Th229 (not positively identified)
**Duplicate Analyses

UCCNHT0000713

Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access.

Pit in Building No. 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium. However gamma radiation next to a drum will read 150 μR/hr. I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard. The pit is still not completely clean with radiation of about 50 μR/hr above the pit and about 150 μR/hr. at the surface 9 feet down. Background is about 9μR/hr.

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use. I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation.

We are faced with the decision on how to proceed (1) Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc. and would be unable to sell the property, (2) Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination. If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R. F. Kelly.

Hopefully we can tackle this on your planned visit next week

Sincerely,

D. J. Hansen

mau/357h
Attachments

UCCNHT0000714

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr. Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation. The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No. 950-0139.

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site. We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed.

The location of the radioactivity and the levels of radiation observed are shown in Table I.

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce. Rm.)	5-10 µR/hr.		
	- I-beam south of 30 Fce.		200 µR/hr.	20
	- Trunion support north of 30 Fce.		420 µR/hr.	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr.		
	- Area below dust collector		170 µR/hr.	15
2/20/86	Yard East of #6 Fce. Rm.	8-12 µR/hr.		
	- 6' x 6' Areas near slag pile		200 µR/hr.	20
2/20/86	Yard East of #6 Fce. Rm.			
	- 2' x 2' area near Bldg. 191		210 µR/hr.	20

UCCNHT0000715

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984. (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986).

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446.

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce. Rm. #6)	5-10 μR/hr.	Area next to Fce. 30 above background.
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 μR/hr.	Some sample cans >1mR/hr
	32 (#2 Packing)	8-10 μR/hr.	OK
2/14/86	89, 89A (#10 Packing)	8-10 μR/hr.	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 μR/hr.	Area below Dust Coll above background
2/20/86	(Storage Shed N.W. Corner of Umetco Property)	8-12 μR/hr.	OK
2/25/86	7 (Storeroom)	8-10 μR/hr.	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 μR/hr.	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 μR/hr.	OK
2/27/861	13, 14 (Aux. Storeroom, Drum Shop, #8 Packing)	10-12 μR/hr	OK
3/14/86	111 (Eng. Annex-Works Lab)	15-17 μR/hr.	OK
3/14/86	3 (Compressor Bldg.)	7-8 μR/hr.	OK

UCCNHT0000716

The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers.

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No. 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24.

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority.

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above.

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
R. G. Tisch
C. T. Wentzel

UCCNHT0000717

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38.11 Duration of licenses. Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38 12 Renewal of licenses An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38 13 Amendment of licenses. A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38.14 Suspension or revocation. The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38 15 Additional requirements. Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

UCCNHT0000718

timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38.27 Enclosed controlled areas. Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38.28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38 29 Vacating installations and property. (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferee or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

UCCNHT0000719

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits			
(1) Alpha emitters			
(i) Removable	15 pCi / 100 cm	= 33 dpm / 100 cm²	average over any one surface
	45 pCi / 100 cm²	= 100 dpm / 100 cm²	maximum
(ii) Total (fixed)	450 pCi / 100 cm²	= 1000 dpm / 100 cm²	average over any one surface
	2250 pCi / 100 cm²	= 5000 dpm / 100 cm²	maximum
	0 25 mrem at 1 cm / hr		
(2) Beta-Gamma emitters			
(i) Removable (all beta-gamma emitters except Hydrogen 3)	100 pCi / 100 cm²		average over any one surface
	500 pCi / 100 cm		maximum
Removable (Hydrogen 3)	1000 pCi / 100 cm²		average over any one surface
	5000 pCi / 100 cm²		maximum
(ii) Total (fixed)	0 2-		surface

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

UCCNHT0000720

TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

UCCNHT0000721

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 ($T_{1/2}$ = 9.2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0000722

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

UCCNHT0000723

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

UCCNHT0000724

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70) . .	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

** μc/gm for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2, the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41, Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides, the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed "one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \cdots < 1$$

UCCNHT0000725

LINDE
UNION CARBIDE

Union Carbide Corporation
Linde Division
P O Box 44
Tonawanda, New York 14151-0044
Telex 754632

Research and Development
Analytical Services
Tonawanda, NY
March 26, 1986

RECEIVED
MAR 27 1986
FILE D. J. HANSEN

Dr. D.J. Hansen
UMETCO Minerals Corporation
137 47th Street
Niagara Falls, NY 14302

Dear Don:

Enclosed is a copy of the most recent version of N.Y.S. Industrial Code Rule 38, Ionizing Radiation Protection. I have managed to extract several bits of information from my own copy which may save you some time, at least as concerns your situation there at UMETCO.

Please refer to Table 5, p. 58. The loose material we are dealing with would appear to fall under the description of Part(c). Referral to Table 2, Column 2, on pp. 36-40 reveals the exempt quantities for a number of radionuclides, in microcuries per milliliter (per gram for solids). This Table, as you remember, was the one you didn't have available when we met last Friday, March 21. As you can see, neither of the elements we suspect of being present, thorium and uranium, are listed. Instead, these elements fall under the definition (p. 6, part 11) of source material, the limit for which (Table 5, Part (c)(2)) is 0.05 percent by weight.

It would therefore appear that we must identify the individual radioisotopes causing the elevated activity readings observed so far in our lab here at Tonawanda. This would have to be done on the outside, since our instrumentation can determine total radioactivity only and not that attributable to individual radioisotopes. If thorium and uranium were determined to be the cause, the next step would be to determine whether or not they are present at greater than 0.05 weight percent.

Please feel free to contact me with any questions. I will contact you when I've completed the radioassay of the samples I removed last Friday from the areas in question.

Sincerely,

Bill Smith
W.D. Smith

WDS/nmw
Enclosure
1891r

UCCNHT0000726

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING
65 COURT STREET
BUFFALO, N Y 14202

RAMONA L GALLAGHER
Assistant Commissioner of Labor

INVESTIGATIVE REPORT

Umetco - 47th and Royal Avenues, Niagara Falls

Report prepared by Robert F. Kelly on 25 MAR 86.

Report reviewed by _____ on _____.

On 20 MAR 86 after obtaining soil samples on the Umetco property, Dr. Richard Hanson related to me possible "problem" areas when he performed an external radiation survey of the plant facilities a short time ago.

There are four possible problem areas; all seem minor since external readings almost at contact showed levels at about 3-5 times background.

These are described below:

A) "Rock area" outside Building 24 -- This area shows some potential for a bigger problem; rocks on frozen grounds showed the readings mentioned above. Warmer weather will let facility determine what is under these piles.

B) Number 6 Furnace Room in Building 77 - Area shows slight contamination; its mainly on surface and doesn't seem to be a big problem.

C) Building 24 -- dust near furnace. Again doesn't seem to be a big hazard.

D) Samples in cans -- Now located in caged area in Building 25, they will be shipped as radioactive waste.

As related to Dr. Hansen, samples are to be analyzed in all three areas listed above and results sent to the Department. If within the limits, the Department will resurvey premises to insure compliance with Coderule 38.

Robert Kelly
Associate Radiophysicist

UCCNHT0000727

INTERNAL CORRESPONDENCE

METALS DIVISION

• P O BOX 579 4625 ROYAL AVE, NIAGARA FALLS, NEW YORK 14302

To (Name) Messrs.
Division R.J. Klotzbach
Location R.L. Folkman + F.V. McMillen
F.T. Temple

Date June 4, 1981

Originating Dept Safety, Health and Environmental Affairs

Answering letter date

Copy to F.M. Charles
R.F.X. Fusaro + J.B. Rouse
E.W. Kantz/File
W.M. Kelly + R.L. MacCallum
J.G. Oxaal + W. Chynoweth + D.R. Brosnahan
W.R. Pioli

Subject Results of Survey of Union Carbide Corporation Site, Niagara Falls, NY Formerly Used by the Manhattan Engineer District

Attached is a copy of a letter from Dr. W. E. Mott of the Department of Energy (DOE) and a radiological survey report on the Niagara property associated with the Manhattan Engineer District (MED) project during the period 1943-1946. Previous correspondence on this subject by Mr. W.R. Pioli and the writer, which provides background information, is also attached. It should be noted that the affected site is located within the area to be leased to Elkem.

DOE does not plan to conduct any further investigation since they do not believe the present onsite contamination is related to MED activities. If we do not disagree with this conclusion, DOE plans to certify that the site does not contain residual radioactive material above acceptable guidelines as a result of MED activity and will delete the site from their Formerly Utilized Sites Remedial Action Program. This implies that DOE will not cover any costs that may be incurred by Union Carbide in any future remedial actions.

DOE recommends that we conduct a detailed radiological survey (in-house or by consultants) of the site since radiation levels exceed Nuclear Regulatory Commission (NRC) guidelines for unrestricted use. The results of the survey could then be used to determine the magnitude of the corrective actions needed to comply with NRC requirements.

I had a telephone conversation with Dr. W.E. Mott on June 4, 1981 and he indicated that he would be pleased to discuss the subject with Mr. Klotzbach and the writer during a visit to the area within the next month. If there is any information available that would cause us to disagree with the DOE position expressed in Dr Mott's letter, please contact Mr. Klotzbach or the writer as soon as possible.

C. R. Allenbach

CRAllenbach:fhr
Attach.

UCCNHT0000728

RECEIVED
JUN 3 1981
SHEA DEPT.

Department of Energy
Washington, D.C. 20545

MAY 28 1981

Mr. R. C. Allenback, Manager
Environmental, Health and
Product Safety Affairs
Union Carbide Corporation
4625 Royal Avenue
P.O. Box 579
Niagara Falls, New York 14302

Dear Mr. Allenback:

In response to a request from William Pioli of your staff, I am enclosing a copy of the preliminary radiological survey report on the Union Carbide Corporation, Metals Division (former Electro Metallurgical "Electromet" Company), Niagara Falls, New York. We have also transmitted a copy of this report to Mr. Jack Spath, New York Energy Office.

As stated in the report, a detailed radiological survey of the Technology Area at the Union Carbide Corporation, Metals Division is needed. The Department of Energy (DOE) has no present plans to conduct this survey since it does not appear, based on available data, that the present contamination onsite is related to the DOE or one of its predecessor agencies, i.e., the Manhattan Engineer District (MED) or the Atomic Energy Commission (AEC). If, however, you can provide us with any additional information on the source of contamination, please call it to our attention. If no additional information is provided to us, we plan to certify that this site does not contain residual radioactive material above acceptable guidelines as a result of MED/AEC activities and will delete the site from the Formerly Utilized Sites Remedial Action Program.

We will be pleased to send you additional information as required.

Sincerely,

William E. Mott, Director
Environmental and Safety
Engineering Division (EP-14)
Office of Environmental Protection,
Safety, and Emergency Preparedness

Enclosure

cc: William Piolo, Union Carbide, w/encl
Jack Spath, New York Energy Office, w/o encl.
Herb Fish, U.S. Dept. of Energy, EP-7, w/encl.

UCCNHT0000729

PRELIMINARY SURVEY OF THE UNION CARBIDE CORPORATION METALS DIVISION PLANT, NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

December 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

UCCNHT0000730

PRELIMINARY SURVEY OF THE UNION CARBIDE CORPORATION METALS DIVISION PLANT, NIAGARA FALLS, NEW YORK

B. A. Berven and R. W. Doane

Introduction

On September 24, 1980, two representatives from Oak Ridge National Laboratory visited Union Carbide Corporation's Metal Division Plant (UCC-MD) in Niagara Falls, New York. The purpose of the visit was to perform a radiological survey of property where anomalously high levels of radiation were observed during an earlier preliminary survey of this site (see attachment). This report presents the results of this radiological survey.

A diagram of the technology area of the UCC-MD plant is shown in Fig. 1. The location of the anomalous radiation levels was between Buildings 163 and 166 where beta-gamma dose-rate levels were measured at 0.1 mrad/h at the ground surface.

Survey Methods

The preliminary radiological survey of the UCC-MD Technology Area consisted of the following measurements or samples: (1) a gamma-ray scan of the outside ground surface; (2) two bias surface soil samples from outside locations where external gamma radiation levels were significantly above background; (3) a gamma-ray scan of the inside floor and wall surfaces of Building 163; (4) bias alpha measurements inside Building 163 where external gamma radiation levels were significantly above background; (5) five smear samples from inside Building 163 measuring transferable alpha and beta contamination.

Portable instrumentation used in this survey included a gamma-ray scintillator [NaI (Tl)] survey meter, an alpha scintillation [ZnS (Ag)] counter, and a Geiger-Mueller (G-M) survey meter.

Survey Results

Outside

The gamma-ray scanning of the ground surface in the Technology Area at UCC-MD indicates wide-spread contamination over an extensive portion of this property (see shaded area in Fig. 2). Relatively high concentrations

UCCNHT0000731

of gamma-emitting radionuclides were observed in localized areas. External gamma exposure rates on ground surfaces were measured, ranging from background (approximately 10 μR/h) to a maximum of 3 mR/h. The contamination appeared to be low-level but uniform under several asphalt pads, and high-level and "spotty" following two railroad spurs traversing the property.

The highest external gamma levels (3 mrad/h)* observed in the area where surface soil sample NF_1 (see Fig. 3) was located. Potentially contaminated material appeared to be located beneath the asphalt pads surrounding Buildings 163 and 171. Surface exposure rates were a general 30 μR/h around Building 171, but appeared to be highly variable around Building 163, ranging from 17 to 100 μR/h.

The location of two surface soil samples (0-15 cm) taken in the Technology Area are shown in Fig. 3. The results are listed below:

Sample	External Gamma Exposure Rate at Ground Surface (μR/h)	Radionuclide Concentration (pCi/g)		
		^{238}U	^{226}Ra	^{232}Th
NF_1	3000	3200 ± 3%	3300 ± 4.8%	860 ± 7.1%
NF_2	83	81 ± 3%	72 ± 1.7%	190 ± 7.2%

The highest external gamma readings were found at the surface of the soil, with the levels decreasing rapidly with increasing depth.

Inside Building 163

Low-level contamination was found inside Building 163 during a cursory survey. The surface external gamma levels from the walls and floor were within typical background ranges (13 to 17 μR/h). The alpha activity on the walls and floor were elevated but not significantly above background levels at 68 dpm/100 cm^2.

Cracks in the floor of Building 163 exhibited elevated radiation levels, with external gamma activities ranging from 17 to 50 μR/h, and alpha activity over these cracks ranging from 100 to 150 dpm/100 cm^2.†

*This exceeds Nuclear Regulatory Commission's maximum beta-gamma level guideline of 1.0 mrad/h at 1 cm (see Ref. 1).

†This exceeds Nuclear Regulatory Commission's guideline of 100 dpm/100 cm^2 for alpha activity originating from ^{226}Ra (see Ref. 1)

UCCNHT0000732

Five smear samples were taken to determine the amount of transferable alpha and beta contamination. The location of the smear samples are identified in Fig. 4. The levels of transferable alpha and beta-gamma contamination were all at background levels.

At location "b", surface external gamma levels measured 83 μR/h and alpha activity measured approximately 530 dpm/100 cm^2 (also above NRC guidelines). At location "c", beta-gamma levels of 0.12 mrad/h were observed.

Discussion

Relatively high concentrations of radionuclides in the ^{232}Th and ^{238}U decay chains exist in the surface soil in the Technology Area at UCC-MD in Niagara Falls, New York. These materials also appear in cracks and seams in the walls and floor of Building 163.

Dr. C. R. Allenback, Manager of Environmental, Health, and Product Safety Affairs at the UCC-MD, indicated thorium-bearing ores were used during operations at this site, however, these operations were unrelated to Manhattan Engineer District (MED)/Atomic Energy Commission (AEC) activities. In view of the nature of past MED/AEC operations (limited to reacting of UF_4 to uranium metal), it seems unlikely that the present contamination on-site is related to those MED/AEC activities. However, because uranium appears to be present in the soil in significant amounts, contamination due to MED/AEC activities cannot be eliminated, but only considered improbable.

Recommendations

Based on the results of this preliminary survey, it is recommended that a formal detailed radiological survey of the Technology Area at the UCC-MD Plant in Niagara Falls, New York, be conducted by some responsible agency since radiation levels exceed Nuclear Regulatory Commission guidelines for unrestricted use.

References

Nuclear Regulatory Commission, "Guidelines for Decontamination of Facilities or Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Product, Source, or Special Nuclear Material," November 1976.

UCCNHT0000733

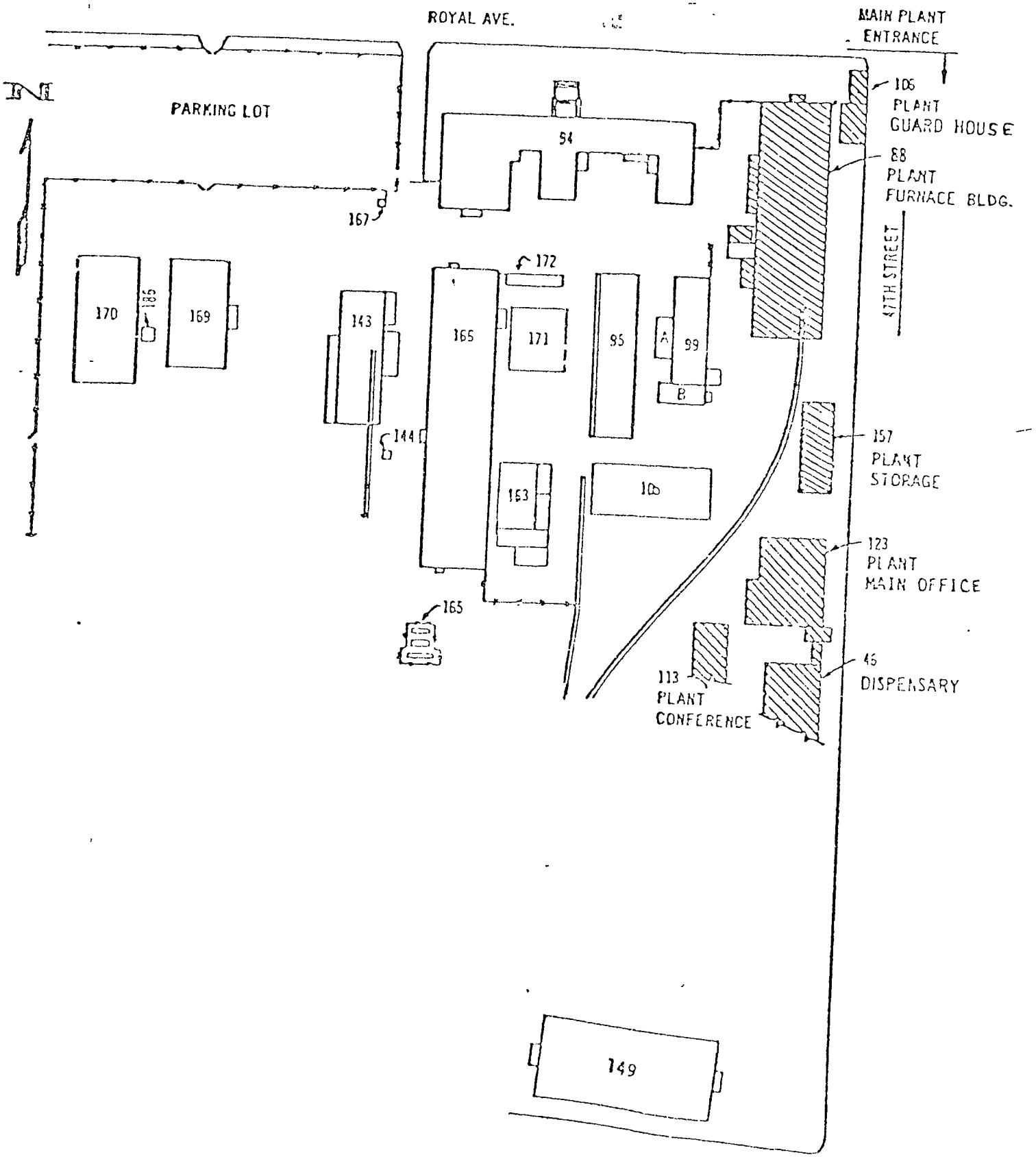

Fig. 1. Technology Area at the Union Carbide Corporation - Metals Division Plant (former Electromet site) in Niagara Falls, NY (adapted from UCC-MD drawing).

UCCNHT0000734

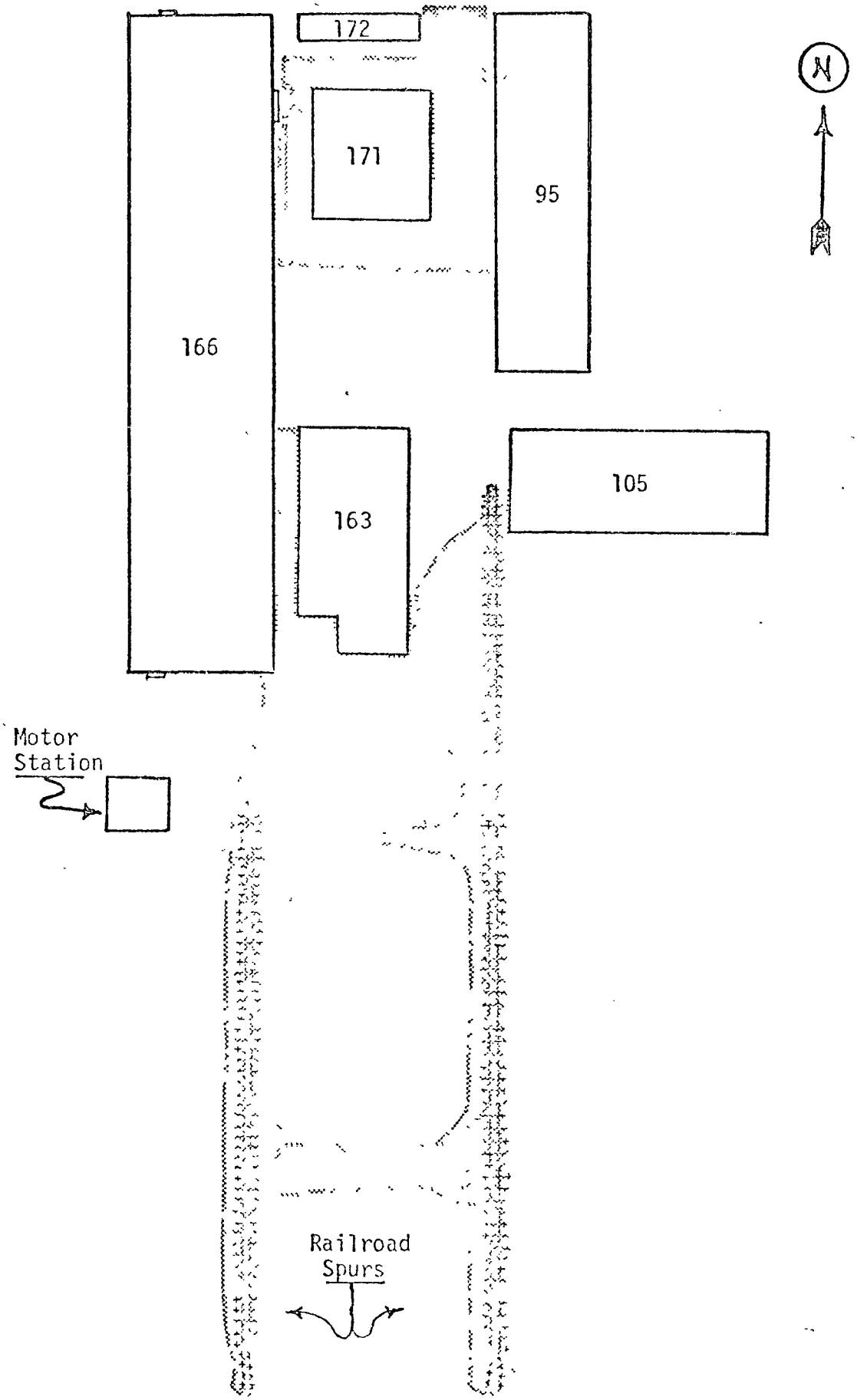

Fig. 2. Location of elevated surface gamma-ray levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY.

UCCNHT0000735

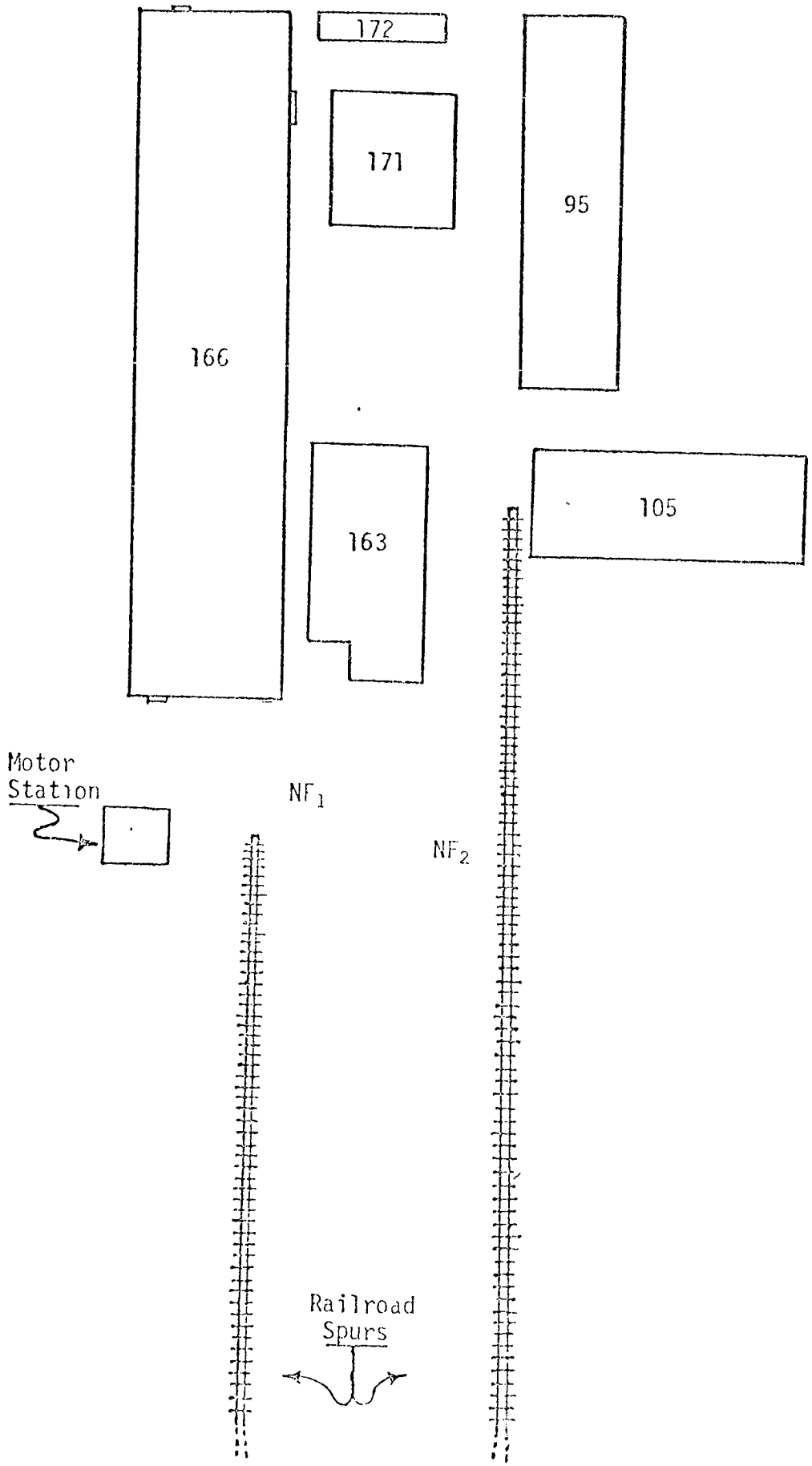

Fig. 3. Location of surface soil samples taken in the Technology Area of UCC-MD in Niagara Falls, NY.

UCCNHT0000736

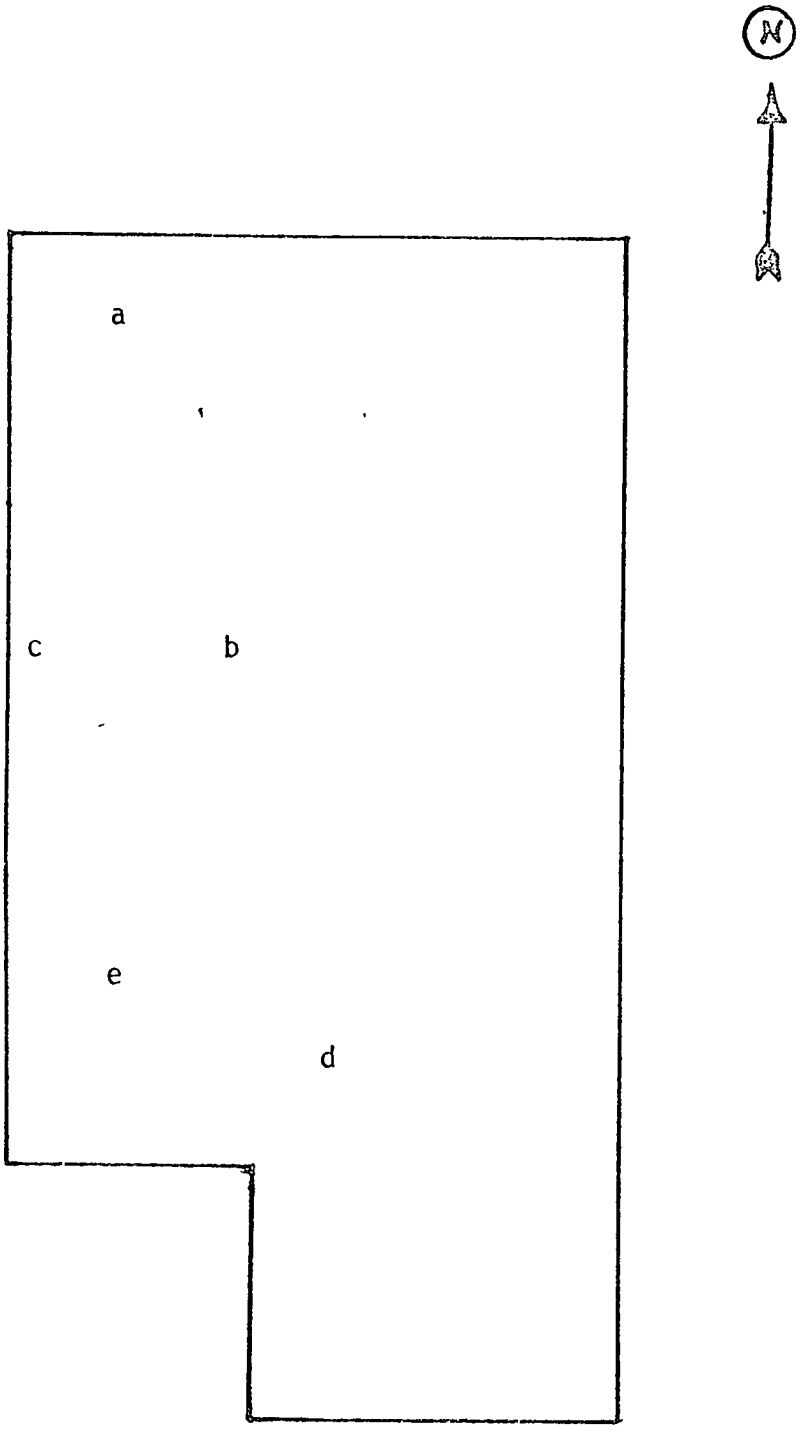

Fig. 4. Location of smear samples in Building 163 in the Technology Area of UCC-MD in Niagara Falls, NY.

UCCNHT0000737

ATTACHMENT

PRELIMINARY SURVEY OF ELECTROMET CORPORATION UNION CARBIDE METALS DIVISION NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

March 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

UCCNHT0000738

ELECTROMET CORPORATION
UNION CARBIDE METALS DIVISION
NIAGARA FALLS, NEW YORK

At the request of the Department of Energy (DOE, then ERDA), a preliminary survey was performed at the former Electromet Plant (currently Union Carbide Corporation - Metals Division plant) in Niagara Falls, New York (see Fig. 1), on August 24, 1976, to assess the radiological status of those facilities utilized under Manhattan Engineer District (MED) contract during the period 1943 through 1946. Robert D. Forgeng, Plant Manager, provided information about the contract operations and identified the former site of the one building (a cinder block and wood structure) utilized in the process. C. R. Allenbach and Don Hawkes also provided information as to the building location and project operations. Also, Bill Chynoweth, an employee at the plant during the MED contract period, provided information about operational processes and assisted in identifying the location of the building which was demolished about 1958.

The project involved receiving Green Salt (UF_4) in drums from the Linde Air plant at Tonawanda, New York, reacting the Green Salt in furnaces, converting it to metal, and then recasting it into ingots. The building was formerly located where Building 166 now stands and just west of Building 163 (see Figs. 2 and 3) which existed at the time of the project. The former process building was constructed of wood and cinder block and was about 18 x 46 m at one end and 14 x 46 m at the opposite end. Waste from the operation was disposed at the Lake Ontario Ordnance Works depot. Residues of dolomite slag liners (MgF_2 slag), uranium chips, and crucible dross associated with the process were shipped to other sites for uranium recovery.

Present Use of Facilities

The building utilized in the MED project was washed, vacuumed, and, in some locations, the concrete floor and some wood platforms were removed (see Report N04600). Following the project (post-1946), the building was used for zirconium processing from 1947 to 1948, and later titanium was processed prior to demolition. Building 166 (see Fig. 4)

UCCNHT0000739

was constructed on the site of the former process building, and it is currently used by Union Carbide's Metal Division operations.

Results of Preliminary Survey

The preliminary survey was performed by H. W. Dickson of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office (then ERDA). Accompanying Dickson and Thornton during the survey was C. R. Allenbach, Don Hawkes, and Bill Chynoweth. Measurements taken at this site included external gamma-ray exposure rates taken at 1 m in height and beta-gamma dose rate taken at 1 cm from the surface. Results of the survey measurements were within background levels with the exception of slightly elevated background with maximum beta-gamma dose-rate readings of 0.1 mrad/hr at a location between Buildings 163 and 166. Survey measurements in sections of the old Union Carbide dump (200 to 300 acres and now owned by CECOS International, Inc.) located to the north of Pine Avenue (see Figs. 5 and 6) resulted in radiation levels that were not significantly above background levels. Some of the waste from the process and rubble from the demolition of the old building has been buried at this dump.

In view of the near background radiation measurements taken at this site, a comprehensive, formal survey will probably not be required. However, it is suggested as a precautionary measure to (1) obtain further measurements between Buildings 163 and 166 to define extent of elevated readings, (2) obtain a soil sample at location in (1) where maximum β-γ and external gamma measurements are observed, (3) drill core samples in the old Union Carbide dump to determine if any radioactive material has been deposited in this area.

A formal survey of this facility was performed as part of the dismantlement and decommissioning of Electromet by the Health and Safety Division of the AEC on August 11 and 14, 1953. The results of this survey are reported in the attached document.

UCCNHT0000740

R. L. Kirk, Director,
Production Division

September 28, 1953

W. B. Harris, Chief,
Industrial Hygiene Branch, Health & Safety Division

DISMANTLEMENT OF ELECTROMET CO.-CONTRACT NO. W-7405-ENG-14
DECONTAMINATION SURVEY OF AUGUST 11th and 14th, 1953.

SYMBOL: HSH.PBK

A resurvey of contamination was made by the Health and Safety Division in the standby green to metal plant of the Electromet Company, Niagara Falls, New York. This survey was made at the request of Mr. B. F. Fields, Electromet Plant Superintendent and our Administrative Operations and Legal Divisions in order to determine whether the radiation levels are being met before release from commission control.

On the visit of August 11, 1953, it was found that Electromet personnel were in the process of removing wooden structures around the vacuum casting furnaces, piping and other structural equipment. The results of the radiation survey of December 10-12 and the recommendations contained in the memo dated February 3, 1953, to F. M. Belmore from W B. Harris re Decontamination were reviewed with Mr. Fields. In addition, decontamination procedures for removal of uranium contamination were discussed with plant personnel.

On August 14, 1953, a revisit to the plant was made to determine.

1. The degree of contamination of remaining equipment and the building proper.

2. Need for any additional recommendation for plant cleanup.

PROCEDURES

Direct radiation measurements were taken on all equipment, floors and walls of the plant using Eltronic and Detectron Beta-Gamma survey meters. Smear samples were taken from those locations and equipment at which high smears were found in the December, 1952 survey. The smears were taken over an area of 150 sq. cm. using 1-1/8" Whatman filter paper.

During cleanup operations and the contamination study general air samples were collected on 1-1/8" Whatman #41 filter paper, employing a universal sampler at 20 liters per minute as the basic equipment. The samples were taken in such former operations areas as the graphite burnout, vacuum casting as billet saw areas.

UCCNHT0000741

RESULTS OF SURVEY

Radiation target levels for decontamination have been revised since the December, 1952 survey due to a recommended increase in any beta exposures of five times the previous level. The criteria for decontamination which must be met by any buildings before release by NYOO are now

1. The average gamma radiation at 3 feet from the floors or walls should not exceed 0.3 mr/hr. The average beta-gamma radiation measured in a like manner should not exceed 1.5 mrep/hr.

2. The maximum gamma radiation measured from the floors or walls should not exceed 0.6 mr/hr. The maximum beta-gamma radiation measured in a like manner should not exceed 3.0 mreps/hr.

3. No gamma radiation measured in contact with the floor should exceed 0.9 mr/hr. The maximum beta-gamma radiation measured in a contact with the floor should not exceed 4.5 mrep/hr.

Due to the nature of the survey instrument employed and the material measured, the field beta gamma intensities must be computed to the actual beta-gamma value using the expression:

$$\beta\gamma \text{ actual} = 2\beta\gamma \text{ Field} - \gamma \text{ Field}$$

The attached table which contains the results of the computed direct radiation measurements and smear samples taken on equipment, walls, floors and other building structures reveals the following:

(a) The highest gamma reading (0.1 mr/hr) was found on the floor of the old graphite burnout area. The concommitant $\beta\gamma$ measurement was only 1.7 mrep/hr.

(b) The highest beta gamma contamination (4.4 mreps/hr) was found on the racine cutting machine #931. Gamma contamination was negligible.

(c) Mechanical saw #1630 was found to be contaminated with 4.0 mreps/hr beta gamma.

(d) A high beta-gamma reading of 5.0 mreps/hr was found on the Lancaster mixer. Gamma contamination was negligible.

UCCNHT0000742

(e) Vacuum casting equipment wooden platforms, and the former green mixing equipment were removed from the building at the time of this survey. This equipment and contaminated wood partitions were checked and found to be uranium contaminated. It was agreed by Mr. Fields and Dr. Spedding, project leader, that the wood partitions would be burned and ashes buried. Other equipment, such as furnace casting equipment and parts was to be sent to LOSA for storage and disposal.

(f) All other equipment was found to meet the radiation target levels.

Of the eleven general air samples taken in the standby green to metal plant during cleanup operations only one sample (117 α d/m/M^3) exceeded the present acceptable level of 70 α d/m/M^3. However, the average general air concentration for the eleven samples was only 18 α d/m/M^3. The following table shows the average high and low general air concentrations found at specific locations:

Location	Concentration d/m/M^3 Average	High	Low	Number of Samples
Center of area 20 ft South of Machine Saw	12	25	2	4
Center of area 10' South vacuum casting area	7	14	3	3
At graphite burnout area	40	117	2	4

α d/m/M^3 = alpha disintegrations per minutes per cubic meter of air.

CONCLUSION

This survey shows that a negligible degree of contamination both to equipment and to building has been measured. Since this contamination study was made during such major cleanup operations as demolition of floor by air hammer, sweeping, etc., and inasmuch as the criteria for uranium contamination has still been met by the plant, it is recommended that the plant be released by the government.

Three pieces of equipment, namely the Racine Cutter, Mechanical Saw and Lancaster mixer found to contain beta-gamma up to 5.0 mreps/hr was scrubbed and sand blasted by Electromet personnel since this survey Beta-gamma survey measurements by Dr. R. Spedding revealed no reduction in beta-gamma contamination.

UCCNHT0000743

The Electrometallurgical Co., according to Dr. Spedding, intends to use the aforementioned equipment in connection with their own radio metallurgy program. It is recommended that Electromet notify the NYOO they will agree not to sell the contaminated equipment to any third party and will not hold the NYOO responsible for any damage incurred by Electromet personnel in using this equipment.

Att:
Table of Radiation Readings and Smear Results.

cc: J. Quidor, Admin. Op.
J. Maffucci, Prop. Mgmt.
M. Medwin, Asst. Gen'l. Counsel

UCCNHT0000744

TABLE OF DIRECT RADIATION READINGS AND SMEAR RESULTS

Location	Direct Radiation βγ (mrep/hr)	Direct Radiation γ mr/hr	Smear Sample α d/m/sample
Entrance to Lab. 3' level	neg.	neg.	
Entrance to Lab. Floor (Kentile)	.04	neg.	74
Chem. Lab.-Lab Desk near door	.06	neg.	57
Chem. Lab. Cupboard	.0.1	neg.	1.8
Chem. Lab. 3' level	neg.	neg.	
Chem. Lab.-Office Floor	.06	0.02	107
Chem. Lab. Office Wall	neg.	neg.	1.1
Corridor in front of Chem. lab. floor	neg.	neg.	
Vicinity Men's room-3' level	neg.	neg.	
Vicinity Men's room-floor	.06	neg.	52
Wall near men's room	0.1	neg.	72
Old graphite area-3' level	.18	neg.	
Old graphite area-floor	1.7	0.1	187
Floor inside graphite burnout area	0.16	.04	10
3' level between vacuum furnace and wall	.07	.03	
Floor between vac. furnace and wall	.55	.04	432
Wall between vac. furnace and wall	.27	.03	234
3' level-Main entrance to plant	.02	neg.	
Floor-Main entrance	.12	neg.	174
Floor around cut-off saw 931	.12	neg.	44
Floor around cut-off saw 1630	.11	.01	38
Saw area 3' level	.04	neg.	
Near storage room 3' level	neg.	neg.	
Near storage room-floor	neg.	neg.	216
Floor under former vac. furnace platform	.75	.05	234
3' level at former vac. furnace platform area	.29	.01	
Buffalo room 3' level	neg.	.01	
Near Buffalo room (floor entrance)	.09	neg.	338
Lancaster Room-3' level	.06	.01	
Lancaster room-Wall	neg.	neg.	
Lancaster room-floor	.09	.01	
Ice crusher room-3' level	neg.	neg.	
Ice crusher room-floor	.18	neg.	
Old GFF furnace	.42	.02	
Vicinity of old GFF furnace	.35	.01	657
Old bomb breakout room-floor	.11	.01	66
Old jolter area of old break-out room-floor	.10	.01	66
Old jolter area of old break-out room-wall	.09	.01	21
Near main entrance of old break-out room-3' level	1.54	.04	
Buffalo room-3' level	0.08	.01	
Buffalo room-floor	1.06	neg.	338

UCCNHT0000745

TABLE OF DIRECT RADIATION READINGS AND SMEAR RESULTS

Name of Item	Govt. No.	Direct Radiation βγ (mrep/hr)	Direct Radiation γ mr/hr	Smear Sample α d/m/sample
Lancaster mixer	--	5.0	neg.	
Mechanical Saw	1630	4.0	neg.	
Racine cutting machine	931	4.4	neg.	
Fire Blanket	481	.12	neg	
Stretcher	804	0.2	neg.	
Hydraulic lifter	165	2.0	neg.	
Crusher	1025	0.1	neg.	140
Hydrowhirl	483	.8	neg.	36
Truck	1220	.24	.01	291
Piping to Buffalo Forge		.12	.02	41
Buffalo forge	83	.44	.02	283
Buffalo Forge canister		.10	neg	60

UCCNHT0000746

R. L. Kirk, Director, Production Division November 9, 1953

W. B. Harris, Chief, Industrial Hygiene Branch,
Health & Safety Division

DISMANTLEMENT OF ELECTROMET COMPANY - CONTRACT NO. W-7405-ENG-14

SYMBOL: HSH:PBK

This is to supplement and to clarify certain doubts in the memo Harris to Kirk dated August 28, 1953, re Electromet Decontamination.

1. The decontamination survey of Electromet was pursuant to Contract AT (30-1)-8-23 and the maximum tolerances as stated in the contract have been met and the property therefore recommended for release to Electromet.

2. It was stated in the memo that radiation target levels for decontamination have been revised since the December, 1952 survey due to a recommended increase in any beta exposure of 5 times the previous level. This does not mean, however, that the property we have released to Electromet exceeded the tolerance levels prescribed and is unsafe.

3. It was not known at the time the August 28th memo was written that the held harmless clause was included in the contract and therefore said clause was referred to in the "conclusion" of the memo.

cc: Asst. Gen. Counsel (Medwin)
J. S. Quidor, Dir., Adm. Op.
J. Maffucci, Adm. Op.

UCCNHT0000747

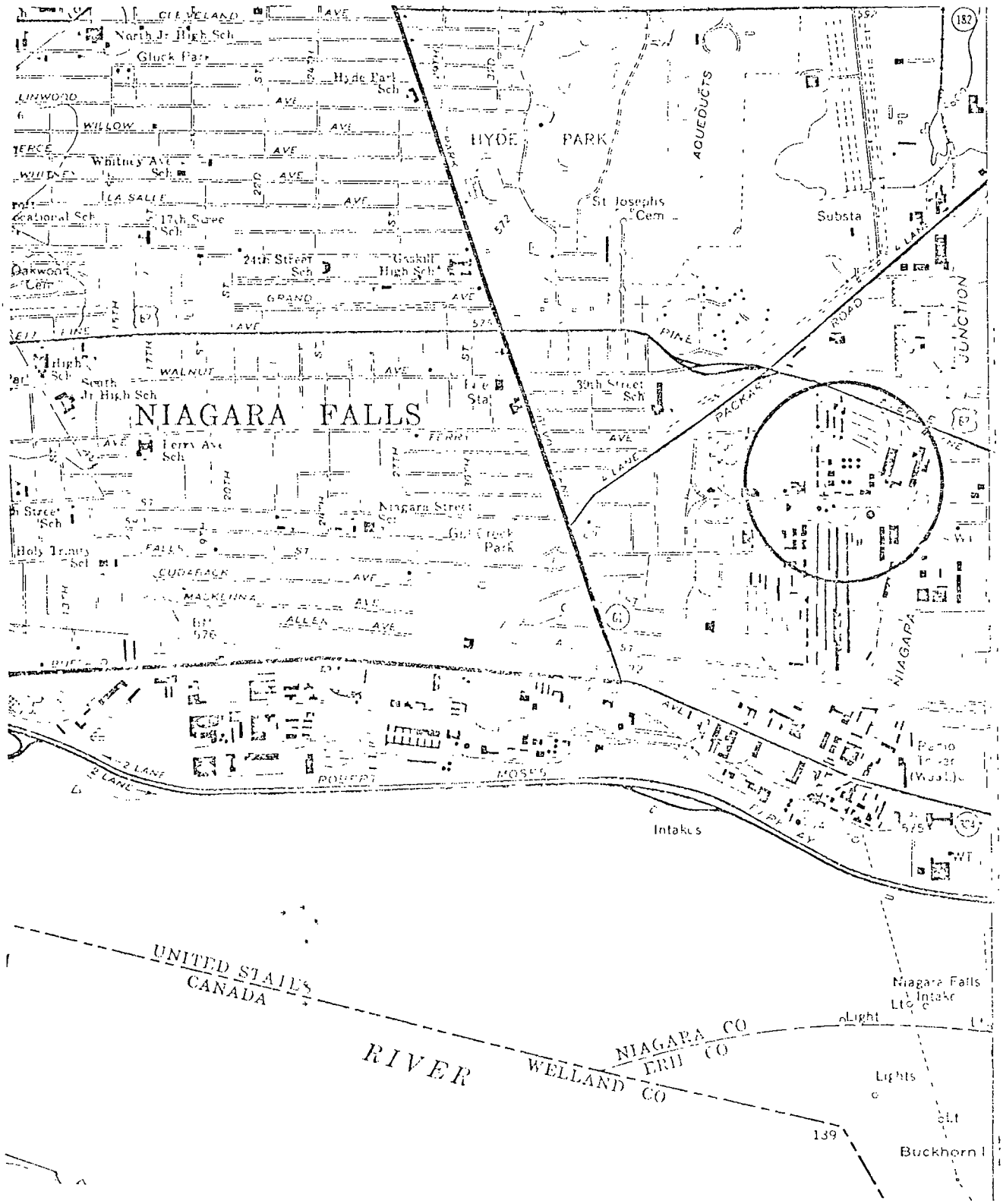

Fig. 1. Location of the Electromet Corporation - Union Carbide Metals Division site in Niagara Falls, New York.

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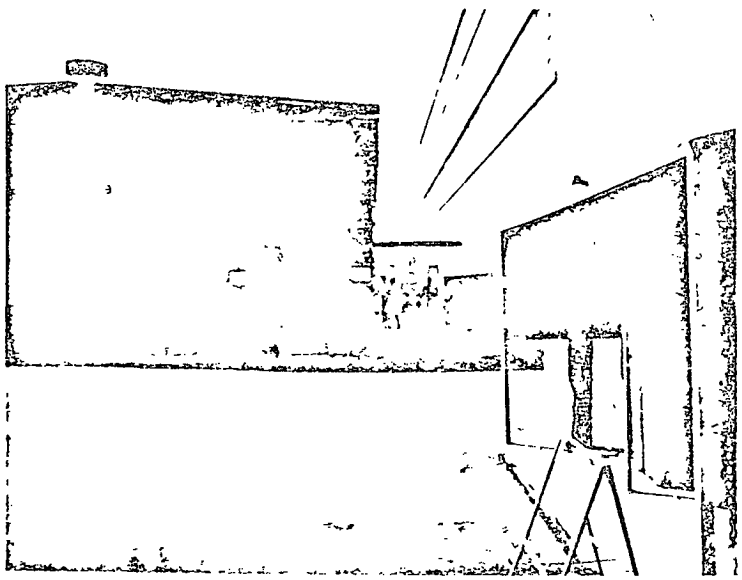

Fig. 2. North end of Building 163 and east side of Building 166.

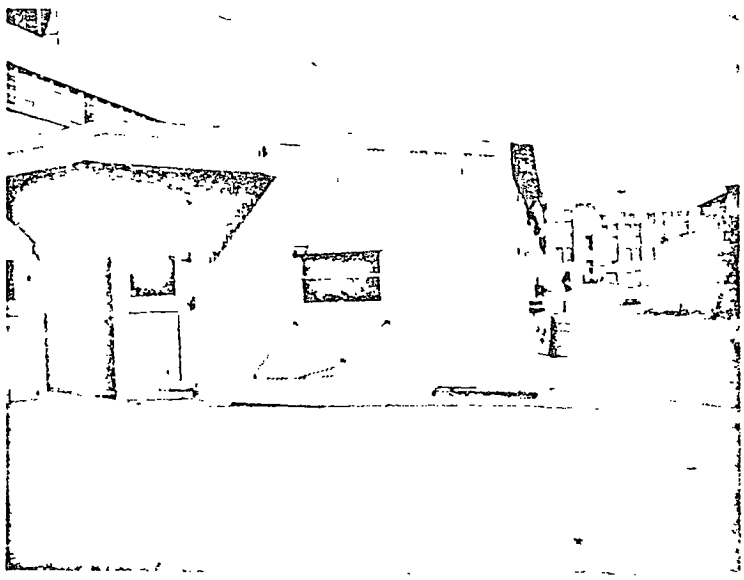

Fig. 3. South end of Building 163 and east side of Building 166.

UCCNHT0000749

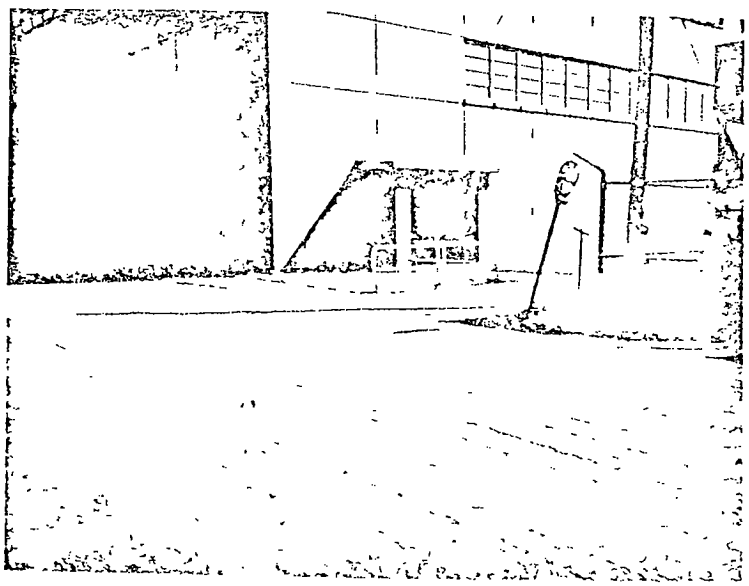

Fig. 4. Building 166.

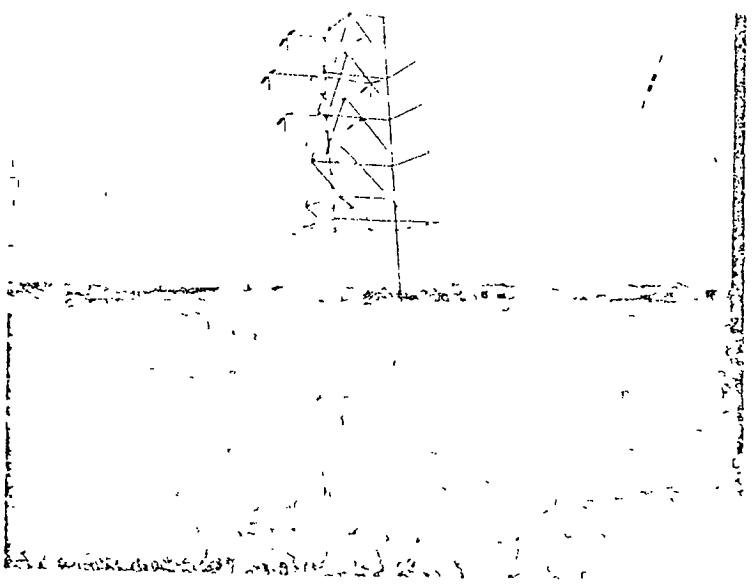

Fig. 5. Old Carbide Dump (now "Niagara Recycling").

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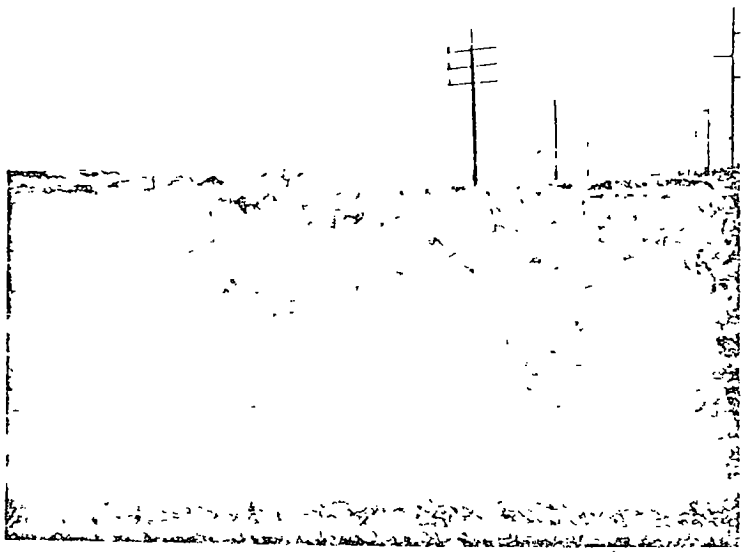

Fig. 6. Old Carbide Dump (now "Niagara Recycling").

UCCNHT0000751

Umetco Minerals Corporation

1814

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To (Name) Mr. D. G. Millenbruch
Umetco Minerals Corporation
Division Danbury, CT

Location

Area

Copy to Messrs:

R. G. Beverly/R.Jones
L. G. Evans
T. J. Kagetsu
F. V. McMillen
W. D. Smith

Date April 15, 1986

Originating Dept TECHNOLOGY

Area

Answering Letter Date

Subject Niagara Plant Radioactive
Material License 950-0139

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background.

For your convenience, I am appending my letter of March 25, 1986 to Mr. R. F. Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination.

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed.

In cleaning up the area around No. 30 furnace we filled seventeen 55-gallon drums. We had Mr William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada. The activity suggested the cleanup was not complete.

The radiation in Building 24 (V-Al) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite. This pit seemed endless; we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet. In addition, the pit was found to extend beneath the floor of the V-Al operation.

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself. The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area. So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons. Even this amount presents problems in packaging for disposal

UCCNHT0000752

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time. The gamma radiation increases from 200 μR/hr at the surface to about 600 μR/hr at a depth of one foot.

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses. The sample identification and results are reported in the attached Table 1. Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license. Section 38.11, 38.29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One.

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified; all radioactive material must be shipped to an approved recipient; the premises must be decontaminated and surveyed to show decontamination took place; and the survey must be verified by the State. Source material (uranium and thorium) must be reduced to 0 05 percent by weight to meet decontamination. (This is 500 ppm or 500 μg/g.) For non-source material for which we are not licensed, the levels are specific for each element e.g. for radium the exempt concentration is 0.1 pico currie per gram

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in μg/g). 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm). Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination. Looking at samples from each of the areas:

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance. We have made no attempt to determine the amount of soil that is contaminated.

Slag Pile East of No. 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226. The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally). This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag. This falls into the category of non-licensed material and possibly we need a ruling on it.

Furnace No. 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area. As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium.

Sample 41-1 tells us we have more cleanup to do around the north furnace support. This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports.

UCCNHT0000753

TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY: EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No.	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34.7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33.8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No. 6 Furnace Building	4.4±1.1	20.2	16±2	299±7	4.0±.9	17±2
2446-40-4	Light Slag - East of No. 6 Furnace Building	7.0±1.4	18.6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No. 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No. 24, V-Al	19±2	28 9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No. 24, V-Al	31±3	44.3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No. 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No. 30 After Cleanup	42±3	68.4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No. 30 After Cleanup	43±3	24 9	9 6±1.3 8.5±1 3	6.2±1.1 5.9±1.0	9.5±1.3 9.2±1.3**	

*Th229 (not positively identified)
**Duplicate Analyses

UCCNHT0000754

Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access.

Pit in Building No. 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium. However gamma radiation next to a drum will read 150 µR/hr. I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard The pit is still not completely clean with radiation of about 50 µR/hr above the pit and about 150 µR/hr. at the surface 9 feet down. Background is about 9µR/hr.

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State. Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use. I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation.

We are faced with the decision on how to proceed. (1) Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc. and would be unable to sell the property, (2) Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination. If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R. F. Kelly.

Hopefully we can tackle this on your planned visit next week

Sincerely,

D. J. Hansen

mau/357h
Attachments

UCCNHT0000755

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr. Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation. The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No. 950-0139.

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site. We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed.

The location of the radioactivity and the levels of radiation observed are shown in Table I.

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce. Rm.)	5-10 µR/hr.		
	- I-beam south of 30 Fce.		200 µR/hr.	20
	- Trunion support north of 30 Fce.		420 µR/hr.	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr.		
	- Area below dust collector		170 µR/hr.	15
2/20/86	Yard East of #6 Fce. Rm.	8-12 µR/hr.		
	- 6' x 6' Areas near slag pile		200 µR/hr.	20
2/20/86	Yard East of #6 Fce. Rm.			
	- 2' x 2' area near Bldg. 191		210 µR/hr.	20

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The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984. (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986).

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446.

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce. Rm. #6)	5-10 µR/hr.	Area next to Fce. 30 above background.
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr.	Some sample cans >1mR/hr.
	32 (#2 Packing)	8-10 µR/hr.	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr.	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr.	Area below Dust Coll. above background.
2/20/86	(Storage Shed N.W. Corner of Umetco Property)	8-12 µR/hr.	OK
2/25/86	7 (Storeroom)	8-10 µR/hr.	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr.	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr	OK
2/27/861	13, 14 (Aux. Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr.	OK
3/14/86	111 (Eng. Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg.)	7-8 µR/hr.	OK

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The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers.

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No. 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24.

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority.

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above.

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
R. G. Tisch
C. T. Wentzel

UCCNHT0000758

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38.11 Duration of licenses. Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38.12 Renewal of licenses. An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38 13 Amendment of licenses A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38 14 Suspension or revocation. The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38.15 Additional requirements. Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

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timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38 27 Enclosed controlled areas Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38 28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38.29 Vacating installations and property. (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferree or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

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TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits		
(1) Alpha emitters		
(i) Removable	$\frac{15\ pCi}{100\ cm} = \frac{33\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{45\ pCi}{100\ cm} = \frac{100\ dpm}{100\ cm^2}$	maximum
(ii) Total (fixed)	$\frac{450\ pCi}{100\ cm^2} = \frac{1000\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{2250\ pCi}{100\ cm^2} = \frac{5000\ dpm}{100\ cm^2}$	maximum
	$\frac{0.25\ mrem\ at\ 1\ cm}{hr}$	
(2) Beta-Gamma emitters		
(i) Removable (all beta-gamma emitters except Hydrogen 3)	$\frac{100\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{500\ pCi}{100\ cm}$	maximum
Removable (Hydrogen 3)	$\frac{1000\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{5000\ pCi}{100\ cm^2}$	maximum
(ii) Total (fixed)	0.2	surface

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0.05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

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TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-4}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

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TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 (T $_{1/2}$ = 9 2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0000763

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

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TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

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TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70) . .	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

**μc/gm for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2, the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41, Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides, the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed "one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \quad < 1$$

UCCNHT0000766

PRELIMINARY SURVEY OF
ELECTROMET CORPORATION
UNION CARBIDE METALS DIVISION
NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

March 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

UCCNHT0000767

ELECTROMET CORPORATION
UNION CARBIDE METALS DIVISION
NIAGARA FALLS, NEW YORK

At the request of the Department of Energy (DOE, then ERDA), a preliminary survey was performed at the former Electromet Plant (currently Union Carbide Corporation - Metals Division plant) in Niagara Falls, New York (see Fig. 1), on August 24, 1976, to assess the radiological status of those facilities utilized under Mannattan Engineer District (MED) contract during the period 1943 through 1946. Robert D. Forgeng, Plant Manager, provided information about the contract operations and identified the former site of the one building (a cinder block and wood structure) utilized in the process. C. R. Allenbach and Don Hawkes also provided information as to the building location and project operations. Also, Bill Chynoweth, an employee at the plant during the MED contract period, provided information about operational processes and assisted in identifying the location of the building which was demolished about 1958.

The project involved receiving Green Salt (UF_4) in drums from the Linde Air plant at Tonawanda, New York, reacting the Green Salt in furnaces, converting it to metal, and then recasting it into ingots. The building was formerly located where Building 166 now stands and just west of Building 163 (see Figs. 2 and 3) which existed at the time of the project. The former process building was constructed of wood and cinder block and was about 18 x 46 m at one end and 14 x 46 m at the opposite end. Waste from the operation was disposed at the Lake Ontario Ordnance Works depot. Residues of dolomite slag liners (MgF_2 slag), uranium chips, and crucible dross associated with the process were shipped to other sites for uranium recovery.

Present Use of Facilities

The building utilized in the MED project was washed, vacuumed, and, in some locations, the concrete floor and some wood platforms were removed (see Report ND4600). Following the project (post-1946), the building was used for zirconium processing from 1947 to 1948, and later titanium was processed prior to demolition. Building 166 (see Fig. 4)

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was constructed on the site of the former process building, and it is currently used by Union Carbide's Metal Division operations.

Results of Preliminary Survey

The preliminary survey was performed by H. W. Dickson of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office (then ERDA). Accompanying Dickson and Thornton during the survey was C. R. Allenbach, Don Hawkes, and Bill Chynoweth. Measurements taken at this site included external gamma-ray exposure rates taken at 1 m in height and beta-gamma dose rate taken at 1 cm from the surface. Results of the survey measurements were within background levels with the exception of slightly elevated background with maximum beta-gamma dose-rate readings of 0.1 mrad/hr at a location between Buildings 163 and 166. Survey measurements in sections of the old Union Carbide dump (200 to 300 acres and now owned by CECOS International, Inc.) located to the north of Pine Avenue (see Figs. 5 and 6) resulted in radiation levels that were not significantly above background levels. Some of the waste from the process and rubble from the demolition of the old building has been buried at this dump.

In view of the near background radiation measurements taken at this site, a comprenersive, formal survey will probably not be required. However, it is suggested as a precautionary measure to (1) obtain further measurements between Buildings 163 and 166 to define extent of elevated readings, (2) obtain a soil sample at location in (1) wnere maximum β-γ and external gamma measurements are observed, (3) drill core samples in the old Union Carbide dump to determine if any radioactive material has been deposited in this area.

A formal survey of this facility was performed as part of the dismantlement and decommissioning of Electromet by the Health and Safety Division of the AEC on August 11 and 14, 1953. The results of this survey are reported in the attached document.

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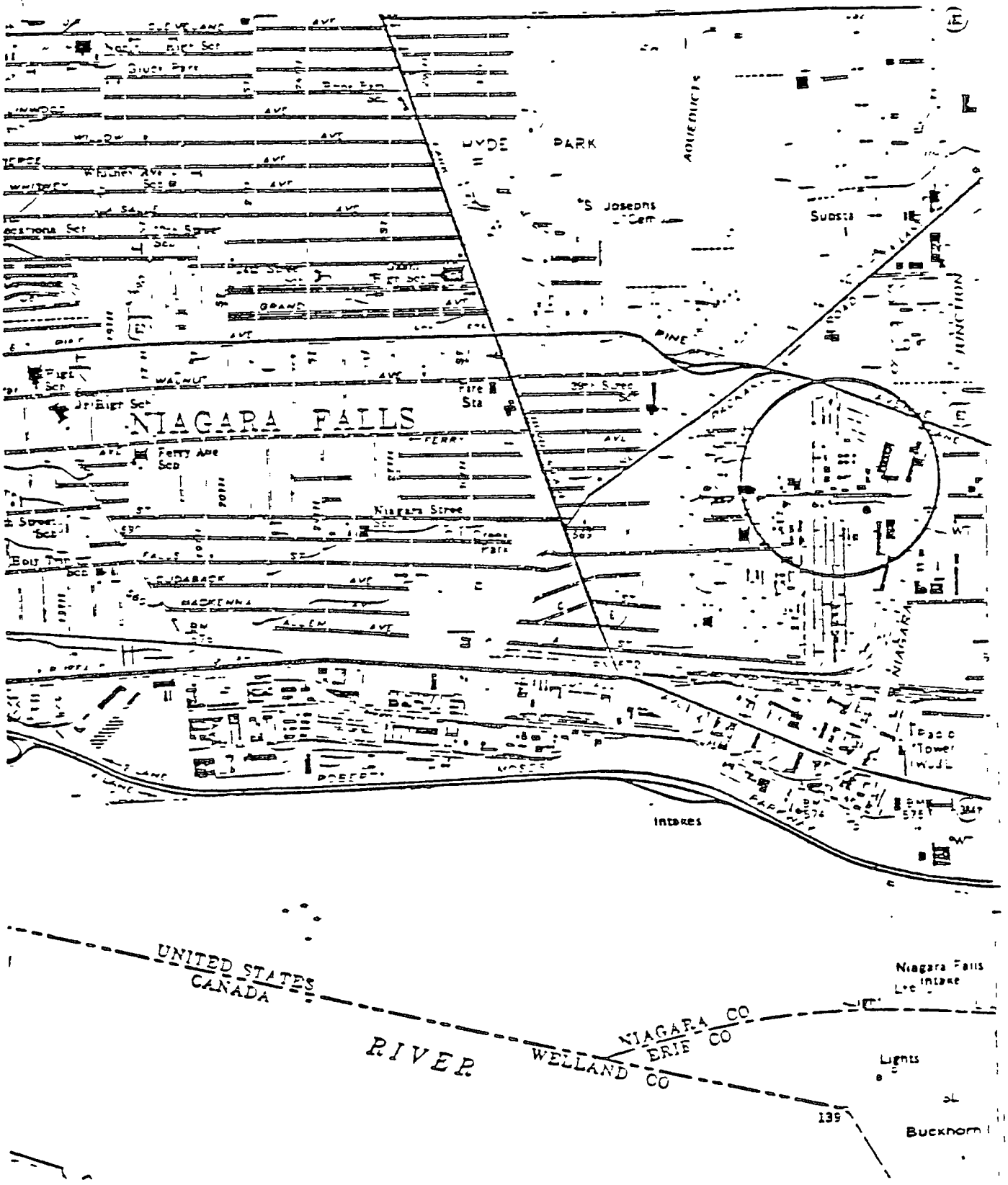

Fig. 1. Location of the Electromet Corporation - Union Carbide Metals Division site in Niagara Falls, New York

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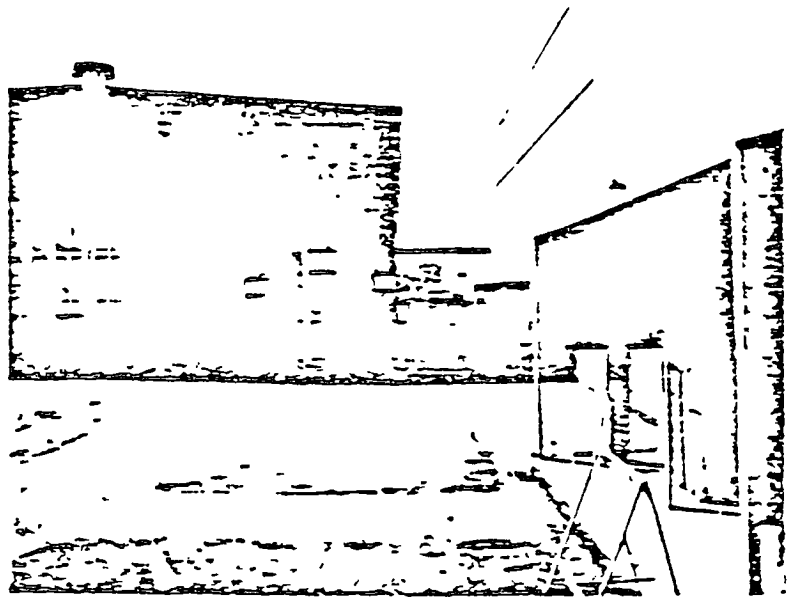

Fig. 2. North end of Building 163 and east side of Building 166.

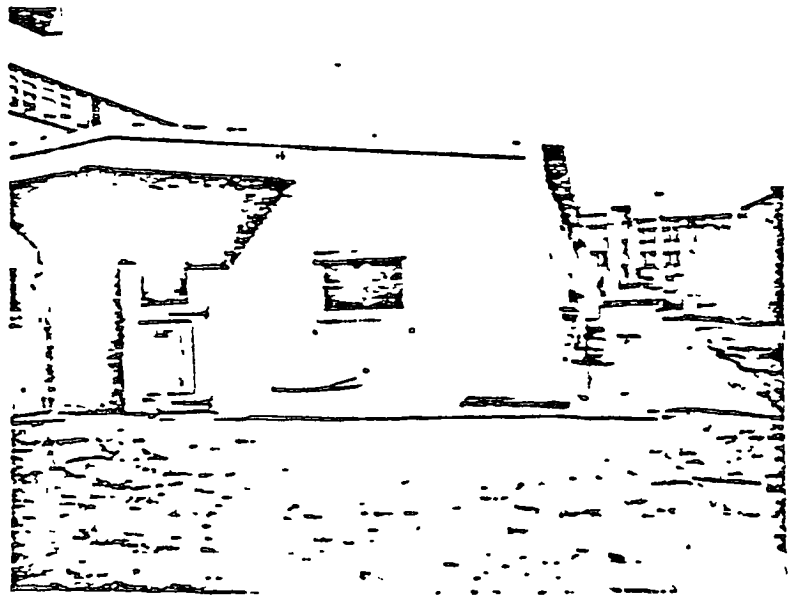

Fig. 3. South end of Building 163 and east side of Building 166.

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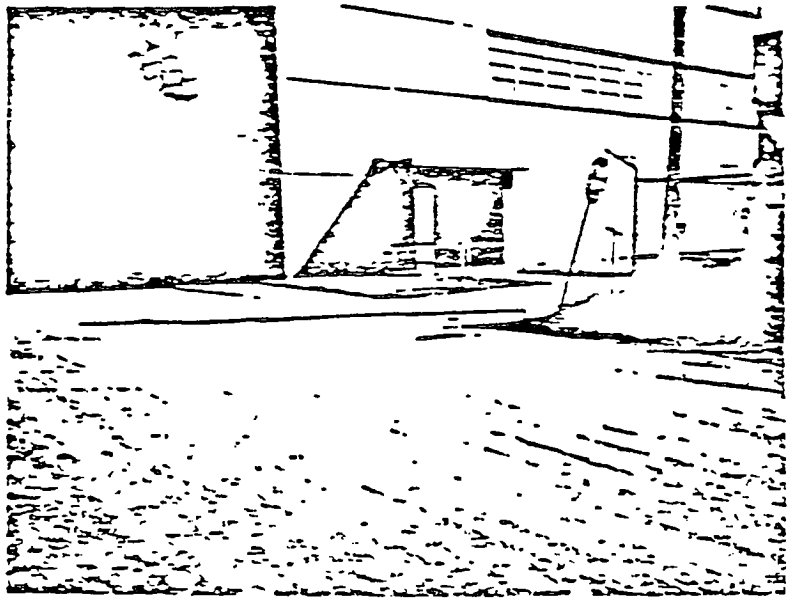

Fig. 4. Building 166.

Fig. 5. Old Carbide Dump (now "Niagara Recycling").

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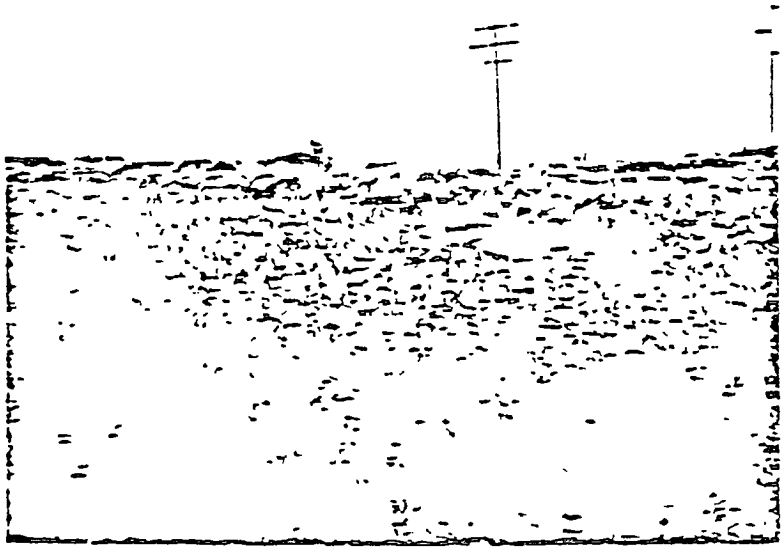

Fig. 6. Old Carbide Dump (now "Niagara Recycling").

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Office Memorandum • UNITED STATES GOVERNMENT

TO : R. L. Kirk, Director,
Production Division

DATE September 28, 1953

FROM : W. B. Harris, Chief,
Industrial Hygiene Branch, Health & Safety Division

SUBJECT: DISMANTLEMENT OF ELECTRONET CO. - CONTRACT NO. W-7405-ENG-14
DECONTAMINATION SURVEY OF AUGUST 11th and 14th, 1953.

SYMBOL: HSE:PBH

A resurvey of contamination was made by the Health and Safety Division in the standby green to metal plant of the Electromet Company, Niagara Falls, New York. This survey was made at the request of Mr. B. F. Fields, Electromet Plant Superintendent and our Administrative Operations and Legal Divisions in order to determine whether the radiation levels are being met before release from commission control.

On the visit of August 11, 1953, it was found that Electromet personnel were in the process of removing wooden structures around the vacuum casting furnaces, piping and other structural equipment. The results of the radiation survey of December 10-12 and the recommendations contained in the memo dated February 3, 1953, to F. M. Belmore from W. B. Harris re Decontamination were reviewed with Mr. Fields. In addition, decontamination procedures for removal of uranium contamination were discussed with plant personnel.

On August 14, 1953, a revisit to the plant was made to determine:

1. The degree of contamination of remaining equipment and the building proper.

2. Need for any additional recommendation for plant cleanup.

PROCEDURES

Direct radiation measurements were taken on all equipment, floors and walls of the plant using Eltronic and Detectron Beta-Gamma survey meters. Smear samples were taken from those locations and equipment at which high smears were found in the December, 1952 survey. The smears were taken over an area of 150 sq. cm. using 1-1/8" Whatman filter paper.

During cleanup operations and the contamination study general air samples were collected on 1-1/8" Whatman #41 filter paper, employing a universal sampler at 20 liters per minute as the basic equipment. The samples were taken in such former operations areas as the graphite burnout, vacuum casting as billet saw areas.

o/1

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RESULTS OF SURVEY

Radiation target levels for decontamination have been revised since the December, 1952 survey due to a recommended increase in any beta exposure of five times the previous level. The criteria for decontamination which must be met by any buildings before release by NYOO are now:

1. The average gamma radiation at 3 feet from the floors or walls should not exceed 0.3 mr/hr. The average beta-gamma radiation measured in a like manner should not exceed 1.5 mrep/hr.

2. The maximum gamma radiation measured from the floors or walls should not exceed 0.6 mr/hr. The maximum beta-gamma radiation measured in a like manner should not exceed 3.0 mreps/hr.

3. No gamma radiation measured in contact with the floor should exceed 0.9 mr/hr. The maximum beta-gamma radiation measured in a contact with the floor should not exceed 4.5 mrep/hr.

Due to the nature of the survey instrument employed and the material measured, the field beta gamma intensities must be computed to the actual beta-gamma value using the expression:

$$\beta\gamma_{actual} = 2\beta\gamma_{Field} - \gamma_{Field}$$

The attached table which contains the results of the computed direct radiation measurements and smear samples taken on equipment, walls, floors and other building structures reveals the following:

(a) The highest gamma reading (0.1 mr/hr) was found on the floor of the old graphite burnout area. The concomitant $\beta\gamma$ measurement was only 1.7 mrep/hr.

(b) The highest beta gamma contamination (4.4 mreps/hr) was found on the Racine cutting machine #931. Gamma contamination was negligible.

(c) Mechanical saw #1630 was found to be contaminated with 4.0 mreps/hr beta gamma.

(d) A high beta-gamma reading of 5.0 mreps/hr was found on the Lancaster mixer. Gamma contamination was negligible.

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(e) Vacuum casting equipment wooden platforms, and the former green machining equipment were removed from the building at the time of this survey. This equipment and contaminated wood partitions were checked and found to be uranium contaminated. It was agreed by Mr. Fields and Dr. Spedding, project leader, that the wood partitions would be burned and ashes buried. Other equipment, such as furnace casting equipment and parts was to be sent to LOSA for storage and disposal.

(f) All other equipment was found to meet the radiation target levels.

Of the eleven general air samples taken in the standby green to metal plant during cleanup operations only one sample (117 α d/m/m^3) exceeded the present acceptable level of 70 α d/m/m^3. However, the average general air concentration for the eleven samples was only 18 α d/m/m^3. The following table shows the average high and low general air concentrations found at specific locations:

Location	Concentration d/m/m^3			Number of Samples
	Average	High	Low	
Center of area 20 ft. South of Macrine Saw	12	25	2	4
Center of area 10' South vacuum casting area	7	14	3	3
At graphite burnout area	40	117	2	4

α d/m/m^3 = alpha disintegrations per minutes per cubic meter of air.

CONCLUSION

This survey shows that a negligible degree of contamination both to equipment and to building has been measured. Since this contamination study was made during such major cleanup operations as demolition of floor by air hammer, sweeping, etc.. and inasmuch as the criteria for uranium contamination has still been met by the plant, it is recommended that the plant be released by the government.

Three pieces of equipment, namely the Racine Cutter, Mechanical Saw and Lancaster mixer found to contain beta-gamma up to 5.0 mreps/hr was scrubbed and sand blasted by Electromet personnel since this survey. Beta-gamma survey measurements by Dr. R. Spedding revealed no reduction in beta-gamma contamination.

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The Electrometallurgical Co., according to Dr. Speeding, intends to use the aforementioned equipment in conjunction with their own radio metallurgy program. It is recommended that Electromet notify the NYOO they will agree not to sell the contaminated equipment to any third party and will not hold the NYOO responsible for any damages incurred by Electromet personnel in using this equipment.

Att:
Table of Radiation Reamings and Smear Results.

(1) Do we require Electromet to have equipment?
(2) This is covered, isn't it, by hold harmless clause in pol?
(3) What do we have to do to close file?

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TABLE OF DIRECT RADIATION READINGS AND SMEAR RESULTS

Location	Direct Radiation γ (mrep/hr)	β mr/hr	Smear Sample α c/m/sample
Entrance to Lab. 3' level	neg.	neg.	
Entrance to Lab. Floor (Kentile)	.04	neg.	74
Chem. Lab.-Lab Desk near door	.06	neg.	57
Chem. Lab. Cupboard	0.1	neg.	1.8
Chem. Lab. 3' level	neg.	neg	
Chem. Lab.-Office Floor	.06	0.02	107
Chem. Lab. Office Wall	neg.	neg.	1.1
Corridor in front of Chem. lab. floor	neg.	neg.	
Vicinity Men's room-3' level	neg.	neg.	
Vicinity Men's room-floor	.06	neg.	52
Wall near men's room	0.1	neg.	72
Old graphite area- 3' level	.18	neg.	
Old graphite area- floor	1.7	0.1	187
Floor inside graphite burnout area	0.16	.04	10
3' level between vacuum furnace and wall	.07	.03	
Floor between vac. furnace and wall	.55	.04	432
Wall between vac. furnace and wall	.27	.03	234
3' level-Main entrance to plant	.02	neg.	
Floor- Main entrance	.12	neg.	174
Floor around cut-off saw 931	.12	neg.	44
Floor around cut-off saw 1630	.11	.01	38
Saw area 3' level	.04	neg.	
Near storage room 3' level	neg.	neg.	
Near storage room- floor	neg.	neg.	216
Floor under former vac. furnace platform	.75	.05	234
3' level at former vac. furnace platform area	.29	.01	
Buffalo room 3' level	neg.	.01	
Near Buffalo room (floor entrance)	.09	neg.	338
Lancaster Room-3' level	.06	.01	
Lancaster room-Wall	neg.	neg.	
Lancaster room-floor	.09	.01	
Ice crusher room-3' level	neg.	neg.	
Ice crusher room-floor	.18	neg.	
Old GFF furnace	.42	.02	
Vicinity of old GFF furnace	.35	.01	657
Old bomb breakout room-floor	.11	.01	66
Old jolter area of old break-out room- floor	.10	.01	66
Old jolter area of old break-out room-wall	.09	.01	21
Near main entrance of old break-out room- 3' level	1.54	.04	
Buffalo room- 3' level	0.08	.01	
Buffalo room-floor	1.06	neg.	338

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TABLE OF DIRECT RADIATION READINGS AND SMEAR RESULTS

Name of Item	Govt. No.	Direct Radiation		Smear Sample
		α (mrep/hr)	γ mr/hr	α c/m/sample
Lancaster mixer	-	5.0	neg.	
Mechanical Sun	1630	4.0	neg.	
Racine cutting machine	931	4.4	neg.	
Fire Blanket	481	.12	neg.	
Stretcher	804	0.2	neg.	
Hydraulic lifter	165	2.0	neg.	
Crusher	1023	0.1	neg.	140
Hydrowheel	483	.8	neg.	36
Truck	1220	.24	.02	291
Piping to Buffalo Forge		.12	.01	41
Buffalo forge	83	.44	.02	283
Buffalo Forge exhauster		.10	neg.	60

UCCNHT0000779

PRELIMINARY SURVEY OF THE UNION CARBIDE CORPORATION METALS DIVISION PLANT, NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

December 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

UCCNHT0000780

PRELIMINARY SURVEY OF THE UNION CARBIDE CORPORATION METALS DIVISION PLANT, NIAGARA FALLS, NEW YORK

B. A. Berven and R. W. Doane

Introduction

On September 24, 1980, two representatives from Oak Ridge National Laboratory visited Union Carbide Corporation's Metal Division Plant (UCC-MD) in Niagara Falls, New York. The purpose of the visit was to perform a radiological survey of property where anomalously high levels of radiation were observed during an earlier preliminary survey of this site (see attachment). This report presents the results of this radiological survey.

A diagram of the technology area of the UCC-MD plant is shown in Fig. 1. The location of the anomalous radiation levels was between Buildings 163 and 166 where beta-gamma dose-rate levels were measured at 0.1 mrad/h at the ground surface.

Survey Methods

The preliminary radiological survey of the UCC-MD Technology Area consisted of the following measurements or samples: (1) a gamma-ray scan of the outside ground surface; (2) two bias surface soil samples from outside locations where external gamma radiation levels were significantly above background; (3) a gamma-ray scan of the inside floor and wall surfaces of Building 163; (4) bias alpha measurements inside Building 163 where external gamma radiation levels were significantly above background, (5) five smear samples from inside Building 163 measuring transferable alpha and beta contamination.

Portable instrumentation used in this survey included a gamma-ray scintillator [NaI (Tl)] survey meter, an alpha scintillation [ZnS (Ag)] counter, and a Geiger-Mueller (G-M) survey meter.

Survey Results

Outside

The gamma-ray scanning of the ground surface in the Technology Area at UCC-MD indicated wide-spread contamination over an extensive portion of this property (see shaded area in Fig. 2). Relatively high concentrations

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of gamma-emitting radionuclides were observed in localized areas External gamma exposure rates on ground surfaces were measured, ranging from background (approximately 10 μR/h) to a maximum of 3 mR/h. The contamination appeared to be low-level but uniform under several asphalt pads, and high-level and "spotty" following two railroad spurs traversing the property.

The highest external gamma levels (3 mrad/h)* observed in the area where surface soil sample NF_1 (see Fig. 3) was located Potentially contaminated material appeared to be located beneath the asphalt pads surrounding Buildings 163 and 171. Surface exposure rates were a general 30 μR/h around Building 171, but appeared to be highly variable around Building 163, ranging from 17 to 100 μR/h.

The location of two surface soil samples (0-15 cm) taken in the Technology Area are shown in Fig. 3. The results are listed below.

Sample	External Gamma Exposure Rate at Ground Surface (μR/h)	Radionuclide Concentration (pCi/g)		
		^{238}U	^{226}Ra	^{232}Th
NF_1	3000	3200 ± 3%	3300 ± 4.8%	860 ± 7.1%
NF_2	83	81 ± 3%	72 ± 1.7%	190 ± 7.2%

The highest external gamma readings were found at the surface of the soil, with the levels decreasing rapidly with increasing depth.

Inside Building 163

Low-level contamination was found inside Building 163 during a cursory survey. The surface external gamma levels from the walls and floor were within typical background ranges (13 to 17 μR/h). The alpha activity on the walls and floor were elevated but not significantly above background levels at 68 dpm/100 cm^2.

Cracks in the floor of Building 163 exhibited elevated radiation levels, with external gamma activities ranging from 17 to 50 μR/h, and alpha activity over these cracks ranging from 100 to 150 dpm/100 cm^2.†

*This exceeds Nuclear Regulatory Commission's maximum beta-gamma level guideline of 1.0 mrad/h at 1 cm (see Ref. 1).

†This exceeds Nuclear Regulatory Commission's guideline of 100 dpm/100 cm^2 for alpha activity originating from ^{226}Ra (see Ref. 1).

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Five smear samples were taken to determine the amount of transferable alpha and beta contamination. The location of the smear samples are identified in Fig. 4. The levels of transferable alpha and beta-gamma contamination were all at background levels.

At location "b", surface external gamma levels measured 80 μR/h and alpha activity measured approximately 530 dpm/100 cm^2 (also above NRC guidelines). At location "c", beta-gamma levels of 0.12 mrad/h were observed.

Discussion

Relatively high concentrations of radionuclides in the ^{232}Th and ^{238}U decay chains exist in the surface soil in the Technology Area at UCC-MD in Niagara Falls, New York. These materials also appear in cracks and seams in the walls and floor of Building 163.

Dr. C. R. Allenback, Manager of Environmental, Health, and Product Safety Affairs at the UCC-MD, indicated thorium-bearing ores were used during operations at this site, however, these operations were unrelated to Manhattan Engineer District (MED)/Atomic Energy Commission (AEC) activities. In view of the nature of past MED/AEC operations (limited to reacting of UF_4 to uranium metal), it seems unlikely that the present contamination on-site is related to those MED/AEC activities. However, because uranium appears to be present in the soil in significant amounts, contamination due to MED/AEC activities cannot be eliminated, but only considered improbable.

Recommendations

Based on the results of this preliminary survey, it is recommended that a formal detailed radiological survey of the Technology Area at the UCC-MD Plant in Niagara Falls, New York, be conducted by some responsible agency since radiation levels exceed Nuclear Regulatory Commission guidelines for unrestricted use.

References

Nuclear Regulatory Commission, "Guidelines for Decontamination of Facilities or Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Product, Source, or Special Nuclear Material," November 1976.

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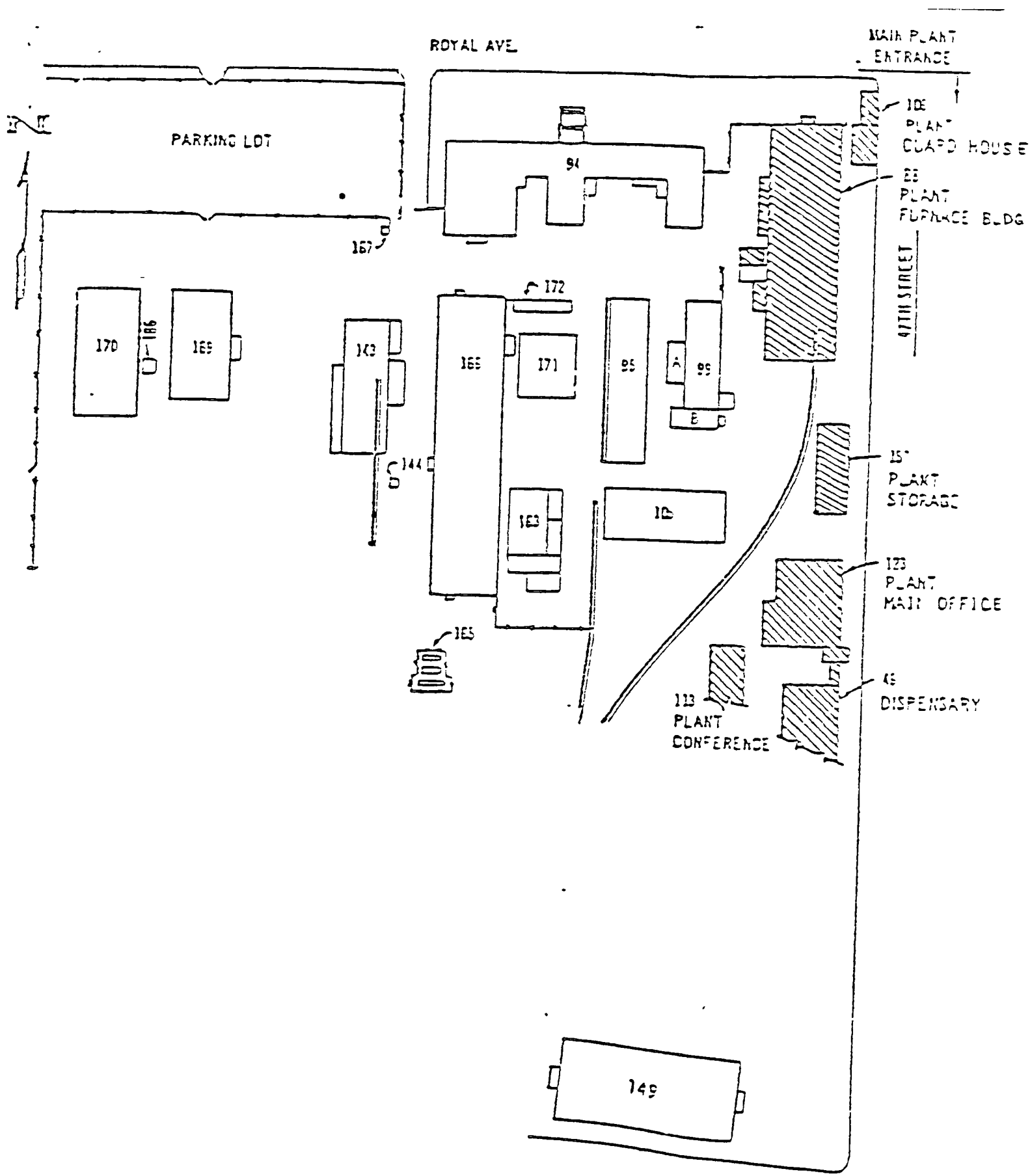

Fig. 1. Technology Area at the Union Carbide Corporation - Metals Division Plant (former Electromet site) in Niagara Falls, NY (adapted from UCC-MD drawing).

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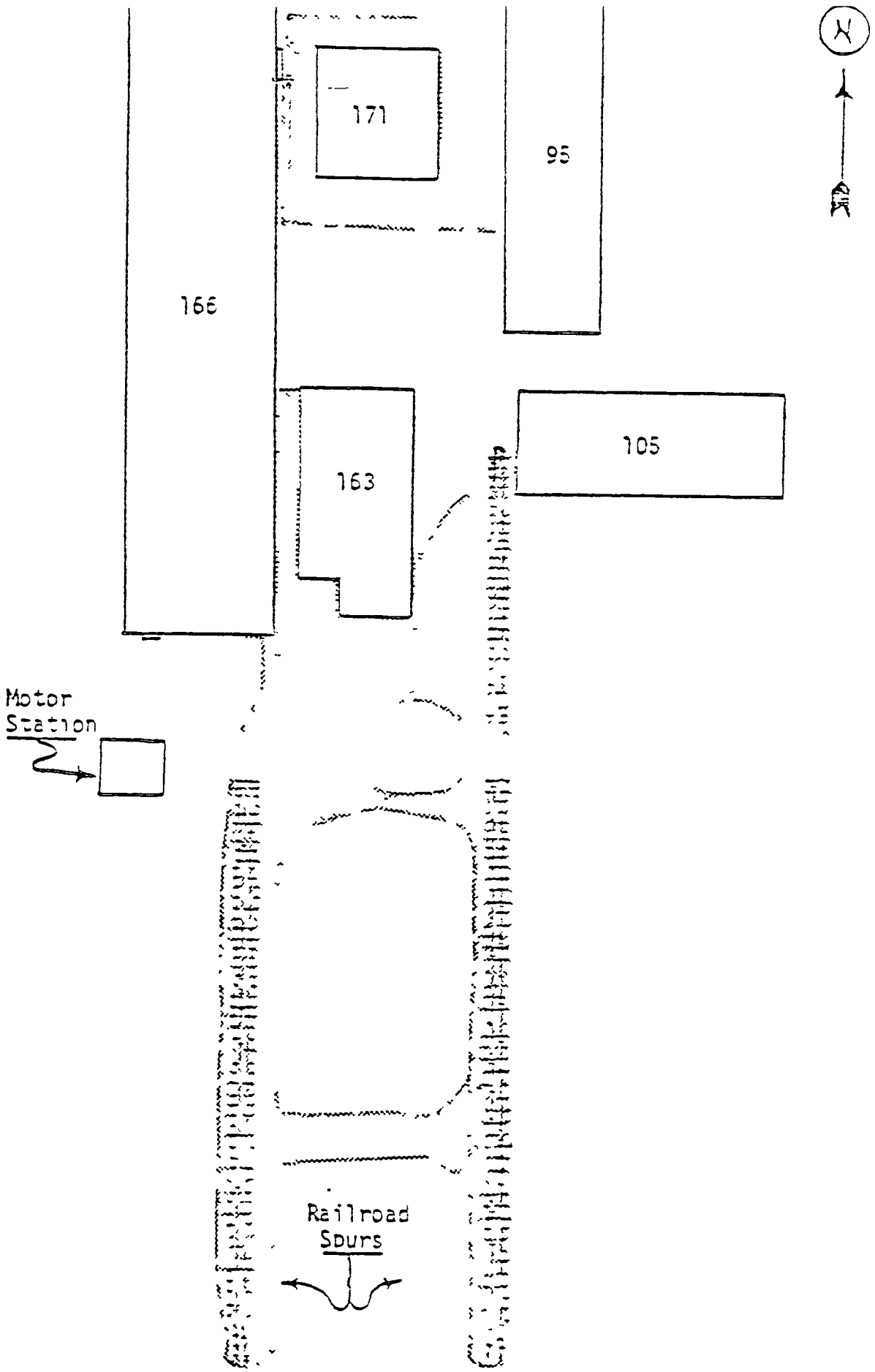

Fig. 2. Location of elevated surface gamma-ray levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY.

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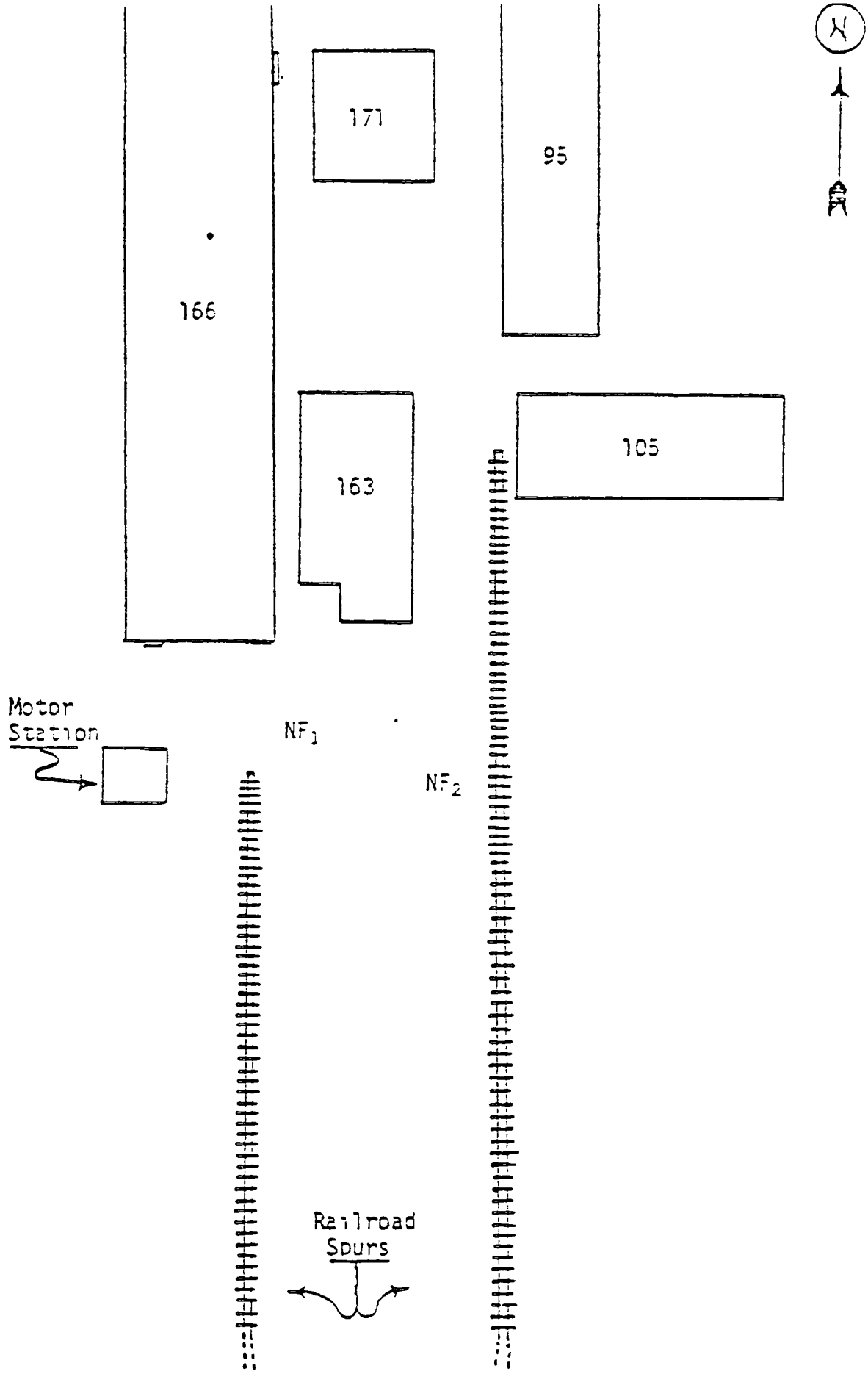

Fig. 3. Location of surface soil samples taken in the Technology Area of UCC-ND in Niagara Falls, NY.

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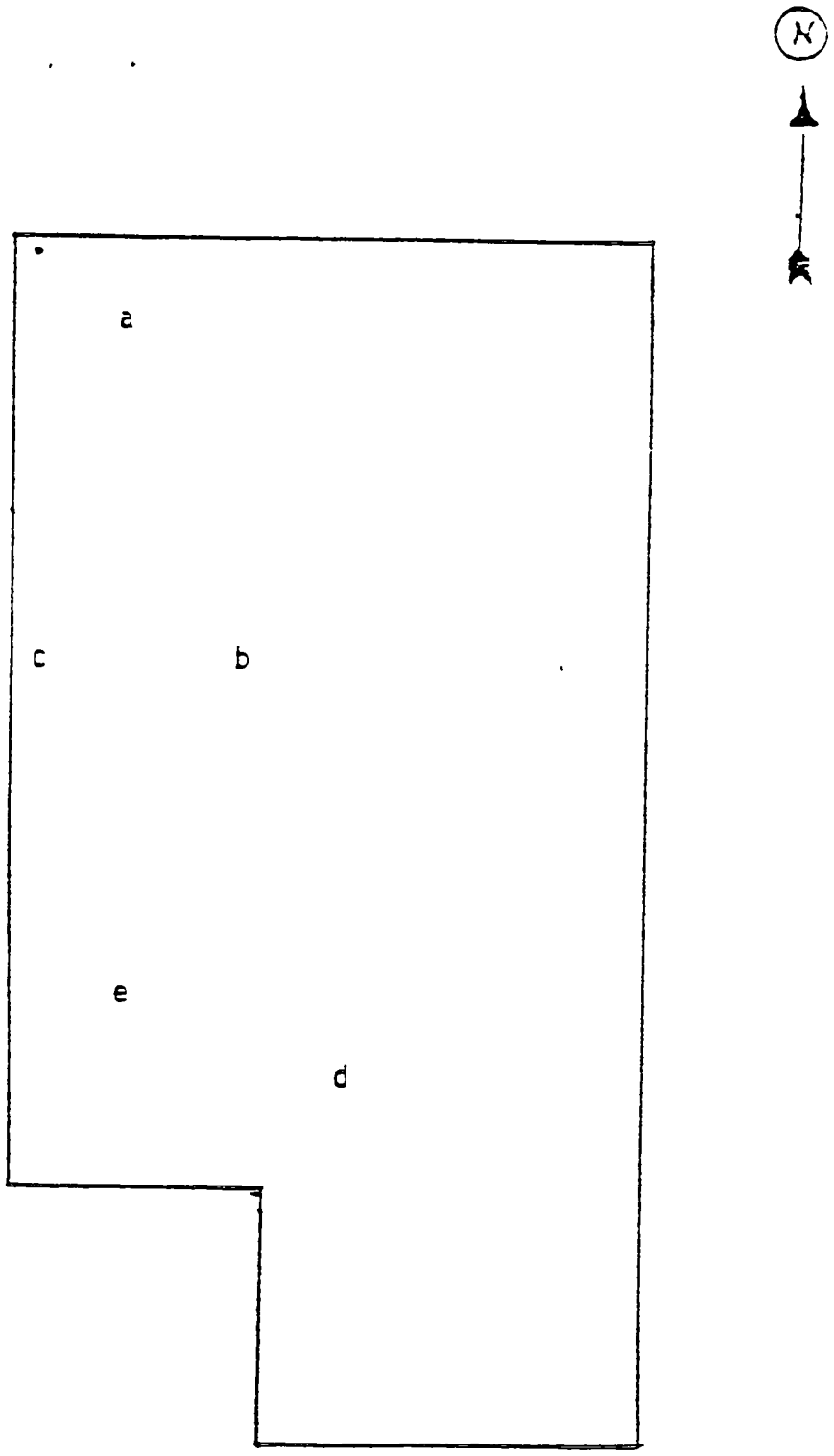

Fig. 4. Location of smear samples in Building 163 in the Technology Area of UCC-ND in Niagara Falls, NY.

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Changes shown to 4/9/86 draft

CFR 0033j 4/16/86

ENVIRONMENTAL AGREEMENT (Niagara Falls)

AGREEMENT made as of this day of April, 1986, by and among Union Carbide Corporation, a New York corporation having an office at 39 Old Ridgebury Road, Danbury, Connecticut 06817-0001 ("Union Carbide"), Umetco Minerals Corporation, a Delaware corporation having an office at 39 Old Ridgebury Road, Danbury, Connecticut 06817-0001 ("Umetco") (Union Carbide and Umetco being hereafter collectively called "Seller") and U. S. Vanadium Corporation, a Delaware corporation having an office at _____ ("USV") and Strategic Minerals Corporation, a Connecticut corporation having an office at 30 Main Street, Danbury, Connecticut 06810 ("Stratcor") (USV and Stratcor being hereafter collectively called "Buyer").

WITNESSETH

WHEREAS, USV has acquired substantially all the assets of Umetco's U.S. vanadium business pursuant to a Purchase Agreement among Union Carbide, Umetco and Stratcor dated April___, 1986 (the "Purchase Agreement"); and

WHEREAS, the parties desire to provide for certain services to be rendered, work to be done and liabilities to be assumed with respect to Umetco's vanadium and tungsten products processing facility located at Niagara Falls, New York (the "Niagara Falls Facility"), and

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WHEREAS, pursuant to the Purchase Agreement, Seller will be transferring to USV all of the environmental permits, licenses and approvals ("Environmental Permits") as identified in Schedule _____ to the Purchase Agreement; and

WHEREAS, Seller and Buyer acknowledge that USV will require a reasonable amount of time after the closing of the Purchase Agreement in order to accomplish a prompt transfer of the Environmental Permits;

NOW, THEREFORE, the parties hereto hereby agree as follows

1. Indemnification.

(a) Subject to the provisions of Articles 3 and 7 below, Seller hereby assumes and will be liable for, and shall indemnify Buyer against and hold Buyer harmless from, any and all costs, claims, damages, lawsuits, attorneys' fees, losses, deficiencies, judgments, actions, liabilities and obligations of any kind or description (collectively called "Claims") asserted against, incurred or required to be paid by Buyer (regardless of when asserted or by whom), resulting from Seller's business operations at the Niagara Falls Facility prior to the date of this Agreement. Seller's obligation hereunder is limited to the Claims and Seller shall have no liability whatsoever for incidental or consequential damages to USV.

(b) USV hereby assumes and will be liable for, and shall indemnify Seller against and hold Seller harmless

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from any and all Claims asserted against, incurred or required to be paid by Seller (regardless of when asserted or by whom), resulting from USV's business operations at the Niagara Falls Facility from and after the date of this Agreement. USV's obligation hereunder is limited to the Claims and USV shall have no liability whatsoever for incidental or consequential damages to Seller.

(c) Notwithstanding the provisions of paragraph (a) above, but subject to the provisions of paragraph (f) below, Buyer agrees that Seller shall have no further indemnification obligation to Buyer with respect to the reclamation, restoration, testing and/or disposal activities and obligations as set forth in paragraphs (a), (b), (c), (d), (e), (f), (g), (h) and (i) of Article 3, but only upon completion of such reclamation, restoration, testing and/or disposal activities or satisfaction of such obligations by Umetco. Upon request from Seller, Buyer will deliver to Seller a written release confirming the cessation and termination of indemnification contemplated in this Article 1, such release to be in form and substance satisfactory to Seller's counsel.

(d) Buyer further agrees that Seller shall have no indemnification obligation to Buyer with respect to

(i) any PCBs in oil filled switches in the Niagara Falls Facility.

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(ii) PCBs in capacitors, transformers, oil supplies or in any other areas of the Niagara Falls Facility, except as specifically enumerated in paragraph (a) of Article 3 below.

(iii) any asbestos in the Niagara Falls Facility except as specifically enumerated in paragraph (e) of Article 3 below.

(e) Upon termination of production of products at the Niagara Falls Facility, Buyer and Seller agree to share any final restoration, reclamation or remediation costs required by applicable laws relating to the plant site (provided that any saleable/salvageable assets in the plant will be sold and the proceeds applied to total reclamation liabilities) and any other areas not specifically enumerated in this agreement in proportion to their respective periods of occupancy of the Niagara Falls Facility. Buyer's share of such costs shall in no event exceed its occupancy of the Niagara Falls Facility (expressed as a percentage) multiplied by $1,000,000.

(f) Buyer and Seller agree to assert no claims of any kind against each other as a result of Seller's, its contractors' or consultants', or Buyer's performance of or supervision of the Work (as hereinafter defined) except in the event of the gross negligence or willful misconduct of the other party.

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(g) Notwithstanding the provisions of paragraph (c) above, Seller's indemnification obligation set forth in paragraph (a) above shall not cease and terminate in the event the Niagara Falls Facility is listed as a "Superfund" site pursuant to the Comprehensive Environmental Response, Compensation and Liability Act.

2. Indemnification Procedure; Right to Contest Reclamation Requirements.

(a) Buyer shall notify Seller within 45 days from the assertion of any Claim or discovery of any fact upon which Buyer intends to base a claim for indemnification hereunder. Buyer's failure to so notify Seller shall relieve Seller from any liability under this Agreement to Buyer with respect to such Claim. Seller shall have the right at its own expense to participate jointly with Buyer in the defense of any claim, demand, lawsuit or other proceeding in connection with which Buyer claims indemnification hereunder and, with respect to any issue involved in such claim, demand, lawsuit or other proceeding as to which Seller shall have acknowledged the obligation to indemnify Buyer hereunder, Seller shall have the sole right to settle or otherwise dispose of such claim, demand, lawsuit or other proceeding on such terms as Seller, in its sole discretion, shall deem appropriate.

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(b) Seller shall notify Buyer within 45 days from the assertion of any Claim or discovery of any fact upon which Seller intends to base a claim for indemnification hereunder. Seller's failure to so notify Buyer shall relieve Buyer from any liability under this Agreement to Seller with respect to such Claim. Buyer shall have the right at its own expense to participate jointly with Seller in the defense of any claim, demand, lawsuit or other proceeding in connection with which Seller claims indemnification hereunder and, with respect to any issue involved in such claim, demand, lawsuit or other proceeding as to which Buyer shall have acknowledged the obligation to indemnify Seller hereunder, Buyer shall have the sole right to settle or otherwise dispose of such claim, demand, lawsuit or other proceeding on such terms as Buyer, in its sole discretion, shall deem appropriate.

(c) Seller and Buyer shall each retain the right to contest any restoration, reclamation or remediation requirements imposed by State or other environmental authorities having jurisdiction over the Niagara Falls Facility.

3. Other Environmental Matters.

(a) PCB Transformers and Capacitors. Umetco agrees to assume the cost of retrofilling, replacing or disposing of the following capacitors and transformers as promptly as feasible.

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Item	Action
Transformers 5, 21, 22, 33, 34, 35, 110, 111, 143	Retrofill
Transformers 4, 23, 24, 122, 159, 160 and 161	Dispose
Transformer 119	Dispose & Replace
86 Capacitors for #32 furnace	Dispose
27 Miscellaneous Capacitors	Dispose
Shaft Furnace Capacitors	Dispose

Umetco further agrees to assume the cost of cleanup and disposal of PCB contaminated sludges, oils, waste material currently on site or that will be accumulated when the above equipment is retrofilled or removed. Specifically, Umetco assumes the cost of cleanup and disposal of PCB contaminated soil under the "Owl" transformers, i.e., Nos. 159, 160, and 161, if necessary. ("Retrofilling" is defined as replacing, flushing, etc., of PCB contaminated oils, which when refilled and after the required test runs under power, test at less than 50 ppm PCBS.)

(b) Halide Scrubber. Umetco further agrees to assume the cost of completing installation after the date of this agreement of the halide scrubber now being installed and any corrective modifications to insure compliance with applicable regulations. Once completed and operating as now designed, USV

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accepts responsibility for obtaining necessary permits for the system.

(c) Chrome Oxide. Umetco further agrees to assume the cost of disposal of 64 drums of chrome oxide now located at the Niagara Falls Facility.

(d) High Antimony Tungsten. Umetco further agrees to assume the cost of disposal of approximately 100,000 pounds of high antimony tungsten molybdenum oxide now located at the Niagara Falls Facility.

(e) Asbestos in Freight Elevator. Umetco further agrees to assume the cost of removal of the asbestos lining in the globar elevator.

(f) "Super Sucker" Dust. Umetco further agrees to test the various waste piles of plant dust deposited by the "Super Sucker" industrial cleaning firm in the plant yard to determine whether such piles are Hazardous Waste (as defined in the Resource Conservation Recovery Act or comparable state law). If any such piles are determined to be Hazardous Waste, under applicable laws, Umetco agrees to assume the cost of removal and disposal of such piles.

(g) Sample Cans. Umetco further agrees to assume the cost of removal and disposal of the numerous small sample cans in the globar area.

(h) Yard Area Ores and Slags. Umetco further agrees to conduct a radiation survey and surface sampling program of

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the plant yard area to determine whether or not Hazardous Waste is present in the yard area. If Hazardous Waste is found, Umetco agrees to assume the cost of reclamation or remediation of the plant site or disposal of such Hazardous Waste, as required by applicable law. At termination of USV's operations at the Niagara Falls Facility Buyer and Seller agree to share the cost of reclamation of the plant yard area based upon their respective periods of occupancy of the Niagara Falls Facility, unless USV's operations at said facility have created a materially more expensive reclamation problem (when compared with reclamation based upon an assumed continuation of operations as conducted in the past by Seller and using the results of the radiation survey and surface sampling program as a benchmark), in which event the excess plant yard reclamation costs will be borne by Buyer. (The parties acknowledge that Seller has been conducting operations at the Niagara Falls Facility since 1919.)

(i) Plant Buildings. Umetco further agrees to assume the cost of decontaminating the three areas of the plant which have been determined to be radioactive based upon Umetco's radiation survey of the plant.

(j) Miscellaneous Slags and Re-Melts in Yard Area. Buyer agrees to assume the cost of disposal, if required, of 20,000 pounds of vanadium aluminum remelts, 4,000 tons of

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miscellaneous slags from various furnace operations, piles of lime, etc. in the plant yard area, and empty drums around the plant and all other miscellaneous materials currently on the plant site and not specifically enumerated in paragraphs (a) through (i) above.

(k) Storage Tanks. If in the future USV is required by law to modify, repair or remove the underground gasoline and/or waste oil storage tanks due to evidence of leaking, Seller and Buyer agree to share the cost of modification, repair or removal based upon their respective periods of occupancy of the Niagara Falls Facility, except if such modification, repair or removal is due solely to the business operations of USV, in which event USV shall solely bear such cost.

4. Environmental Work and Access to Premises.

Seller and Buyer have agreed upon a program of work affecting the environment, including, but not limited to, reclamation, restoration, remediation and cleanup, as described in Articles 1 and 3 above, to be performed at the Niagara Falls Facility (hereafter the "Work") by and under the supervision of Seller and at Seller's sole cost and expense. A plan for the Work, including estimated costs of performing various aspects thereof and estimated time schedules for completing the Work, is attached hereto as Schedule A. Seller agrees to supervise

UCCNHT0000797

the performance of the Work and covenants that the Work will be performed in a good and workmanlike manner, and in compliance with applicable laws (or, in the absence of such laws, in accordance with generally accepted environmental engineering standards). USV hereby grants to Seller, its contractors and consultants, the right and license to enter the Niagara Falls Facility for the purpose of supervising and performing the Work. Seller agrees, for itself, its contractors and consultants, to exercise such right and license so as to minimize any interference with or disruption of USV's normal commercial operations at the Niagara Falls Facility.

5. Coordination Committee, USV Performance of the Work.

(a) USV and Umetco will each designate two (2) representatives to serve on a Coordination Committee which will oversee the performance of the Work with the goal of assuring completion of the Work in a timely and cost-effective manner, with minimal interference with USV's normal commercial operations at the Niagara Falls Facility.

(b) Upon Umetco's reasonable request, USV will perform all or any portion of the Work described in Schedule A, in a good and workmanlike manner. Umetco shall pay USV monthly upon receipt of invoice for USV's actual costs of performing the Work (or otherwise agreed contract price).

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6. Cost Verification.

USV's books and records will be open to inspection by Umetco upon reasonable notice and during normal business hours, but not more than once every six (6) months, for the purpose of verifying USV's costs of performing the Work.

7. Bridging of Environmental Permits.

(a) To the extent that applicable federal, state or local statute, law, regulation, rule or order requires action to be taken by or on the part of Seller in order for USV to obtain a Transfer of the Environmental Permits, Seller shall take or cause to be taken all such action, and Seller otherwise shall cooperate with USV in obtaining such Transfer. As used in this Article 7, a "Transfer" of Environmental Permits shall mean and include, as applicable, the substitution of USV's name on, and a transfer, reissuance or new issuance to USV of, such Environmental Permits, without any continuing obligation or liability of Seller whatsoever, including, without limitation, as a guarantor or surety thereof.

(b) From and after the closing of the Purchase Agreement, Seller shall maintain, at Buyer's sole cost and expense pursuant to Paragraph (c) below, each of the Environmental Permits, including all bonds, guarantees or other financial sureties relating thereto or required thereby ("Sureties") until the earlier of (i) expiration of each such

UCCNHT0000799

Environmental Permit (it being acknowledged that Seller shall have no obligation to renew any Environmental Permit hereunder) or (ii) Transfer of each such Environmental Permit; provided, that during such time USV diligently shall use its best efforts to obtain a Transfer of the Environmental Permits and to obtain any Sureties related to or required by such Environmental Permits. In connection therewith, USV, as promptly as possible, but in no event later than one (1) month after the date of this agreement, shall submit to or file with the appropriate governmental or regulatory authorities, in a complete fashion, all applications and other documents required to be so submitted or filed by USV in order to obtain a Transfer of the Environmental Permits, provided, that such time limitation shall be extended with respect to each applicable Environmental Permit by such period of time that any failure by USV to comply therewith is attributable to action or inaction by or on the part of Seller. Upon either expiration or Transfer of each Environmental Permit as described in subparagraphs (b)(i) or (b)(ii) above, USV's obligation to reimburse Seller for such maintenance of that Environmental Permit shall cease and Seller shall have the right to cancel such Environmental Permit and/or Surety, to the extent such cancellation is permitted by law. USV promptly shall notify Seller of the Transfer of each Environmental Permit and Seller

UCCNHT0000800

promptly shall notify USV of any change in the previously scheduled expiration of any Environmental Permit and of any change in the provisions of each Environmental Permit.

(c) Except with respect to any net income taxes payable by Union Carbide, the maintenance of the Environmental Permits and/or Sureties as described in Paragraph (b) above shall be absolutely net to Seller, and Buyer shall reimburse Seller for all direct costs and expenses incurred by Seller in connection with such maintenance, provided, that Seller shall provide USV with such documentation as USV reasonably may request in order to verify the amount of such maintenance costs and expenses. Seller shall invoice USV for all amounts payable hereunder and payment shall be due net thirty (30) days from the date of invoice. If USV fails to make any payment to Seller hereunder when due with respect to any such Environmental Permit, then Seller shall have the right to terminate this agreement with respect to such Environmental Permit if USV does not cure such default within twenty (20) days after notice thereof from Seller.

(d) Prior to Transfer of the Environmental Permits, Buyer shall cooperate with Seller and provide whatever information is needed and perform whatever actions are necessary to comply with the Environmental Permits in a manner consistent with Seller's past policies and in compliance with

UCCNHT0000801

the terms and conditions of the Environmental Permits. If USV shall fail to comply with any material term or condition of any Environmental Permit or breach any commitment, agreement or obligation under this agreement, then Seller shall have the right to terminate this agreement with respect to such Environmental Permit if USV does not cease and, if necessary, cure any such noncompliance or breach as soon as practicable but in no event later than twenty (20) days after notice thereof from Seller or within any shorter time period as required by any governmental or regulatory authority, provided, however, that if in Seller's sole good faith judgment any such noncompliance or breach creates, contributes to, or results in, or is likely to create, contribute to, or result in, an emergency situation, Seller may immediately suspend USV's operations under applicable Environmental Permits until such emergency situation or potential emergency situation has ceased, and, if necessary, has been cured. Notwithstanding anything to the contrary contained in the foregoing, Seller shall not terminate this agreement or suspend USV's operations under any Environmental Permit based solely upon (i) noncompliance with the transfer provisions of any Environmental Permit or (ii) any breach of this agreement based solely upon noncompliance with such transfer provisions unless an applicable federal, state or local government or regulatory

UCCNHT0000802

authority issues an order or notice of violation that USV's operations under such Environmental Permit is in violation of its transfer provisions and indicates that it will or may take remedial action against Seller as a result thereof. Seller shall promptly notify USV of the termination or suspension of USV's operations under any Environmental Permit under this Paragraph (d) and the reasons therefor.

(e) Buyer shall indemnify Seller against and hold Seller harmless from all claims, damages, losses, liabilities, demands, assessments, fines, penalties, administrative orders, notices of violation, suits, actions or proceedings, costs, expenses and obligations, including interest, penalties and reasonable attorneys' fees (collectively, "Claims"), which arise out of or in connection with (i) USV's failure during the applicable period set forth in paragraph (b) above to comply with the terms and conditions of any Environmental Permit, or the statutes, laws, regulations, rules, orders or codes pertaining thereto or (ii) any breach of any commitment, agreement or obligation by USV under this agreement, provided, however, that USV shall not be obligated to indemnify Seller against any Claims arising solely out of or in connection with any failure by Seller to comply with applicable transfer provisions of the Environmental Permits. These indemnification provisions relate to this Agreement and shall be in addition

UCCNHT0000803

to, and not in derogation of, the respective rights, obligations, liabilities and indemnifications of Seller and Stratcor pursuant to the Purchase Agreement.

8. Headings.

Article headings are not to be considered a part of this Agreement, are included solely for convenience, and are not intended to be full of accurate descriptions of the contents thereof.

9. Governing Law.

This Agreement shall be construed in accordance with and governed by the laws of the State of Connecticut.

10. Notices.

Any notice or other communication required or permitted hereunder shall be in writing, and shall be deemed to have been given if placed in the United States mail, registered or certified, postage prepaid, addressed as follows.

If to Seller, addressed c/o Union Carbide as follows

39 Old Ridgebury Road
Danbury, Connecticut 06817
Attention: President, Umetco Minerals Corporation

If to Buyer.

Strategic Minerals Corporation
30 Main Street
Danbury, Connecticut 06810

UCCNHT0000804

with a copy to.

Gager, Henry & Narkis
30 Main Street
Danbury, Connecticut 06810
Attention: David R. Chipman, Esq.

Each of the foregoing shall be entitled to specify a different address by giving notice as aforesaid to the others.

11. Disputes. Any dispute that the parties are unable to resolve may be submitted to any court having jurisdiction over such dispute.

12. Entire Agreement, Survival, No Waiver.

This Agreement and the other documents and instruments contemplated hereby or thereby constitute the entire agreement between the parties pertaining to the subject matter hereof, and supersede all prior and contemporaneous agreements, understandings, negotiations and discussions, whether oral or written, of the parties, and there are no warranties, representations or other agreements between the parties in connection with the subject matter hereof, except as specifically set forth herein. No supplement, modification, waiver or termination of this Agreement shall be binding unless executed in writing by the party to be bound thereby. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provision hereof (whether or not similar), nor shall such waiver

UCCNHT0000805

constitute a continuing waiver unless otherwise expressly provided herein.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be entered into and executed by their officers thereunto duly authorized as of the date and year hereinabove set forth.

UNION CARBIDE CORPORATION

By: _____

Title: _____

UMETCO MINERALS CORPORATION

By: _____

Title: _____

STRATEGIC MINERALS CORPORATION

By: _____

Title: _____

U.S. VANADIUM CORPORATION

By: _____

Title _____

UCCNHT0000806

SCHEDULE A

Description of the Work

UCCNHT0000807

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

July 1, 1986

Mr. George Parker
Strategic Minerals Corporation
P. O. Box 66
Niagara Falls, NY 11402

Subject: Niagara Environmental

Dear George:

In a meeting in my office, July 1, 1986 we discussed the issues that you were handling that are contained in the Environmental Agreement between Stratcor and Umetco.

I explained that it is my responsibility, acting for Umetco, to see that these jobs are completed quickly, economically, and in a manner acceptable to both parties. Specific items discussed were:

1. Completion of Halide Scrubber

The venturi scrubber has been installed and first tests indicate it is working satisfactory. However when cleaning out heels, fumes are still escaping - the trough will have to be enclosed and perhaps hooded. You agreed to get together with Ron Sullivan and Peter Sherman to propose corrective action. You will furnish me with a timetable to complete the job and a cost estimate.

2. Disposal of "Super Sucker Dust

You had samples from six piles of "Super Sucker" dust analyzed. With the exception of two samples that analyzed 6.69 and 15.0 mg/L barium (maximum allowable is 100.0 mg/L) the other fourty-six (46) analyses were below detectable limits for the eight (8) EP toxic metals. Don Millenbruch, in his letter of May 12, 1986 to you suggested that since this material is non-hazardous it should be removed to a suitable landfill. While you were on vacation, SCA quoted on removal for a cost of $179/ton provided we supply the front end loading equipment. This would amount to several thousands of dollars. They are treating the material as if it were hazardous and I feel this will set a precedent. If we can not transport this to a local dump without all the red tape and further analyses you suggest I would be in favor of using the material to fill in and level "Lake Linde". You will get back to me after conferring with Rich Miller.

UCCNHT0000808

3. Disposal of Sample Cans

You informed me that more than one half of the cans have been disposed of through B.F.T. You are proceeding to identify the contents of the remaining cans and will provide me with an estimate of the additional time you require. If this looks like it is going to take too long due to priorities in other areas I will arrange to have the job completed. I would appreciate you supplying me with the quantity of samples disposed of to date together with costs.

In addition to the above items which were addressed in the Environmental Agreement two others were brought to your attention:

4. Radioactive Sources

Last week I was informed that the plant had a radioactive source that was used in the past to calibrate the X-ray equipment in the Vanadium Aluminum Department. This source is not licensed and should be disposed of. You will provide me with the history of this source, if possible, and I will begin the paperwork to have it disposed of.

5. Radioactive License No. 955-0139

This license, for a cesium source that you returned last August, is still in the name of Umetco. If you will turn over the files to me I will continue to press for termination along with the other two licenses that I am currently involved with.

D. J. Hansen

/mau

CC: Messrs:
J. F. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. C. Miller
C. T. Wentzel

UCCNHT0000809

D G MILLENBRUCH—EXT 4538
DANBURY
H1378

5/13

+ return

Fyfyh — in sections A + B where Don says we will use Cleanup + slag as fill — Don has now talked to Kelly's boss Mr Bradley + has agreed to dispose of material in a local hazardous waste disposal site — which I believe is better.

Don

ok FVM

5/16

UNION CARBIDE
OLD RIDGEBURY ROAD, DANBURY, CT 06817

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

MAY 12 1986

May 9, 1986

Mr. Robert F. Kelly
Associate Radiophysicist
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Mr. Kelly:

Thank you for taking the time on Wednesday, May 7, 1986 to discuss with Bob Beverly and me our plans to complete the cleanup of radioactive material found in the Niagara Plant. After my letter of March 25 to you, we obtained samples of the areas in question and submitted these to EDA Instruments Inc in Colorado for radiochemical analyses. That results shown in Table 1 were the basis for our discussion

I was concerned that we may have been misinterpreting Industrial Code Rule 38 but you kindly gave us a copy of an Inter-Office memo from Dr. Bradley to you dated March 26, 1982 which specified the limits for source material. This memo is appended.

Below I have summarized the topics we discussed and outlined the actions we plan to take.

A Material from Pit in Building 24

A gamma radiation level of 170 µR/hr prompted us to remove the illmenite sand that had been used to backfill a 9'-6" x 10' concrete pit in Building 24. The pit was much deeper than anticipated and we filled one hundred twenty-five 55-gallon drums before reaching a depth of 9 feet. Subsequently when we received the results of the analyses (Samples 40-6 and 40-7) it was evident that the material contained less than 500 parts per million of combined uranium and thorium. This, coupled with a gamma radiation level well below 250 µR/hr, led to the conclusion that this material did not exceed the "Limits for Uncontrolled Areas" as specified in Table 5 of Code Rule 38 You concurred with this conclusion

As we discussed, I plan to use this material as partial fill for a low area in the yard east of No. 6 Furnace Building. The pit will be backfilled with fresh soil or sand However, as agreed, I will not proceed with this plan until after May 15 to allow you time to think more about it and possibly confer with Dr. Bradley.

UCCNHT0000811

B. Slag East of No. 6 Furnace Building

This is what you refer to as the "rock area" in your Investigative Report of March 26 (appended). Since that date we were able to move the slag pile and found that it was the slag itself and not the ground that was radioactive. As we discussed I was puzzled at the relatively high reading of Th-230 in Samples 40-3 and 40-4. Because the Th-230 is in the decay chain of U-238 I would have expected the uranium analyses to be appreciably higher. The explanation is probably that some uranium oxide impurity was inadvertently introduced to a few vanadium aluminum furnace heats and the uranium passed on to the metal and the thorium went with the slag

As Bob Beverly discussed, although the Th-230 analyses were 299 and 466 ρCi/g, these represent very small quantities of the pure nuclide (1.53×10^{-8} and 2.39×10^{-8} grams of Th-230 per gram of slag). The calculations are included as Appendix 3.

Again, since this material contains much less than .05% source material and the radiation is less than 250 μR/hr it need not be controlled. I also plan to dispose of it as fill in the yard east of Furnace Room 6.

C Slag and Soil Contamination South of Furnace No 30

Will ship to Barnwell

Sample 40-5 was taken from the slag that had been splattered south of Furnace No 30. Years ago this furnace had been used to prepare ferrocolumbium. As can be seen, the uranium at 389 μg/g is approaching the 500 μg/g limit and the Th-232 at 241 pCi/g is well above the 55 ρCi/g limit. Seventeen (17) 55-gallon drums of material were removed from around the furnace. Samples 41-2 and 41-3 taken after the cleanup are well within the uncontrolled limits.

D. Sample from North of Furnace No 30

As can be seen from the analyses of Sample 41-1 (Th-232 at 139 ρCi/g) the cleanup was not complete in this area. An additional three 55-gallon drums of material were removed and the gamma radiation dropped from 120 μR/hr to about about 35 to 40 μR/hr. I am convinced we have successfully reduced the radiation to limits for uncontrolled areas I will defer backfilling until you, as a representative for the Department of Labor, take confirmation samples

I plan to immediately begin the paper work to secure space and a permit for burial, either at Barnwell, SC or Richland, WA. We will dispose of the material removed from the area surrounding Furnace No 30 as well as the samples in cans that you refer to in your report of March 1986.

UCCNHT0000812

As you know, we are quite anxious to obtain the results of the wipe tests and soil samples taken on Elkem property that hopefully will allow termination of License 210-0090 and License 950-0139. I was pleased to hear that you will have them designated as top priority and will communicate the results to me as soon as you obtain them.

Again I want to thank you for a very pleasant and helpful meeting

Very truly yours,

Donald J. Hansen

cc: Mr. R. G. Beverly
Mr. F. V. McMillen

mau/369h
Attachments

BLIND COPIES: Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch
R. L. Miller
W. D. Smith
C. T. Wentzel

UCCNHT0000813

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

Sample No.		Description	Analyses: URANIUM SERIES Uranium µg/g	URANIUM SERIES Th-230 pCi/g	THORIUM SERIES Th-232 pCi/g	THORIUM SERIES Th-228 pCi/g	Gamma Radiation µR/hr*
Book 2446		Code Rule 38 Limit	[500]	**	[55]	***	[250]
A	40-6	Bldg. 24 (VA1) Top of Pit	28.9	12±2	16±2	17±2	170
	40-7	Bldg. 24 7' Depth in Pit	44 3	22±2	37±2	39±3	150
B	40-3	Dark Slag-Yard East of Fce Bldg.	20.2	299±7	16±2	40±9	150
	40-4	Light Slag-Yard East of Fce. Bldg.	18 6	466±9	37±3	14±2	200
C	40-5	Slag Before Digging South of Furnace 30	389	186±6	241±7	241±7	200-420
	41-2	Sample in Front of Fce. 30 After Cleanup	68 4	19±2	35±3	35±3	40
	41-3	Sample from Southwest of Furnace 30 After Cleanup	24.9	6 2±1 1 5.9±1.1	9 6±1.3 8.5±1.3	9.5±1.3 9.2±1.33	30
D	41-1	Sample from North Support of Fce. 30 After Cleanup	122	76±4	139±5	145±5	120
		Area of North Support of Fce. 30 After Second Cleanup	-	-	-	-	35-40

*Ludlum Model 19 Micro R Meter - Reading at surface of location where sample was taken
**pCi/g equivalent to 05% (500 ppm) calculated to be $9\ 7 \times 10^{6}$
***pCi/g equivalent to .05% (500 ppm) calculated to be 4.1×10^{11}

UCCNHT0000814

APPENDIX 1

NEW YORK STATE DEPARTMENT OF LABOR

INTER-OFFICE MEMORANDUM

To R. Kelly — Date March 26, 1982 — Office RHU

From F.J. Bradley — Office RHU

Subject Union Carbide/Niagara Falls

Based on your survey of December 1, 1981 and the attached results, issue supplemental Notice of Inspection Findings and include our survey results. Require clean up to Table 5 limits within a specified time span. Contact Radiation Safety Officer to arrive at mutually agreable clean up time schedule.

Union Carbide's internal memo dated October 31, 1981 confirms our results and that they are aware of their responsibilities. All we need now is a clean up schedule.

Code Rule 38, Table 5 limits are as follows:

U-nat: 200pCi, $\frac{\text{U-nat}}{\text{gram of soil}}$

Th-nat: 55 pCi, $\frac{\text{Th-nat}}{\text{gram of soil}}$

and external surface dose levels
250 $\frac{\mu R}{hr}$ on surface.

We need to rely on their results with mixed U/Th contamination. I circled soil contamination values above 200 pCi/g (assuming all U-nat).

F.J. Bradley, Ph.D.
Principal Radiophysicist

FJB:bd

UCCNHT0000815

APPENDIX 2

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING
65 COURT STREET
BUFFALO N Y 14202

RAMONA L GALLAGHER
Assistant Commissioner of Labor

INVESTIGATIVE REPORT

Umetco - 47th and Royal Avenues, Niagara Falls

Report prepared by Robert F. Kelly on 25 MAR 86.

Report reviewed by _____ on _____.

On 20 MAR 86 after obtaining soil samples on the Umetco property, Dr. Richard Hanson related to me possible "problem" areas when he performed an external radiation survey of the plant facilities a short time ago.

There are four possible problem areas; all seem minor since external readings almost at contact showed levels at about 3-5 times background.

These are described below:

A) "Rock area" outside Building 24 -- This area shows some potential for a bigger problem; rocks on frozen grounds showed the readings mentioned above. Warmer weather will let facility determine what is under these piles.

B) Number 6 Furnace Room in Building 77 - Area shows slight contamination; its mainly on surface and doesn't seem to be a big problem.

C) Building 24 -- dust near furnace. Again doesn't seem to be a big hazard.

D) Samples in cans -- Now located in caged area in Building 25, they will be shipped as radioactive waste.

As related to Dr. Hansen, samples are to be analyzed in all three areas listed above and results sent to the Department. If within the limits, the Department will resurvey premises to insure compliance with Coderule 38.

Robert Kelly
Associate Radiophysicist

UCCNHT0000816

APPENDIX 3

Conversion of ρCi to g

$$\text{Specific Activity} = \frac{1.13 \times 10^{13}}{TA} \quad \text{curries per gram of pure nuclide}$$

Where T = half life in seconds
A = mass number

For Th-230

$T = 8.0 \times 10^4$ years $= 8.0 \times 10^4 \times 3.15 \times 10^7 = 2.52 \times 10^{12}$ seconds

$A = 230$

$$\text{Specific Activity per Gram of Th-230} = \frac{1.13 \times 10^{13}}{2.52 \times 10^{12} \times 230} = .0195 \text{ Ci}$$

$$= .0195 \times 10^{12} = 1.95 \times 10^{10} \text{ ρCi}$$

Sample 40-3 299 ρCi/g

$$\frac{299 \text{ ρCi/g}}{1.95 \times 10^{10} \text{ ρCi/g Th-230}} = 1.53 \times 10^{-8} \text{g Th-230/g}$$

Sample 40-4 466 ρCi/g

$$\frac{466 \text{ ρCi/g}}{1.95 \times 10^{10} \text{ ρCi/g Th-230}} = 2.39 \times 10^{-8} \text{g Th-230/g}$$

UCCNHT0000817

File Copy

7 2.6

UMETCO MINERALS CORPORATION
Internal Correspondence

39 Old Ridgebury Road
Danbury, CT 06817

To: F. V.McMillen

Date: February 6, 1986

CC: H. K. Jackson
R. G. Tisch

Subject: Niagara Falls Environmental Status

Dear Frank:

On February 4th I met at Niagara Falls with Rich Miller, Craig Wentzel and his staff and reviewed the environmental areas of concern vis-a-vis the SAC/Umetco divestiture. Although the letter agreement of December 23rd with SAC does not stipulate what the arrangements might be with regard to current environmental problems, I took the approach, just as in Arkansas, that Umetco has agreed in principle to accept the liability for all environmental situations that it has created.

I will list the various areas of environmental concern and review our discussions and my thoughts:

1. The most immediate environmental concern is PCB that exists in various transformers and capacitors throughout the facility. For your information Frank, the regulations stipulate that any electrical equipment which contains oils that contain less than 50 parts per million PCBs are categorized as non-PCB equipment. Those that contain 50 to 500 ppm are referred to as PCB Contaminated Electrical Equipment and the third category, referred to as PCB Equipment, is that equipment with higher than 500 parts per million PCB in the oil. No remedial action is required for that equipment with less than 50 parts per million PCB, nor for the other two categories, as long as the equipment, i.e. transformers, capacitors, etc., is not leaking. The last two categories must be inspected upon schedules required by the EPA and if a leak or seepage is detected, then the clock starts running and within limited time periods equipment must either be retrofilled, i.e. the oils removed and replaced with non-PCB oil, or the equipment must be disposed of. In the latter case, that means removing the oil and then land filling the carcass. From a practical standpoint, if the equipment contains oils containing high amounts of PCBs, it may not be possible to retrofill them, whereas the gaskets and other materials within the equipment may absorb and hold sufficient PCBs so that when refilled, the oil would simply be recontaminated. When you retrofill, it is required that after three months of operation, the equipment must again be sampled to ensure that it is non-PCB.

UCCNHT0000818

The Niagara plant has made a survey amd sampled all known electrical equipment that they believe might contain PCBs. Where they have found contaminated equipment they have made correction recommendations. I have reviewed those recommendations and inspected the various equipment and I concur with their recommendations. Seven relatively large transformers can probably be successfully retrofilled, which would be the most economic route. Those are transformers 33, 34, 35, 110, 111, 21 and 22. The estimated cost of retrofilling and disposing of the PCB contaminated oil, which must be burned by a qualified disposal firm, is approximately $60M. Firm quotes are currently being obtained and it will probably require three to four months to complete, plus a three month running period to retest the transformers. A second group of transformers, numbers 4, 23, 24, 122, and 161, are no longer required and in some cases are highly contaminated with PCBs. It is recommended that they be disposed of. We do not have a recent quote on the costs of performing that disposal, but it is estimated to be in the vicinity of $90M. It would also require three to six months to complete disposal and again, the plant is obtaining firm quotes. There are two relatively small transformers; no. 119 and 143, which would be cheaper to dispose of and replace at a total estimated cost of $2M.

There are 113 PCB capacitors that are no longer required and again, we are obtaining firm quotes for disposal. I would guess the cost could be in the $15M to $20M range. There are three medium sized capacitors in storage, plus twenty smaller PCB capacitors in the control cubicles for the shaft furnace. These capacitors are in acceptable storage and there is no evidence of leakage so I see no reason to either dispose of them or replace them. If SAC plans to use the shaft furnace, they may want larger capacitors since, as you will recall, these are underpowered.

There are three PCB transformers on the roof of 94 building and, as you probably recall, our Legal Department advised us that those are the responsibility of Elkem. The plant has been inspecting and maintaining them and is on record with the Niagara Falls Fire Department as performing those functions. I will ask our Legal Department to advise Elkem in writing that we will no longer perform that maintainance and that those transformers are their responsibility.

Beyond the electrical equipment, the plant has also accumulated seven drums of waste and sludge from clean up of PCB that has leaked from transformers and there will probably be another thirty or so drums that will accumulate from clean up when the above described equipment is either removed or retrofilled. It will be necessary to dispose of that material by a qualified agent. The estimated cost for that is $15M to $20M.

UCCNHT0000819

Three of the above transformers already discussed are sitting outside and are known to have leaked. That leakage could possibly have contaminated a fair amount of soil and it will be necessary to sample that soil and if contaminated, remove and drum it, and dispose of it. There could be as much as ten or twenty barrels and the approximate disposal costs are $300 to $500 per barrel.

The main switching station at Niagara Falls has been the responsibility of Umetco and it is now to be transferred to Linde. That station contains 1,008 PCB capacitors, all of which are sealed, are carefully enclosed, and none have ever been known to leak, nor are there any leaking now. I understand that Linde has already indicated that they would like to see those removed and replaced and have obtained an estimate for removal and disposal of $250M. Our own estimate is less, i.e. $150M. We have no quotes on the reinstallation and replacement costs but I suspect the total cost would be in excess of half a million dollars. There is no legal requirement as long as there are no leaks and as long as the proper inspections are made to replace those capacitors. It makes absolutely no sense to me from the standpoint of Union Carbide's exposure, etc., to replace them at this time, and there may never be a need to.

The only area regarding PCBs that is undefined at Niagara involves the many oil filled switches around the plant. No testing has ever been done. The plant will randomly sample some of the oil fill switches in the near future and have PCB assays run. Hopefully, we will find none and, that being the case, there will be no problem there.

The approximate cost of all of the actions listed above is something in the order of $200M to $250M, not counting the main switching station, for clean up of the PCB situation.

2. The second most critical environmental item is the discharge from the halide cylinder dumping and cleaning operations that we have discussed before. There has been an air discharge of HCl and chlorine gas and a liquid discharge into the Elkem sewer. On occasion, low Phs occur due to HCl and there is also some vanadium. The Engineering group and the plant has designed and tested a new fume control scrubbing system, which is in the process of being installed, to control and correct those problems. This involves a new venturi scrubber and a high pressure blower to collect the fumes and scrub them so that only clean air is discharged and so that the liquid can be released in a controlled fashion. The current schedule is to complete the installation of that facility by the end of April. Tests have shown that the system should collect from 95% to 97% of the particulate fumes which should be acceptable. When complete it will be necessary to obtain an air discharge permit from the

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DEC, which should be no problem, except they may ask why we have not obtained that permit heretofore. It may also be necessary to obtain a water permit, unless we are covered under permits held by Elkem. Craig Wentzel and Don Hansen will attempt to find the answer to the latter question.

I'm sure you appreciate that as we proceed to obtain permits, the discussions we have had in the past with Elkem with regard to discharging into their sewer may arise again. An estimate has been made to install a new sewer extension, so that the discharge would go into our own sewers of about $35M. There is no environmental reason to do so and the new scrubber should alleviate Elkem's previous concerns.

3. Chrome Oxide - There are about 64 drums of a chrome oxide material at Niagara which came from the Strasbourg facility. At this time, there is no obvious home for this. It does classify as a hazardous waste and the quickest and simplest way to resolve the problem would be to have it buried as a hazardous waste. We obtained an estimate of $6M to $7M to do that.

4. There is 78M pounds at Niagara of a high antimony tungsten moly oxide material, which resulted as a part of the Bishop problem some time in the past. There have been efforts to market this unsuccessfully through Investment Recovery and by George Lincoln. This material, unfortunately, is in paper bags, which are beginning to break open. It does classify as a hazardous waste and to dispose of it would require repackaging the material into steel drums and disposal by a qualified agent. Perhaps the material is marketable but if not the disposal would probably cost about $30M.

5. You should be aware, Frank, that there is a collapsed, buried sewer on our property, which was filled many years ago with some kind of a crushed fly ash or slag. We understand it is leaking into the Elkem sewer and the city may be giving Elkem some problems. The source of the leakage is not from us. We understand it is material coming from Hooker's property which is passing through and under this crushed filled sewer, which is merely providing a route to Elkem's sewer. No action is required on this.

6. The freight elevator in the globar area, at some time in the past, was lined with asbestos for "fire protection?" Due to a leak in the roof a few months ago, some fell off, dropped down through the elevator shaft and contaminated the area. The plant had to bring in people to clean it up and since it represents an environmental hazard an estimate has been obtained for an outside firm to remove the asbestos and get rid of it. The cost estimate was $12M, and probably should be done. As far as other asbestos throughout the plant, over the last year or so the plant has encapsulated or removed most of the asbestos pipe

insulation throughout the plant. They believe they have corrected over 95% of that problem. There is some asbestos stored in the plant that needs to be disposed of at a minimal cost.

7. Twice a year, an outside firm, referred as Super Sucker, comes in and vacuums all of the crane rails, etc.. The dust is collected as a sludge which is dumped in the yard. It is scattered over a relatively wide area and no testing has ever been done to determine whether this material qualifies as a hazardous waste. The plant will sample the material and if it is a hazardous waste, an inventory will be taken. To dispose of the material it would have to be drummed and disposed of at a cost of $200 to $300 per drum. I have no firm feel for the quantity of this material, but there could be over a hundred drums.

8. There are in storage in the globar area thousands of small coffee cans, which represent samples of material that have been made at Niagara Falls since 1906. No one knows what is in these cans; whether they are "hazardous waste", radioactive, etc. A program has been started with plant people in their spare time to open each and every can, identify it, categorize it, and separate it for disposal. At the current rate this is proceeding, it probably won't be completed for well over a year. I have recommended that we get an outside firm to quote on coming in and doing that work so that it could be wrapped up and completed in a reasonable time. I would estimate we are talking in the order of $10M to $15M for that task.

9. We talked about numerous other small piles of miscellaneous materials lying around, i.e. lime, etc., and there are no other significant items at issue. However, there is about 20M pounds of moly vanadium aluminum remelts, which is not a hazardous material, but it is the plant's position that they should be written off to the account of Umetco. Perhaps at some stage it may be necessary to landfill them.

There is some concern that there might be material lying around from ancient history that could be thorium bearing and thus radioactive, such as the material we cleaned up in the yard last year. I believe it would be better to determine if there is any potential problem now and have asked Don Hansen to conduct a radiation survey throughout the plant and yard to see if anything crops up. If we find nothing from a surface radiation survey, that should alleviate all concerns.

10. There is a pile in the yard of approximately 4M tons of slag that has come from the various furnacing operations. That slag is currently being sold under contract to Federal Cement Company, who is purchasing the material for $12.00 per ton. The rate at which they are purchasing is at about the rate that it

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is being produced. However, they have shown a strong interest in purchasing all of the material in due course. This material is not hazardous and I do not view it as any liability for Umetco.

11. There are some empty drums scattered around the plant but those can be used by SAC or disposed of, if necessary, by simply washing them out. I view this as no environmental liability.

12. The plant was advised by a Union Carbide Security inspection that it may be advisable to erect a fence between what will be the SAC facilities and the L-Tech facilities. That fence would go across the yard and across where all the various and sundry piles of slag, etc., are and would also go right across the middle of a large pond called Lake Linde. The plant is obtaining an estimate for this fence. Not only will the fence be expensive, it will be extremely difficult to install due to the lake. I do not consider this item an environmental matter and would question that the fence is really needed for security. The fence would be approximately 1500 feet long, would need to be chain length, and, as I say, will not be cheap.

13. Frank, the Lake Linde area that I referred to above and the general yard area, although not representing any immediate environmental probem, does raise some concerns. There have been many different types of materials dumped out there for 60 or 70 years. No one knows whether any of the materials have been leachable, whether they have in any way contaminated the soil, and if so, to what depth, or if there could be any potential ground water contamination. As we dump and identify the contents of the sample cans, we should get some guidance as to what might be out there. Lake Linde has collected drainage from the area and L-Tech is discharging into it and no one really knows the characteristic of that water. The concern I have is that when Umetco no longer has any control over the property, the lessees, i.e. L-Tech, SAC, etc., could dump or discharge in the area, creating environmental problems and a liability for UCC. Ideally, it would be good to go in and sample the area; maybe even by drilling, and establish a base for UCC's liability at this time. The radiation survey will help there. The only danger of this is that with all of the industrial contamination that is either known or suspected in that vast industrial area, we could find something that would open up a real Pandora's box, and so I, therefore, hesitate to recommend that course of action. I suggest we should discuss this particular issue further and perhaps in depth with legal counsel.

14. When the property to the north of our current facility was sold to Niacet, Union Carbide retained ownership of three large boilers and the building and associated equipment contained therein. Prior to 1980 or '81, the boilers were operated to provide steam for our facility. I do not know exactly the legal

situation, i.e. who's responsibility they are, but Umetco has been the UCC manager and, in any event, they are still owned by Union Carbide. The Niacet individual who showed me around is aware of that. He pointed out that the supports on two huge stacks on the top of the building are failing and if the stacks are not resupported or removed, they will fall down. The boilers themselves have asbestos insulation on the external piping and they may have asbestos insulation internally throughout the boilers. I have asked the fellows at Niagara to try and find drawings so that we can determine how severe the asbestos problem is. If we are legally responsible for these boilers, it may be necessary to either remove the asbestos, certainly to either support the stacks or tear them down, and possibly demolish the boilers. These are large units and the costs would be significant. I will ask our Legal Department to give me an opinion as to what our responsibilities are. This issue does not involve SAC except perhaps for a service agreement but may have to be resolved before Umetco can withdraw from Niagara Falls.

15. Under the agreement with SAC, Carbide has said that they will share the final and eventual reclamation costs of the site, if and when it is ever abandoned. To fix that liability now, we could get a demolition contractor to make an estimate now of demolishing and reclaiming the facility. However, the logical final solution would probably be to clean out and scrap the equipment and sell the buildings at that time. If the parties agree to resolve Items 1 through 14, I suggest the final buildings reclamation be left and the cost or credit be shared based on relative time of occupancy.

16. Miscellaneous - We touched on numerous other minor areas, such as underground tanks, and there are no problems there. We talked about bulk storage and although initially there appeared to be a caustic tank problem, it was tested and checked out okay. We talked about the 86 or so vanadium halide tanks scattered around the country, and they seem to be under control and all in good condition. There is no major waste oil problem, etc. There are no radiation sources on the site. I believe, Frank, that if the situations described in this memo are addressed, we can fairly well define the environmental liabilities of Union Carbide at Niagara Falls.

Very truly yours,

D. G. MILLENBRUCH

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UCCNHT0000824

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

July 25, 1985

Mr. Robert F. Kelly
Senior Radiologist
New York State - Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139 - Majors Cleanup

Dear Mr. Kelly:

As I told you in our phone conversation of July 15, 1985, I will be taking over some of R. J. Klotzbach's responsibilities because of his recent heart attack. On May 14, 1985 he sent you a letter which listed soil samples taken from the surface before excavation, after excavation at 3 depths, and after backfilling at 5 depths for a total of 64.

I am enclosing a copy of the analytical results completed by Alpha Nuclear Laboratories at Dallas, Texas. We have converted the units to pCi/gm and these, together with the various sample codes are shown in the accompanying table. You will also find enclosed a diagram which depicts the sample location.

The formula we used for conversion of units were:

Ra-226, Th-232: $\mu Ci/gm \times 10^6 = pCi/gm$

U-Nat: $\mu gm/gm \times 0.667 = pCi/gm$ .335 ? dpm

After you have had a chance to examine the data you may wish to call me. I would appreciate any advice you could give on how to proceed with our delicensing.

Very truly yours,

Donald J. Hansen

Donald J. Hansen
Assistance Director-Technology

cc: Messrs: R. G. Beverly
L. G. Evans
T. J. Kagetsu
D. G. Millenbruch
R. L. Miller

/mau/259h
Enclosure

UCCNHT0000825

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ALPHA NUCLEAR LABORATORIES INC.
A DIVISION OF ALPHA ENERGY LABORATORIES INC

REPORT OF ANALYSIS

ANL JOB# 85-180

UMETCO

*20 OF 65 SAMPLES FOR RA TH AND U * U-NAT REPORTED IN UNITS OF UG/G*

SAMPLE I. D.	ISOTOPE	CONCENTRATION (UCI/G)	LLD (UCI/G)
32774	RA-226	(1.23 ± 0.01) X 10^{-5}	1 X 10^{-7}
6189	TH-232	(1.54 ± 0.09) X 10^{-5}	6 X 10^{-9}
	* U-NAT	(35.4 ± 3.00) X 10^{+0}	1 X 10^{+0}
32775	RA-226	(2.80 ± 0.03) X 10^{-4}	1 X 10^{-7}
6190	TH-232	(3.50 ± 0.71) X 10^{-6}	2 X 10^{-8}
	* U-NAT	(300.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32776	RA-226	(2.40 ± 0.04) X 10^{-5}	2 X 10^{-7}
6191	TH-232	(2.75 ± 0.33) X 10^{-5}	2 X 10^{-8}
	* U-NAT	(43.00 ± 3.00) X 10^{+0}	1 X 10^{+0}
32777	RA-226	(1.40 ± 0.02) X 10^{-5}	2 X 10^{-7}
6192	TH-232	(1.71 ± 0.59) X 10^{-6}	8 X 10^{-9}
	* U-NAT	(280.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32778	RA-226	(1.18 ± 0.01) X 10^{-4}	2 X 10^{-7}
6193	TH-232	(1.50 ± 0.13) X 10^{-5}	8 X 10^{-9}
	* U-NAT	(1.80 ± 1.00) X 10^{+0}	1 X 10^{+0}
42779	RA-226	(1.36 ± 0.15) X 10^{-6}	2 X 10^{-7}
6194	TH-232	(4.59 ± 1.20) X 10^{-7}	8 X 10^{-9}
	* U-NAT	(10.8 ± 4.00) X 10^{+0}	1 X 10^{+0}
32780	RA-226	(5.40 ± 0.51) X 10^{-6}	3 X 10^{-7}
6195	TH-232	(3.48 ± 0.30) X 10^{-6}	7 X 10^{-9}
	* U-NAT	(0.1 ± 1.00) X 10^{+0}	1 X 10^{+0}
32781	RA-226	(1.23 ± 0.30) X 10^{-6}	2 X 10^{-7}
6196	TH-232	(9.16 ± 3.39) X 10^{-7}	2 X 10^{-8}
	* U-NAT	(1.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32782	RA-226	(4.31 ± 0.34) X 10^{-6}	2 X 10^{-7}
6197	TH-232	(1.94 ± 7.06) X 10^{-6}	2 X 10^{-6}
	* U-NAT	(2.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32783	RA-226	(1.46 ± 0.15) X 10^{-6}	2 X 10^{-7}
6198	TH-232	(4.22 ± 1.41) X 10^{-7}	5 X 10^{-9}
	* U-NAT	(1.00 ± 1.00) X 10^{+0}	1 X 10^{+0}

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Swati Damle.

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REPORT OF ANALYSIS

ANL JOB# 85-180

UMETCO

*20 OF 65 SAMPLES FOR RA TH AND U * U-NAT REPORTED IN UNITS OF UG/G*

SAMPLE I. D.		ISOTOPE	CONCENTRATION(UCI/G)	LLD(UCI/G)
32784		RA-226	(2.79 ± 0.43) X 10^{-6}	4 X 10^{-7}
6199		TH-232	(4.32 ± 1.62) X 10^{-7}	7 X 10^{-9}
	*	U-NAT	(1.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32785		RA-226	(1.11 ± 0.05) X 10^{-5}	2 X 10^{-7}
6200		TH-232	(4.05 ± 0.67) X 10^{-6}	8 X 10^{-9}
	*	U-NAT	(15.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32786		RA-226	(1.80 ± 0.39) X 10^{-6}	3 X 10^{-7}
6201		TH-232	(1.02 ± 0.22) X 10^{-6}	9 X 10^{-9}
	*	U-NAT	(1.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32787		RA-226	(1.22 ± 0.21) X 10^{-6}	3 X 10^{-7}
6202		TH-232	(4.82 ± 1.34) X 10^{-7}	7 X 10^{-9}
	*	U-NAT	(1.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32788		RA-226	(5.43 ± 0.25) X 10^{-6}	2 X 10^{-7}
6203		TH-232	(1.64 ± 0.23) X 10^{-6}	5 X 10^{-9}
	*	U-NAT	(49.00 ± 5.00) X 10^{+0}	1 X 10^{+0}
32789		RA-226	(2.68 ± 0.03) X 10^{-6}	2 X 10^{-7}
6204		TH-232	(8.44 ± 1.77) X 10^{-7}	6 X 10^{-9}
	*	U-NAT	(5.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32790		RA-226	(2.67 ± 0.32) X 10^{-6}	2 X 10^{-7}
6205		TH-232	(4.80 ± 1.33) X 10^{-7}	5 X 10^{-9}
	*	U-NAT	(9.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32791		RA-226	(1.31 ± 0.04) X 10^{-5}	2 X 10^{-7}
6206		TH-232	(9.02 ± 0.54) X 10^{-6}	7 X 10^{-9}
	*	U-NAT	(17.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32792		RA-226	(3.20 ± 0.27) X 10^{-6}	2 X 10^{-7}
6207		TH-232	(3.21 ± 1.36) X 10^{-7}	8 X 10^{-9}
	*	U-NAT	(3.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32793		RA-226	(1.29 ± 0.10) X 10^{-6}	1 X 10^{-7}
6208		TH-232	(5.73 ± 1.53) X 10^{-7}	6 X 10^{-9}
	*	U-NAT	(1.00 ± 1.00) X 10^{+0}	1 X 10^{+0}

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REPORT OF ANALYSIS

ANL JOB# 85-181

UMETCO

*20 OF 65 SAMPLES FOR RA TH AND U *U-NAT REPORTED IN UNITS OF UG/G.*

SAMPLE I. D.		ISOTOPE	CONCENTRATION(UCI/G)	LLD(UCI/G)
32794		TH-232	(3.26 ± 1.30) X 10^{-7}	8 X 10^{-9}
6209		RA-226	(1.35 ± 0.23) X 10^{-6}	2 X 10^{-7}
	*	U-NAT	(5.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32795		TH-232	(2.52 ± 0.92) X 10^{-7}	7 X 10^{-9}
6210		RA-226	(1.71 ± 0.19) X 10^{-6}	2 X 10^{-7}
	*	U-NAT	(4.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32796		TH-232	(2.74 ± 0.95) X 10^{-7}	5 X 10^{-9}
6211		RA-226	(1.29 ± 0.08) X 10^{-6}	1 X 10^{-7}
	*	U-NAT	(4.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32797		TH-232	(9.66 ± 2.09) X 10^{-7}	7 X 10^{-9}
6212		RA-226	(1.17 ± 0.03) X 10^{-5}	1 X 10^{-7}
	*	U-NAT	(73.00 ± 15.00) X 10^{+0}	1 X 10^{+0}
32798		TH-232	(1.98 ± 0.25) X 10^{-6}	6 X 10^{-9}
6213		RA-226	(3.45 ± 0.09) X 10^{-6}	1 X 10^{-7}
	*	U-NAT	(19.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32799		TH-232	(8.95 ± 1.91) X 10^{-7}	8 X 10^{-9}
6214		RA-226	(1.86 ± 0.17) X 10^{-6}	1 X 10^{-7}
	*	U-NAT	(13.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32800		TH-232	(1.28 ± 0.24) X 10^{-6}	6 X 10^{-9}
6215		RA-226	(5.69 ± 0.35) X 10^{-6}	2 X 10^{-7}
	*	U-NAT	(15.00 ± 3.00) X 10^{+0}	1 X 10^{+0}
32801		TH-232	(4.98 ± 1.94) X 10^{-7}	9 X 10^{-9}
6216		RA-226	(3.92 ± 0.39) X 10^{-6}	2 X 10^{-7}
	*	U-NAT	(5.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32802		TH-232	(5.61 ± 1.55) X 10^{-7}	6 X 10^{-9}
6217		RA-226	(2.71 ± 0.26) X 10^{-6}	2 X 10^{-7}
	*	U-NAT	(3.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32803		TH-232	(2.60 ± 0.22) X 10^{-6}	6 X 10^{-9}
6218		RA-226	(6.07 ± 0.08) X 10^{-5}	2 X 10^{-7}
	*	U-NAT	(14.0 ± 2.00) X 10^{+0}	1 X 10^{+0}

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ALPHA NUCLEAR LABORATORIES INC.
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REPORT OF ANALYSIS

ANL JOB# 85-181

UMETCO

*20 OF 65 SAMPLES FOR RA TH AND U *U-NAT REPORTED IN UNITS OF UG/G.*

SAMPLE I. D.	ISOTOPE	CONCENTRATION(UCI/G)	LLD(UCI/G)
32804	TH-232	(9.69 ± 2.24) X 10^{-7}	8 X 10^{-9}
6219	RA-226	(1.88 ± 0.22) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(25.00 ± 4.00) X 10^{+0}	1 X 10^{+0}
32805	TH-232	(1.19 ± 0.26) X 10^{-6}	8 X 10^{-9}
6220	RA-226	(2.69 ± 0.20) X 10^{-6}	1 X 10^{-7}
	* U-NAT	(8.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32806	TH-232	(3.28 ± 2.08) X 10^{-7}	1 X 10^{-8}
6221	RA-226	(2.94 ± 0.63) X 10^{-6}	5 X 10^{-7}
	* U-NAT	(8.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32807	TH-232	(6.79 ± 2.59) X 10^{-7}	1 X 10^{-8}
6222	RA-226	(2.64 ± 0.42) X 10^{-6}	4 X 10^{-7}
	* U-NAT	(4.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32808	TH-232	(9.86 ± 2.53) X 10^{-7}	6 X 10^{-9}
6223	RA-226	(3.58 ± 0.40) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(2.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32809	TH-232	(4.50 ± 1.65) X 10^{-7}	6 X 10^{-9}
6224	RA-226	(1.97 ± 0.21) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(3.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32810	TH-232	(4.15 ± 0.56) X 10^{-7}	8 X 10^{-9}
6225	RA-226	(1.77 ± 0.33) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(3.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32811	TH-232	(5.50 ± 1.64) X 10^{-7}	6 X 10^{-9}
6226	RA-226	(2.07 ± 0.46) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(2.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32812	TH-232	(3.52 ± 1.53) X 10^{-7}	9 X 10^{-9}
6227	RA-226	(1.99 ± 0.22) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(3.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32813	TH-232	(4.60 ± 1.58) X 10^{-7}	5 X 10^{-9}
6228	RA-226	(0.00 ± 1.76) X 10^{-7}	2 X 10^{-7}
	* U-NAT	(3.00 ± 2.00) X 10^{+0}	1 X 10^{+0}

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ALPHA NUCLEAR LABORATORIES INC.
A DIVISION OF ALPHA ENERGY LABORATORIES, INC

REPORT OF ANALYSIS

ANL JOB# 85-182

UMETCO

*20 OF 65 SAMPLES FOR RA TH AND U * U-NAT REPORTED IN UNITS OF UG/G.*

SAMPLE I. D.	ISOTOPE	CONCENTRATION(UCI/G)	LLD(UCI/G)
32814	TH-232	(4.98 ± 1.70) X 10^{-7}	5 X 10^{-9}
6229	RA-226	(3.75 ± 0.34) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(2.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32815	TH-232	(2.21 ± 0.381) X 10^{-6}	5 X 10^{-9}
6230	RA-226	(4.77 ± 0.14) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(21.00 ± 6.00) X 10^{+0}	1 X 10^{+0}
32816	TH-232	(1.04 ± 0.31) X 10^{-6}	1 X 10^{-8}
6231	RA-226	(1.04 ± 0.23) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(8.00 ± 3.00) X 10^{+0}	1 X 10^{+0}
32817	TH-232	(8.09 ± 1.73) X 10^{-7}	6 X 10^{-9}
6232	RA-226	(1.97 ± 0.18) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(6.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32818	TH-232	(6.48 ± 0.61) X 10^{-7}	5 X 10^{-9}
6233	RA-226	(3.23 ± 0.31) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(11.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32819	TH-232	(4.79 ± 0.67) X 10^{-7}	8 X 10^{-9}
6234	RA-226	(4.15 ± 0.39) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(4.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32820	TH-232	(2.50 ± 0.388) X 10^{-6}	4 X 10^{-9}
6235	RA-226	(8.65 ± 0.12) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(18.00 ± 6.00) X 10^{+0}	1 X 10^{+0}
32821	TH-232	(2.63 ± 0.76) X 10^{-7}	6 X 10^{-9}
6236	RA-226	(4.48 ± 2.18) X 10^{-7}	2 X 10^{-7}
	* U-NAT	(3.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32822	TH-232	(1.30 ± 0.57) X 10^{-7}	6 X 10^{-9}
6237	RA-226	(5.75 ± 0.61) X 10^{-7}	1 X 10^{-7}
	* U-NAT	(2.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32823	TH-232	(3.29 ± 1.68) X 10^{-7}	6 X 10^{-9}
6238	RA-226	(1.34 ± 0.23) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(3.00 ± 1.00) X 10^{+0}	1 X 10^{+0}

9982 MONROE DRIVE SUITE 405 DALLAS, TEXAS 75220 (214) 351-6092

Swati Damle.

UCCNHT0000830

ALPHA
NUCLEAR
LABORATORIES INC.
A DIVISION OF ALPHA ENERGY LABORATORIES INC

REPORT OF ANALYSIS

ANL JOB# 85-182

UMETCO

20 OF 65 SAMPLES FOR RA TH AND U * U-NAT REPORTED IN UNITS OF UG/G.

SAMPLE I. D.	ISOTOPE	CONCENTRATION(UCI/G)	LLD(UCI/G)
32824	TH-232	(5.32 ± 3.17) X 10^{-7}	1 X 10^{-8}
6239	RA-226	(3.61 ± 0.31) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(4.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32825	TH-232	(5.28 ± 1.27) X 10^{-7}	6 X 10^{-9}
6240	RA-226	(8.04 ± 1.72) X 10^{-7}	3 X 10^{-7}
	* U-NAT	(3.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32826	TH-232	(1.67 ± 0.59) X 10^{-7}	4 X 10^{-9}
6241	RA-226	(8.03 ± 1.27) X 10^{-7}	2 X 10^{-7}
	* U-NAT	(3.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32827	TH-232	(6.31 ± 6.37) X 10^{-8}	5 X 10^{-9}
6242	RA-226	(6.77 ± 2.06) X 10^{-7}	1 X 10^{-7}
	* U-NAT	(3.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32828	TH-232	(3.21 ± 0.27) X 10^{-7}	5 X 10^{-9}
6243	RA-226	(1.81 ± 0.27) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(3.00 ± 2.00) X 10^{+0}	1 X 10^{+0}
32829	TH-232	(5.37 ± 1.12) X 10^{-7}	8 X 10^{-9}
6244	RA-226	(1.26 ± 0.18) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(3.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32830	TH-232	(1.99 ± 0.36) X 10^{-6}	2 X 10^{-8}
6245	RA-226	(3.09 ± 0.40) X 10^{-6}	2 X 10^{-7}
	* U-NAT	(9.20 ± 2.00) X 10^{+0}	1 X 10^{+0}
32831	TH-232	(1.98 ± 0.48) X 10^{-7}	9 X 10^{-9}
6246	RA-226	(0.00 ± 1.70) X 10^{-7}	2 X 10^{-7}
	* U-NAT	(2.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32832	TH-232	(2.18 ± 1.37) X 10^{-7}	7 X 10^{-9}
6247	RA-226	(1.91 ± 0.32) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(3.00 ± 1.00) X 10^{+0}	1 X 10^{+0}
32833	TH-232	(3.76 ± 1.55) X 10^{-7}	7 X 10^{-9}
6248	RA-226	(1.29 ± 0.17) X 10^{-6}	3 X 10^{-7}
	* U-NAT	(4.00 ± 1.00) X 10^{+0}	1 X 10^{+0}

9982 MONROE DRIVE SUITE 405 DALLAS, TEXAS 75220 (214) 351-6092

Swati Damle.

UCCNHT0000831

ALPHA
NUCLEAR
LABORATORIES INC.
A DIVISION OF ALPHA ENERGY LABORATORIES INC

REPORT OF ANALYSIS

ANL JOB# 85-183

UMETCO

*5 OF 65 SAMPLES FOR RA TH AND U *U-NAT REPORTED IN UNITS OF UG/G.*

SAMPLE I. D.	ISOTOPE	CONCENTRATION (UCI/G)	LLD (UCI/G)
32834	TH-232	$(3.50 \pm 1.47) \times 10^{-7}$	7×10^{-9}
6249	RA-226	$(1.80 \pm 0.28) \times 10^{-6}$	2×10^{-7}
	* U-NAT	$(3.60 \pm 1.00) \times 10^{+0}$	$1 \times 10^{+0}$
32835	TH-232	$(4.33 \pm 1.16) \times 10^{-7}$	6×10^{-9}
6250	RA-226	$(1.66 \pm 0.28) \times 10^{-6}$	3×10^{-7}
	* U-NAT	$(4.00 \pm 1.00) \times 10^{+0}$	$1 \times 10^{+0}$
32836	TH-232	$(1.74 \pm 1.54) \times 10^{-6}$	5×10^{-7}
6251	RA-226	$(2.33 \pm 0.18) \times 10^{-6}$	1×10^{-7}
	* U-NAT	$(18.4 \pm 3.00) \times 10^{+0}$	$1 \times 10^{+0}$
32837	TH-232	$(1.21 \pm 0.20) \times 10^{-6}$	1×10^{-8}
6252	RA-226	$(1.11 \pm 0.09) \times 10^{-6}$	1×10^{-7}
	* U-NAT	$(5.00 \pm 1.00) \times 10^{+0}$	$1 \times 10^{+0}$
32838	TH-232	$(3.21 \pm 1.58) \times 10^{-7}$	6×10^{-9}
6253	RA-226	$(1.92 \pm 0.33) \times 10^{-6}$	2×10^{-7}
	* U-NAT	$(7.40 \pm 1.00) \times 10^{+0}$	$1 \times 10^{+0}$

Swati Damle
7.15.85.

9982 MONROE DRIVE SUITE 405 DALLAS, TEXAS 75220 (214) 351-6092

UCCNHT0000832

UMETCO MINERALS CORPORATION - NIAGARA FALLS, NY
SOIL ANALYSES - SOUTH OF BLDG. 166 (CONT'D)

Niagara Engineering Sample No.	Grand Junction Analytical Code No.	Alpha Nuclear Labs, Inc. Sample No.	Location		Concentrations		
			Area	Depth	Ra 226 pCi/gm	Th 232 pCi/gm	U Nat pCi/gm
3. Samples - After Backfilling							
101-A	32804	6219	West	Surface	1.88	0.97	16.7
101-B	32805	6220	West	6"	2.69	1.19	5.3
101-C	32806	6221	West	12"	2.94	0.33	5.3
101-D	32807	6222	West	18"	2.64	0.68	2.7
101-E	32808	6223	West	24"	3.58	0.99	1.3
102-A	32809	6224	West	Surface	1.97	0.45	2.0
102-B	32810	6225	West	6"	1.77	0.42	2.0
102-C	32811	6226	West	12"	2.07	0.55	1.3
102-D	32812	6227	West	18"	1.99	0.35	2.0
102-E	32813	6228	West	24"	0.0	0.46	2.0
103-A	32814	6229	West	Surface	3.75	0.50	1.3
103-B	32815	6230	West	6"	4.77	2.21	14.0
103-C	32816	6231	West	12"	1.04	1.04	5.3
103-D	32817	6232	West	18"	1.97	0.81	4.0
103-E	32818	6233	West	24"	3.23	0.05	7.3
104-A	32819	6234	East	Surface	4.15	0.48	2.7
104-B	32820	6235	East	6"	8.65	2.50	12.0
104-C	32821	6236	East	12"	0.45	0.26	2.0
104-D	32822	6237	East	18"	0.58	0.13	1.3
104-E	32823	6238	East	24"	1.34	0.33	2.0
105-A	32824	6239	East	Surface	3.61	0.53	2.7
105-B	32825	6240	East	6"	0.80	0.53	2.0
105-C	32826	6241	East	12"	0.80	0.17	2.0
105-D	32827	6242	East	18"	0.68	0.06	2.0
105-E	32828	6243	East	24"	1.81	0.32	2.0
106-A	32829	6244	East	Surface	1.26	0.54	2.0
106-B	32830	6245	East	6"	3.09	1.99	6.1
106-C	32831	6246	East	12"	0.0	0.20	1.3
106-D	32832	6247	East	18"	1.91	0.22	2.0
106-E	32833	6248	East	24"	1.29	0.38	2.7
107-A	32834	6249	East	Surface	1.80	0.35	2.4
107-B	32835	6250	East	6"	1.66	0.43	2.7
107-C	32836	6251	East	12"	2.33	1.74	12.3
107-D	32837	6252	East	18"	1.11	1.21	3.3
107-E	32838	6253	East	24"	1.92	0.32	4.9

UCCNHT0000833

UMETCO MINERALS CORPORATION - NIAGARA FALLS, NY
SOIL ANALYSES - SOUTH OF BLDG. 166

Niagara Engineering Sample No.	Grand Junction Analytical Code No.	Alpha Nuclear Labs, Inc. Sample No.	Location		Concentrations		
			Area	Depth	Ra 226 pCi/gm	Th 232 pCi/gm	U Nat pCi/gm
1. Samples - Before Excavation							
S-1	32774	6189	West	Surface	12.3	15.4	23.6
S-2	32775	6190	West	Surface	280.0	3.5	200.0
S-3	32776	6191	West	Surface	24.0	27.5	28.7
S-4	32777	6192	West	Surface	14.0	1.71	186.7
S-5	32778	6193	West	Surface	118.0	15.0	1.2
2. Samples - Before Backfilling							
WA-1-S	32779	6194	West	Surface	1.36	0.46	7.2
WA-1-6	32780	6195	West	6"	5.40	3.48	0.1
WA-1-12	32781	6196	West	12"	1.23	0.92	0.7
WA-2-S	32782	6197	West	Surface	4.31	1.94	1.3
WA-2-6	32783	6198	West	6"	1.46	0.42	0.7
WA-2-12	32784	6199	West	12"	2.79	0.43	0.7
WA-3-S	32785	6200	West	Surface	11.1	4.05	10.0
WA-3-6	32786	6201	West	6"	1.80	1.02	0.7
WA-3-12	32787	6202	West	12"	1.22	0.48	0.7
WA-4-S	32788	6203	West	Surface	5.43	1.64	32.7
WA-4-6	32789	6204	West	6"	2.68	0.84	3.3
WA-4-12	32790	6205	West	12"	2.67	0.48	6.0
EA-1-S	32791	6206	East	Surface	13.1	9.02	11.3
EA-1-6	32792	6207	East	6"	3.20	0.32	2.0
EA-1-12	32793	6208	East	12"	1.29	0.57	0.7
EA-2-S	32794	6209	East	Surface	1.35	0.33	3.3
EA-2-6	32795	6210	East	6"	1.71	0.25	2.7
EA-2-12	32796	6211	East	12"	1.29	0.27	2.7
EA-3-S	32797	6212	East	Surface	11.7	0.97	48.7
EA-3-6	32798	6213	East	6"	3.45	1.98	12.7
EA-3-12	32799	6214	East	12"	1.86	0.89	8.7
EA-4-S	32800	6215	East	Surface	5.69	1.28	10.0
EA-4-6	32801	6216	East	6"	3.92	0.50	3.3
EA-4-12	32802	6217	East	12"	2.71	0.56	2.0
WL-1	32803	6218	West	Surface	60.7	2.60	9.3

UCCNHT0000834

IM 12 75
EM 174 9A

UNION CARBIDE CORPORATION METALS DIVISION

DRAWING NUMBER SF- 8013

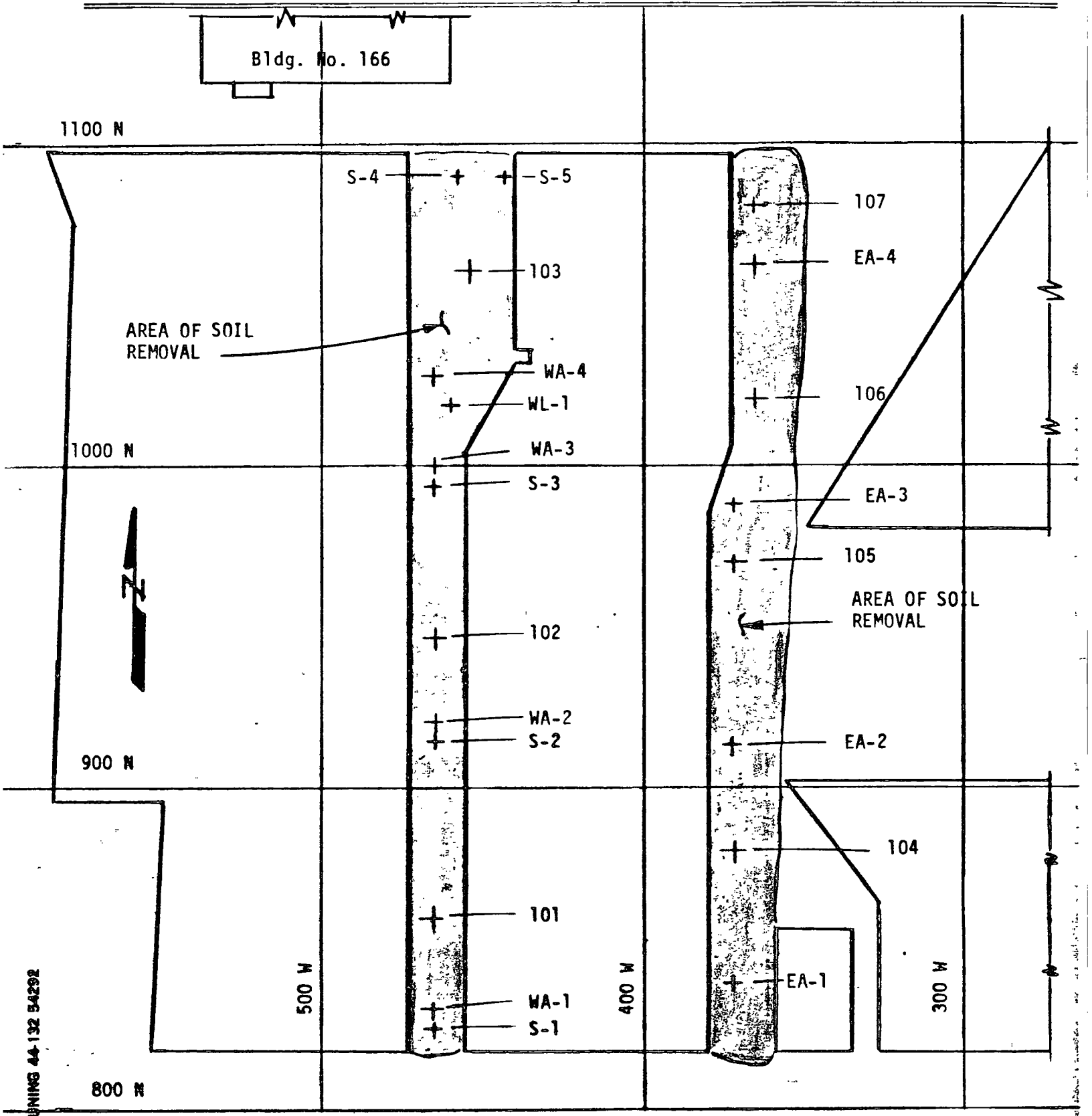
930/256 | FILE NO 11309

TITLE Soil Samples

PLANT	DEPARTMENT	BLDG NO	DRAWN BY	CHECKED BY	APPROVED	EX	ACC ENG	DATE	DRAWING SCALE
Niagara	Yard		DGF					7/22/85	1"=40'-0"

REV | REV

REV | REV



+ = Sample Location

BRUNING 44-132 54292

UCCNHT0000835

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

To (Name) Ms. Lana Abramson
Umetco Minerals Corporation
Division Grand Junction, CO

Location

Area

Copy to

Date August 3, 1986

Originating Dept

Area

Answering Letter Date

Subject P. O. 250-07126
Payment to Dubee Construction Co.
Radioactive Remedial Work
at Niagara Site

Dear Lana:

This letter is to signify my approval for payment of $3,672.00 to Dubee Construction Company for work that is being performed on the Niagara Site. The approved invoice along with copies of the daily work sheets submitted by Dubee are attached.

Very truly yours,

D. J. Hansen mau

D. J. Hansen

/mau
Enclosures

UCCNHT0000836

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731-3635

8/1/86
Invoice #0023

Union Carbide Corp.
P. O. Box 66
Niagara Falls, NY 14302
Attn: Mr. Donald Hansen

P. O. #250-07126
Acct. #1885-88-0900-0000
Loader w/operator @$45.00 per hr

6/16/86	Ticket #4663	2.5 hrs.	$112.50
6/18/86	" #4469	4 hrs.	$180.00
	Low level radioactive slag removal	Cleaned up @ Traxcavator	
7/11/86	Ticket #7316	955 Catterpillar w/operator	
	Super Sucker Dust Removal	8 hrs @ $40.00 per hr	$320.00
		Leveled dirt in back of bldg.	
		Dozer w/operator @ $60.00 per hr.	
7/15/86	Ticket #6529	7 hrs	$420.00
7/17/86	" #4619	8 hrs	$480.00
7/21/86	" #4623	8 hrs	$480.00
7/22/86	" #4622	8 hrs	$480.00
7/23/86	" #4624	8 hrs	$480.00
7/24/86	" #4625	8 hrs	$480.00
			$3,432.00
		State tax	240.28
		Total due this bill	$3,672.00

Fill w/ Lake

Thank you!

Approved for payment
Donald J Hansen 8/1/86

Note: Current work on Elkem Property will Also be Charged to this P.O.

TERMS 2% per month on unpaid balance

UCCNHT0000837

Umetco Minerals Corporation

PO BOX 66 137 47th STREET • NIAGARA FALLS NEW YORK 14302

October 6, 1986

Mr. Craig T. Wentzel
Stratcor
P. O. Box 66
Niagara Falls, NY 14302

Subject. Disposal of "Super Sucker" Dust

Dear Craig:

On July 17, 1986 I sent documentation to Dr. R. L. Miller concerning removal of the "Super Sucker" dust from the yard area east of No. 6 Furnace Room (Attachment 1).

On July 22, 1986 George Parker sent a letter to Dr. R. L. Miller informing him that he had inspected the area and was satisfied (Attachment 2).

Although EP Toxicity tests indicated that dust was non-toxic we proceeded to remove the dust from the property to a sanitary landfill. This fulfilled Item 3 (f) of Exhibit E, Environmental Agreement (Niagara Falls) between Umetco Minerals Corporation and Strategic Minerals Corporation which reads·

"(f) "Super Sucker Dust. Umetco further agrees to test the various waste piles of plant dust deposited by the "Super Sucker" industrial cleaning firm in the plant yard to determine whether such piles are Hazardous Waste (as defined in the Resource Conservation Recovery Act or comparable state law). If any such piles are determined to be Hazardous Waste, under applicable laws, Umetco agrees to assume the cost of removal and disposal of such piles."

UCCNHT0000838

Would you and Dr. Miller, as members of the Stratcor Environmental Coordination Committee for the Niagara Plant acknowledge acceptance by signing the second copy of this letter and returning it to me.

Very truly yours,

Donald J. Hansen

ACCEPTED:

Stratcor

By _____

Title Gen Mgr - USI / Niagara Falls

By _____

Title Director Environment, Health & Safety

cc. Messrs:
W. G. Beattie
J. F. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller

/mau
Attachments

UCCNHT0000839

Umetco Minerals Corporation

PO BOX 66 137 47th STREET • NIAGARA FALLS NEW YORK 14302

November 26, 1986

RECEIVED
DEC 8 1986

[redacted]O.
Rich Miller

Mr. C. T. Wentzel
U. S. Vanadium Corporation
P. O. Box 66
Niagara Falls, NY 14302

Subject: Disposal of Sample Cans

Dear Craig·

The last of the metallurgical samples stored in the Globar area that dated back as far as 1902 were removed from the Niagara Plant on November 24, 1986 by SCA Chemical Services. A copy of the Hazardous Waste Manifest is appended. An earlier shipment of non-hazardous samples were removed by BFI Waste Systems on October 10, 1986 (manifest appended). Radioactive samples were included in a shipment to Barnwell Waste Management Facility, South Carolina September 19, 1986.

On Wednesday, November 26, 1986, Al Gonas and I accompanied Mr. Herb Wilber to inspect the area in Globar where the samples has been stored. A radioactive survey was made at that time to confirm that no traces of the radioactive samples had been left on the shelves or in the storage containers. A copy of the letter from Herb Wilber to you attesting to the satisfactory completion of the sample cans removal is also appended.

This completes the obligation of Umetco Minerals to Stratcor Minerals Corporation as outlined in Item 3 (g) of the Environmental Agreement (Niagara Falls) between Umetco Minerals Corporation and U. S. Vanadium Corporation which reads:

> "(g) Sample Cans Umetco further agrees to assume the cost of removal and disposal of the numerous small sample cans in the globar area."

UCCNHT0000840

Would you and Dr. Miller, as members of the Stratcor Environmental Coordination Committee for the Niagara Plant, acknowledge acceptance by signing the second copy of this letter and returning it to me.

Very truly yours,

Donald J. Hansen

ACCEPTED BY:

U. S. VANADIUM

By: C. T. Wentzel

Title: Gen Mgr - U.S Vanadium Niagara Plant

By: Richard L Miller

Title: Director Environmental Health & Safety

cc. Messrs:
W. G. Beattie
J. F. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller

UCCNHT0000841

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No 950-0139

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site. We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed

The location of the radioactivity and the levels of radiation observed are shown in Table I

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce Rm)	5-10 µR/hr		
	- I-beam south of 30 Fce		200 µR/hr.	20
	- Trunion support north of 30 Fce.		420 µR/hr	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr.		
	- Area below dust collector		170 µR/hr	15
2/20/86	Yard East of #6 Fce Rm	8-12 µR/hr.		
	- 6' x 6' Areas near slag pile		200 µR/hr.	20
2/20/86	Yard East of #6 Fce. Rm			
	- 2' x 2' area near Bldg 191		210 µR/hr	20

UCCNHT0000842

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984. (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986).

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce. Rm. #6)	5-10 µR/hr.	Area next to Fce 30 above background
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr	Some sample cans >1mR/hr.
	32 (#2 Packing)	8-10 µR/hr.	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr.	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr.	Area below Dust Coll. above background
2/20/86	(Storage Shed N.W. Corner of Umetco Property)	8-12 µR/hr.	OK
2/25/86	7 (Storeroom)	8-10 µR/hr.	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr.	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr.	OK
2/27/861	13, 14 (Aux Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr.	OK
3/14/86	111 (Eng. Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg.)	7-8 µR/hr.	OK

UCCNHT0000843

The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers.

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No. 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24.

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above.

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
R. G. Tisch
C. T Wentzel

UCCNHT0000844

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38 11 Duration of licenses Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38 12 Renewal of licenses An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38 13 Amendment of licenses A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensec's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38 14 Suspension or revocation The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38 15 Additional requirements. Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

UCCNHT0000845

timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38 27 Enclosed controlled areas Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38 28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38.29 Vacating installations and property (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferee or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

UCCNHT0000846

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits		
(1) Alpha emitters		
(i) Removable	$\frac{15\ pCi}{100\ cm^2} = \frac{33\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{45\ pCi}{100\ cm^2} = \frac{100\ dpm}{100\ cm^2}$	maximum
(ii) Total (fixed)	$\frac{450\ pCi}{100\ cm^2} = \frac{1000\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{2250\ pCi}{100\ cm^2} = \frac{5000\ dpm}{100\ cm^2}$	maximum
	$\frac{0\ 25\ mrem\ at\ 1\ cm}{hr}$	
(2) Beta-Gamma emitters		
(i) Removable (all beta-gamma emitters except Hydrogen 3)	$\frac{100\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{500\ pCi}{100\ cm^2}$	maximum
Removable (Hydrogen 3)	$\frac{1000\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{5000\ pCi}{100\ cm^2}$	maximum
(ii) Total (fixed)	0 2[illegible] [illegible] om surface	

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

UCCNHT0000847

TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

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TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 (T ½ = 9.2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0000849

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

UCCNHT0000850

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

UCCNHT0000851

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

** μc/gm for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2, the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41, Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides, the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed "one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \leq 1$$

UCCNHT0000852

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

OLD RIDGEBURY ROAD • DANBURY, CONNECTICUT 06817

To [Name] Mr. C.T. Wentzel

Date April 30, 1986

Division

Originating Dept

Location

Area

Area

Answering Letter Date

Subject

Copy to H.M. Wilber
J. Frost
F.V. McMillen

Dear Craig:

Herb has probably filled you in on our meeting at Niagara on the 22nd, particularly regarding our discussions on asbestos removal. After examining the various jobs to be performed, the package is getting rather large and Herb indicated we could likely get better quotes by combining the work.

Would you please arrange to get two or three quotes on removal and disposal of the following asbestos items:

a) Globar Elevator Lining
b) Building 111 heating boiler and associated piping for distribution system
c) All asbestos in Niacet boiler buildings (Bldg 4)
d) Asbestos on steam pipes leaving Building 4 and proceeding towards Umetco property, ie., 3-400 feet of pipe rack holding 4-5 pipes.

Craig, would you also get a quote for removal of the boilers themselves from building 4, associated pumps and equipment, two stack from the roof and removal of the sheet metal wing on the south side. Hopefully there would be some salvage value from the piping, steel and fire bricks etc. to alleviate some of the removal costs. I doubt if you could combine this job with the asbestos removal but you could inquire.

Please let me know when you have the quote so we can find how to proceed. Thanks very much.

Very truly yours,

D.G. Millenbruch

DGM/cw

UCCNHT0000853

Niagara Falls, New York
July 13, 1983

Design Memo No. 1

File No. 11309

SUBJECT: Radiological Survey, Cleanup Options and Cost Estimates

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UCCNHT0000854

UC 149 2

UNION CARBIDE

INTERNAL CORRESPONDENCE

METALS DIVISION • P O BOX 97, NIAGARA FALLS, NY

To (Name) Mr. R. J. Klotzbach
Division UCC-Metals Division
Location Niagara Falls, NY

Date July 13, 1983

Originating Dept Engineering

Answering letter dated

Copy to See Attached Distribution

Subject Design Memo No. 1
Radiological Survey, Cleanup
Options and Cost Estimates
File No. 11309

Dear Bob:

Attached is Design Memo No. 1 "Radiological Survey, Cleanup Options and Cost Estimates".

Union Carbide Corporation presently is out of compliance with its New York Radioactive Materials License No. 950-0139 due to radioactive source concentrations in excess of 500 ppm behind Niagara Building 166, where access to employees is unrestricted. To identify the area and depth of contamination, the area south of Building 166 was surveyed by Mr. D. R. Brosnahan and the author. The results indicate that a soil volume of 5130 ft.^{3} must be restricted or removed for compliance with New York State regulations. An additional 1700 ft.^{3} must be removed for delicensing and unrestricted use.

The following five alternatives have been considered and cost estimates prepared as part of the design memo.

Alternative	Description	Cost
1	Fence in Place	$ 10,000
2	Remove & Fence on Elkem Property	65,000
3	Remove & Fence on UCC Property	120,000
4	Remove & Bury - UCC Niagara	175,000
5	Remove & Ship to a Repository	335,000

The recommendation is to proceed with Alternative No. 3, based primarily on the condition that the property will be deeded to Elkem Metals Company. The material remains available for implementing Alternative No. 4, "Bury on UCC Property", or Alternative No. 5, "Ship to an Approved Repository", in the future. An R & D effort can also proceed to investigate ways to reduce the volume. Far less expense is required for the alternative to "Fence in Place", which is recommended if property ownership does not change.

L. G. Evans

LGE/dac
Attachments

UCCNHT0000855

Union Carbide Corporation
Metals Division
Technology Department - Engineering
Niagara Falls, New York

File No. 11309

DESIGN MEMORANDUM
SPONSOR: T. J. KAGETSU

PROJECT: Soil Decontamination - South of Building 166, Niagara

BY: L. G. Evans/D. R. Brosnahan

DATE. May 20, 1983

Design Memo No. 1
Revision 0
Subject: Radiological Survey, Cleanup Options and Cost Estimates

1.0 INTRODUCTION

1.1 Scope

To include an engineering evaluation of the alternatives available for disposal of the radioactive contaminants from areas south of Building 166.

1.2 History

The U. S. Department of Energy performed surveys in 1976 to assess the radiological status of facilities utilized under Manhattan Engineer District contract during the period 1943-1946. UCC's Metals Division at Niagara was one of those sites. They discovered contamination South of Building 166 and notified Union Carbide and New York State.

As a result, New York State Department of Labor performed a follow up survey on December 1, 1981 and cited UCC for violation of its New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access to employees.

Later, thorium was found to be a major radioactive contaminate indicating that the radiation is unrelated to the Manhattan Engineer Project.

This problem is further complicated by the divestiture of the ferroalloys business and anticipated eventual ownership of the property by Elkem Metals Company.

UCCNHT0000856

2.0 DISCUSSION

2.1 General

All phases of a waste clean up project are directly affected by the quantity of waste to be handled. Therefore, the first priority was to develop a reasonably good estimate of the volume.

A gamma radiation survey was performed over the entire fenced area behind Building 166 to determine the area of involvement excluding areas covered by asphalt or concrete. Soil samples were obtained from several areas and analyzed for % U_3O_8 and % ThO_2. Samples were extracted at various levels in five holes to determine depth of involvement. Samples were also taken to obtain a rough correlation between gamma readings and uranium/thorium content.

2.2 Cleanup Criteria

2.2.1 General

The cleanup criteria is dependent upon the use or future use of the property. New York State Regulations would apply with continuance of license. NRC Regulations would apply for delicensing.

2.2.2 New York State Regulations

NYS requires restriction of access to areas where the radioactive contaminants exceed 500 ppm of source materials. Below 500 ppm radioactive materials can be stored with unrestricted access.

To facilitate a comparison of this limit to the NRC limits a conversion to pCi/gm is made assuming a 2:1 (thorium.uranium) ratio. (See calculations attached).

These limits for unrestricted access are the total of the following:

≤36 pCi/gm Thorium
≤57 pCi/gm Uranium

These limits are used only for determination of compliance with our license for restricted or unrestricted access.

If the State is approached by UCC for criteria for delicensing they probably will require compliance with NRC Regulations due to Agreement State principles.

2.2.3 NRC Regulations

The NRC proposed regulations[1] provide four options for burial and delicensing. A fifth option deals with continuing the license.

[1] Federal Register/Vol. 46 No. 205/Friday Oct. 23, 1981, Notices (attached).

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Option 1 ≤10 pCi/gm Thorium and/or 10 pCi/gm Uranium - unrestricted use and delicensing. (Burial not required).

Option 2&3 ≤50 pCi/gm Thorium and 40 pCi/gm Uranium - deed amendment and delicense, restricted access by burial with minimum four foot cover. No residential building. Option 2 specifies thorium and Option 3 uranium.

Option 4 ≤500 pCi/gm Thorium and 200 pCi/gm Uranium - much more restricted use of the land than Options 2 and 3. No excavation or building.

Option 5 of the Regulation deals with on-site storage of higher concentrations pending the availability of space at an approved repository. No burial is permitted.

2.3 Radiological Survey

2.3.1 Gamma Survey

The survey was performed with a portable gamma ray spectrometer, Model GR-410 manufactured by Geometries Exploranium and detector Model No. GPX-21 employing a sodium iodide thallium activated crystal as a scintillation phosphor.

All of the area south of Building 166 and bounded by the chain link fence was surveyed except areas covered by concrete or asphalt. The actual area surveyed was approximately 26,000 ft.^{2}. Concrete and asphalt cover 63,000 ft.^{2}.

A 10' x 10' grid was established and readings were taken at the intersection points. Extra readings were taken along the west track center line and near the edge of the concrete on both sides.

A resurvey of a 400 ft.^{2} area was done using a 2' x 2' grid to assess the reliability of the general survey. The location of this area is shown on Drawing SF-7902 as Detail 1. The data are also displayed in Figure I (attached).

All gamma meter readings were reduced to the number of times background and are reported on Drawing SF-7902.

2.3.2 Analytical Survey

Soil Samples - The physical samples were essentially 'grab' samples. No systematic sampling technique was used. The analytical work was performed by Elkem's laboratory at Niagara Falls. The results are shown in Table III (attached) and on Drawing SF-7902.

The chemical analyses of the surface soil samples ranged from 0.006% to 0.40% ThO_2 and from 0.002% to 0.17% U_3O_8.

UCCNHT0000858

2.4 Survey vs Regulations

The following Table I is a comparison of the surface soil sample analyses converted to pCi/g and the gamma radiation readings (times background). Below the table is a guide comparing gamma readings to cleanup or storage criteria. The gamma range is estimated based on the analyses of Table III (attached).

TABLE I

GAMMA X BKG	URANIUM pCi/gm	THORIUM pCi/gm	SAMPLE NO.	CONTAMINANTS PPM
1	3	2	11	20
3	11	11	9	131
5	6	6	8	70
6	11	19	2	210
8	8	22	5	228
9	14	40	1	401
12	26	61	3	650
13	8	12	10	140
17	26	66	4	674
21	42	105	12	1094
26	57	164	14	1664
33	82	201	13	2091
83	466	382	5	4957

GAMMA RANGE	NYS/NRC REQUIREMENTS
1 - 5	Will meet NRC proposed regulations for delicensing and unrestricted land use. NRC Option 1 (Sec. 2.3.3) - no burial required.
6 - 9	NYS allows unrestricted access and continue license. NRC allows burial and delicensing. Options 2 and 3 - burial required.
10 - 60*	NYS requires restricted access. NRC allows burial and delicensing - Option 4.
>60	NYS requires restricted access. NRC requires restricted access and storage until space is available at an approved repository, e.g., Barnwell, SC.

*Interpolated

UCCNHT0000859

2.5 Contamination Volume

2.5.1 General

The gamma survey, surface and subsurface soil analyses and the guide above are combined to estimate the quantity of material of each class in each area.

The depth of contamination varies throughout the area of involvement, but is generally less than six inches. However, to expedite cleanup, the rails and ties must be removed, requiring a minimum removal depth of eight inches.

2.5.2 High Concentration Area

This area contains material which exceeds NRC burial limits and must be disposed of (eventually) at an approved repository. Gamma readings are above 60 times background. This area is the most heavily contaminated both in radiation level and depth of contamination. Contamination can be found 12 inches below the surface.

Volume = 400 $ft.^2$ x 1 ft. deep = 400 $ft.^3$

2.5.3 Medium Concentration Area

This area contains material which requires restricted access. Gamma readings are 10-60 times background.

Volume = 6400 $ft.^2$ x 2/3 ft. deep = 4267 $ft.^{3*}$

*Approximately 30% of the area found to be low concentration on the general survey (10' x 10' Grid) was found to be medium concentration upon resurvey (2' x 2' Grid). See Drawing SF-7902 or Figure I. This volume is included.

2.5.4 Low Concentration Area

This area contains material which must be removed to delicense but which can remain with unrestricted access under current license. Gamma readings are 6-9 times background.

Volume = 2200 $ft.^2$ x 2/3 ft. deep = 1467 $ft.^3$

2.5.5 Summary

The following summarizes the above volumes including a 15 percent contingency:

High Concentration	-	230 $ft.^3$
Medium Concentration	-	4900 $ft.^3$
Low Concentration	-	1700 $ft.^3$
TOTAL		6830 $ft.^3$

UCCNHT0000860

NOTE: No exploration was done beneath any of the concrete or asphalt pads. The depth of involvement and the location of contamination along the railroad tracks indicates the radioactive materials were spilled during handling from rail cars and contamination under the pads is unlikely.

3.0 DESCRIPTION OF CLEANUP ALTERNATIVES

3.1 Summary

Five cleanup alternatives are considered in this memorandum. The major factors influencing final selection of an alternative are. term of solution (short or long), delicensing, property transfer to Elkem, compliance with NYS Regulations, and cost.

Table II below summarizes the alternatives opposite these factors.

TABLE II

ALTER-NATIVE NO.	DESCRIPTION	TERM	DELICENSE*	TRANSFER PROPERTY TO ELKEM	COST $000
1	Fence in place	Short	No	No	10
2	Remove & fence on Elkem Property	Short	No	No	65
3	Remove & fence on UCC Property	Medium	No	Yes	120**
4	Remove & bury - UCC Niagara	Long	Yes	Yes	175
5	Remove & ship to repository	Permanent	Yes	Yes	335

* Assumes that this is the only contaminated area in the plant.

**If a concrete pad is available the cost would be $90,000.

3.2 Alternative No. 1 - Fence in Place

Simply enclose the contaminated area thus restricting access.

Requirements - 400 feet of fence.

Advantages - Quick solution to come into compliance with NYS.
- Minimum cost.

Disadvantages - Contamination remains requiring future action.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

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3.3 Alternative No. 2 - Remove and Fence on Elkem Property

As mentioned earlier, much of the area South of Building 166 is covered with concrete and asphalt. The material (soil) could be removed and stored on an existing pad in the Southeast corner of the property. The pad and a plastic covering would provide stability and a fence would provide restricted access until final disposal.

Requirements
- Removal of railroad tracks.
- Disposal of scrap and debris**.
- 100 ft. fence required - S & E corner site.
- Concrete/asphalt pad - already available.
- Replacement of railroad track.

Advantages
- Consolidation of contaminants.
- Access can be restricted.
- This work is required for ultimate disposal in any event.

Disadvantages
- Short term solution.
- 1/10 acres of land would not be available for Elkem use.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

**This includes
- Three flat bed railroad cars loaded with induction furnaces.
- Stacks of deteriorating 55 gallon drums.
- Stacked wooden boxes containing steel shot, etc.
- Numerous 5' x 5' x 5' steel boxes.
- Various ladles, furnaces, carbon electrodes, etc.

3.4 Alternative No. 3 - Remove and Fence on UCC Property

The work required here is essentially the same as in 3.3 above. Costs increase and extra care must be taken to avoid contamination of other areas of the plant. However, the property can then be released for transfer to Elkem. An area in the Niagara Plant has been designated by plant personnel for possible use.

Requirement
- Same as 3.3 except more fence and a new concrete pad may be required.

Advantage
- Same as 3.3 except it has the additional advantage of not interfering with Elkem property use. Property can be transferred to Elkem.

Disadvantage
- Medium term solution.

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3.5 Alternative No. 4 - Remove and Bury - UCC Niagara

Burial on Union Carbide owned property was explored for the Marietta TaCb cleanup project. The main problems are: finding a suitable burial site, getting State and Local approval, future use or transfer of the burial site is restricted, and long term monitoring of the site is necessary.

Requirements
- Remove and replace railroad tracks.
- Dispose of scrap and debris at approved repository.
- A suitable burial site.
- Containers (55 gallon drums) may be required.
- Dispose of 400 $ft.^3$ soil at approved repository.

Advantages
- Long term solution.
- Delicense.

Disadvantages
- Use of the burial site will be restricted - no construction.

3.6 Alternative No. 5 - Remove and Ship to Repository

This alternative is permanent. Once the material is received at the repository, the host state becomes owner and the licensee's accountability ends. However, this is the most expensive alternative.

Requirements
- Remove and replace railroad tracks.
  Disposal of scrap and debris at approved repository.
  Containers.
  Loading system.

Advantage
- Permanent solution.

Disadvantage
- Highest cost.

3.7 Remove and Ship to Uravan

This alternative was selected for the TaCb residue cleanup project in Marietta. The uranium content of the TaCb residue was 0.13% U_3O_8 and processing to recover uranium values was feasible and acceptable to the Colorado Department of Health. The material (soil) analyses at Niagara indicate 0.01% U_3O_8. Therefore, transfer to Uravan cannot be considered.

4.0 COST ESTIMATES

As discussed in Section 2.4, the radiological survey indicates three levels of contamination above NRC delicensing limits. They are: 6-9 x BKG (background), 10-60 x BKG and greater than 60 x BKG. Volumes were calculated

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for each area with the thought that some alternatives would not require the removal of the combined total volume but only those areas with the highest concentrations. However, to simplify costings and cost comparison, only the total volume of Section 2.5.5 is considered. All medium and high concentration material requires fencing or removal. The low concentration material adds an additional 25% to the volume, but adds only 10% to the cost. The volume for cost estimating is then 6830 ft.^{3}.

Cost Estimates No. 6342 through 6346 are attached.

Cost Estimate No. 6342	Fence in Place	$ 10,000
Cost Estimate No. 6343	Remove and Fence - Elkem	$ 65,000
Cost Estimate No. 6344	Remove and Fence - UCC Niagara	$120,000
Cost Estimate No. 6345	Remove and Bury - UCC Niagara	$175,000
Cost Estimate No. 6346	Remove and Ship to Barnwell	$335,000

Note: Costs do not reflect removal of debris which is assumed to be Elkem's accountability.

5.0 RECOMMENDATIONS

Removal and relocation of the contaminated soil to the Niagara plant as described in Alternative No. 3 is recommended based on the following:

1. The property will be deeded to Elkem Metals Company.

2. Any restriction to the use of the property behind Building 166, or any potential cleanup liability to Elkem, is unacceptable.

3. EPA and NRC regulatory uncertainties exist concerning burial. (Perpetual maintenance costs are not included in the estimate for Alternative No. 4.) Burial also makes the material unavailable for disposal at an approved repository as discussed below. New York state may ban all burial within the state in the near future.

4. Disposal at Barnwell, SC is too costly and there is reason to believe that a new repository will be opened in the Northeast by 1986 which may reduce the cost of that option.

Any remedial effort must be approved by the State of New York, Department of Labor. For the material to be left on-site, Radioactive Materials License No. 950-0139 must be amended. This amendment or some form of approval should be received prior to the beginning of any cleanup.

UCCNHT0000864

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6342

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - FENCE IN PLACE (ALTERNATIVE 1)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	MATERIAL				
101	400' Fence (6 ft.) Along 1100N	-	8	8	-
	TOTAL		8	8	-
	TOTAL DIRECTS		8	8	-
	ENGINEERING			-	-
	CONTINGENCY			2	
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			-	-
	TOTAL			10	-

FRANGELORI/dac

cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000865

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6343

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE ELKEM (ALTERNATIVE 2)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3}	-	5	-	5
102	Fence 6 ft. - 100 ft.	-	2	-	2
	TOTAL		7		7
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
	TOTAL DIRECTS		40	23	17
	ENGINEERING			7	5
	CONTINGENCY			8	3
	RADIOLOGIST/HEALTH PHYSICS			2	-
	TOTAL			40	25

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000866

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6344

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE - UCC NIAGARA (ALTERNATIVE 3)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Concrete Pad - 60 cy.	-	30	30	-
103	Fence 6 ft. - 200 ft.	-	4	4	-
	TOTAL		44	34	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	-
	TOTAL DIRECTS		77	57	20
	ENGINEERING			9	6
	CONTINGENCY			10	2
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			14	2
	TOTAL			90	30

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000867

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6345

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND BURY - UCC NIAGARA (ALTERNATIVE 4)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Clay Lined Pit w/Drain System 40 ft.^{2} x 5 ft.	-	15	15	-
103	Clay Cap	-	15	15	-
	TOTAL		40	30	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation	-	1	-	1
302	Burial Fee (200 ft.^{3})	1	8	-	9
	TOTAL	1	9		10
	TOTAL DIRECTS	1	82	53	30
	ENGINEERING			8	8
	CONTINGENCY			15	5
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	SITE SELECTION			35	
	TOTAL			125	50

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000868

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6346

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND SHIP TO BARNWELL, SC (ALTERNATIVE 5)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove Soil 7000 ft.^{3} (haul)	-	5	-	5
102	Containers (80 boxes - 100 ft.^{3})	20	-	-	20
103	Loading Trucks (incl. Pallets, etc.)	5	4	-	9
	TOTAL	25	9		34
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation $1000 (10 loads)	-	10	-	10
302	Burial Fee (8000 ft.^{3} incl Container)	-	160	-	160
	TOTAL		170		170
	TOTAL DIRECTS	25	212	23	214
	ENGINEERING			5	28
	CONTINGENCY			3	46
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	TOTAL			45	290

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

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CALCULATIONS

New York State regulations require that access be restricted to areas where the source material exceeds 500 ppm. For the purpose of comparison with NRC regulations a Thorium/Uranium ratio of 2:1 is assumed.

Therefore, the maximum activities for unrestricted access are:

NYS maximum Thorium activity equals:

330 parts/million x 1.09×10^5 pCi/gm = 36 pCi/gm ≤ 55 for 500

NYS maximum Uranium activity equals:

170 parts/million x 3.33×10^5 pCi/gm = 57 pCi/gm ≤ 160 for 510

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The Assistant Secretary finds that good cause exists for not publishing the supplement to the Puerto Rico State Plan as a proposed change and making the Regional Administrator's approval effective upon publication for the following reasons:

1. The standards are identical to the Federal standards which were promulgated in accordance with Federal law meeting requirements for public participation.

2. The standards were adopted in accordance with the procedural requirement of State Law and further participation would be unnecessary.

The decision is effective October 23, 1981.

(Sec. 18 Pub L. 91-596, 84 Stat. 1608 (29 U.S.C. 667))

Signed at New York City, New York, this 15th day of June 1981.

Roger A. Clark,

Regional Administrator

[FR Doc. 81-30745 Filed 10-22-81, 8:45 am]

BILLING CODE 4510-26-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards, Subcommittee on Callaway Plant; Location Change

The ACRS Subcommittee on Callaway Plant will hold a meeting on November 4 and 5, 1981, at the HOLIDAY INN-WEST, 1900 I-70 Drive Southwest, Columbia, MO instead of the Hilton Inn.

Notice of this meeting was published in the Federal Register on October 19, 1981 (46 FR 51329), and all other items remain the same except for the location change as indicated above.

Dated: October 19, 1981.

John C. Hoyle,

Advisory Committee, Management Officer,

[FR Doc. 81-30733 Filed 10-22-81, 8:45 am]

BILLING CODE 7590-01-M

Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Discussion of options for NRC approval of applications for disposal or onsite storage of thorium or uranium wastes, interim use and public comment.

SUMMARY: This notice discusses five options for NRC approval of disposal or onsite storage or thorium or uranium wastes from past nuclear operations. The options are contained in a Branch Technical Position for administration by the Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

DATES: Comments on the options for disposal or onsite storage of thorium or uranium are encouraged. Such comments will be considered in any subsequent revision of the Branch Technical Position. Comments are due December 22, 1981.

Note.—Comments received after the expiration date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments filed on or before that date.

FOR FURTHER INFORMATION CONTACT: Ralph G. Page, Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, telephone 301-427-4309.

SUPPLEMENTARY INFORMATION:

I. Introduction

Some of the sites formerly used for processing thorium and uranium are known today to be contaminated with residual radioactive materials. Some are currently covered by NRC licenses. Others were once licensed, but the licenses to possess and use material have expired. In many cases, the total amount of contaminated soil is large, but the activity concentrations of radioactive materials are believed sufficiently low to justify their disposal on privately owned lands or storage onsite rather than their transport to a licensed radioactive materials disposal (commercial) site. In many instances packaging and transporting these wastes to a licensed disposal site would be too costly and not justified from the standpoints of risk to the public health or cost-benefit. Furthermore, because of the total volume of these wastes, limited commercial waste disposal capacity, and restrictions placed on receipt of long-lived wastes at commercial sites, it is not presently feasible to dispose of these wastes at commercial low-level waste disposal sites.

Effective January 28, 1981, NRC regulations in 10 CFR 20, "Standards for Protection Against Radiation", were amended (45 FR 71761-71762) to delete § 20.304 which provided general authority for disposal of radioactive materials by burial in soil. Under the amended regulations, licensees must apply for and obtain specific NRC approval to dispose of radioactive materials in this manner under the provisions of 10 CFR 20.302. A case-by-case review was believed needed to assure that burial of radioactive wastes would not present an unreasonable health hazard at some future date.

The deleted provisions of § 20.304 previously permitted burial of up to 100 millicuries of thorium or natural uranium at any one time, with a yearly limitation of 12 burials for each type of material at each site. The only disposal standards specified were (1) burial at a minimum depth of four feet, and (2) successive burials separated by at least six feet. Thus a total of 1.2 curies of these materials were permitted to be disposed of each year by burial in a 12 foot by 18 foot or larger plot of ground.

Under the amended regulations, it is incumbent on an applicant who wants to bury radioactive wastes to demonstrate that local land burial is preferable to other disposal alternatives. The evaluation of the application takes into account the following information:

Types and quantities of material to be buried
Packaging of waste
Burial location
Characteristics of burial site
Depth of burial
Access restrictions to disposal site
Radiation safety procedures during disposal operations
Recordkeeping
Local burial restrictions, if any

For applications involving disposal of soils contaminated with low level concentrations of thorium and uranium (other than concentrations not exceeding EPA cleanup standards), the matters of principal importance are:

Concentrations of thorium and uranium (either in secular equilibrium with their daughters or without daughters present)
Volume of contaminated soil
Costs for offsite and onsite disposal
Availability of offsite burial space
Disposal site characteristics
Depth of burial and accessibility of buried wastes
State and local government views

II. Branch Technical Position

There are five acceptable options for disposal or onsite storage of thorium and uranium contaminated wastes. Applications for disposal or storage will be approved if the guidelines discussed under any option are met. Applications for other methods of disposal may be submitted and these will be evaluated on their own merits.

1. Disposal of acceptably low concentrations (which meet EPA cleanup standards) of natural thorium with daughters in secular equilibrium, depleted or enriched uranium, and

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uranium ores with daughters in secular equilibrium with no restriction on burial method.

Under this option, the concentrations of natural thorium and depleted or enriched uranium wastes are set sufficiently low that no member of the public is expected to receive a radiation dose commitment from the disposed materials in excess of 1 millirad per year to the lung or 3 millirads per year to the bone from inhalation and ingestion, under any foreseeable use of the material or property. These radiation dose guidelines were recommened by the Environmental Protection Agency (EPA) for protection against transuranium elements present in the environment as a result of unplanned contamination (42 FR 60956–60959). In addition, the concentrations are sufficiently low so that no individual may receive an external dose in excess of 10 microroentgens per hour above background. This is compatible with guidelines EPA proposed as cleanup standards for inactive uranium processing sites (46 FR 2556–2563)

For natural uranium ores having daughters in equilibrium, the concentration limit is equal to that set by the EPA (46 FR 2556–2563) for radium-226 (i.e., 5 pCi/gm, including background) and its decay products.

The concentrations specified below are believed appropriate to apply. It is expected, however, that currently licensed operations will be conducted in such a manner as to minimize the possibility of soil contamination and when such occurs the contamination will be reduced to levels as low as reasonably achievable

Kind of material	Concentration (pCi/gm)
Natural thorium (Th-232 plus Th-228) if all daughters are present and in equilibrium	10
Depleted Uranium	35
Enriched Uranium	30
Natural Uranium Ores (U-238 plus U-234) if all daughters are present and in equilibrium	10

The analysis upon which the Branch Technical Position is based is available for inspection at the Commission's Public Document Room at 1717 H St., N.W., Washington, D.C.

The concentrations specified under this option may be compared with naturally occurring thorium and uranium ore concentrations of 1.3 pCi/gm in igneous rock and uranium concentrations of 120 pCi/gm in Florida phosphate rock and 50–80 pCi/gm in Tennessee bituminous shale Concentration limits for natural thorium and natural uranium ore wastes containing daughters not at secular equilibrium can be calculated on a case-by-case basis using the applicable isotopic activities data

2. Disposal of certain low concentrations of natural thorium with daughters in secular equilibrium and depleted or enriched uranium with no daughters present when buried under prescribed conditions with no subsequent land use restrictions and no continuing NRC licensing of the material.

Under this option the concentrations of natural thorium and uranium are set sufficiently low so that no member of the public will receive a radiation dose exceeding those discussed under option 1 when the wastes are buried in an approved manner absent intrusion into the burial grounds This option will require establishing prescribed conditions for disposal in the license, such as depth and distribution of material, to minimize the likelihood of intrusion. Burial will be permitted only if it can be demonstrated that the buried materials will be stabilized in place and not be transported away from the site.

Acceptability of the site for disposal will depend on topographical, geological, hydrological and meteorological characteristics of the site At a minimum, burial depth will be at least four feet below the surface. In the event that there is an intrusion into the burial ground, no member of the public will likely receive a dose in excess fo 170 millirems to a critical organ. An average dose not exceeding 170 millirems to the whole body for all members of a general population is recommended by international and national radiation expert bodies to limit population doses With respect to limiting doses to individual body organs, the concentrations are sufficiently low that no individual will receive a dose in excess of 170 millirems to any organ from exposure to natural thorium, depleted uranium or enriched uranium.

The average activity concentration of radioactive material that may be buried under this option in the case of natural thorium (Th-232 plus Th-228) is 50 pCi/gm, if all daughters are present and in equilibrium; for enriched uranium it is 100 pCi/gm if the uranium is soluble and 250 pCi/gm if insoluble, for depleted uranium it is 100 pCi/gm if the uranium is soluble and 300 pCi/gm if insoluble Natural uranium ores containing radium 226 and its daughters are not included under this option, because of possible radon 222 emanations and resultant higher than acceptable exposure of individuals in private residences if houses were built over buried materials

3. Disposal of low concentrations of natural uranium ores, with all daughters in equilibrium, when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the specified land contains buried radioactive materials and are conditioned in a manner acceptable under state law to impose a covenant running with the land that the specified land may not be used for residential building (There is no continuing NRC licensing of the material.)

Disposal will be approved if the burial criteria outlined in option 2 (including burial at a minimum of 4 feet) are met. Depending upon local soil characteristics, burials at depths greater than 4 feet may be required. In order to assure protection against radon 222 releases (daughter in decay chain of uranium 238 and uranium 234), it is necessary that the recorded title documents be amended to state in the permanent land records that no residential building should be permitted over specified areas of land where natural uranium ore residues (U-238 plus U-234) in concentrations exceeding 10 pCi/gm has been buried. Industrial building is acceptable so long as the concentration of buried material does not exceed 40 pCi/gm of uranium (i.e., Ra-226 shall not exceed 20 pCi/gm)

4. Disposal of land-use-limited concentrations of natural thorium or natural uranium with daughters in secular equilibrium and depleted or enriched uranium without daughters present when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the land contains buried radioactive material and are conditioned in a manner acceptable under state law to impose a covenant running with land that the land (1) may not be excavated below stated depths in specified areas of land unless cleared by appropriate health authorities, (2) may not be used for residential or industrial structures over specified areas where radioactive materials in concentrations higher than specified in options 2 and 3 are buried, and (3) may not be used for agricultural purposes in the specified areas (There is no continuing NRC licensing of the disposal site.)

Under this option, conditions of burial will be such that no member of the public will receive radiation doses in excess of those discussed under option 1 absent intrusion into the burial ground Criteria for disposal under these conditions is predicated upon the assumption that intentional intrusion is less likely to occur if a warning is given

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in land documents of record not to excavate below burial depths in specified areas of land without clearance by health authorities, not to construct residential or industrial building on the site, and not to use specified areas of land for agricultural purposes. Because of this, we believe it appropriate to apply a maximum critical organ exposure limit of 500 millirems per year to thorium and uranium buried under this restriction instead of 170 millirems as used in options 2 and 3. In addition, any exposure to such materials is likely to be more transient than assumed (essentially continual exposure) under those options. These two factors combine to increase the activity concentration limits calculated under option 2 by about 10. Thus, the average concentration that may be buried under this option for thorium (Th-232 plus Th-228) is 500 pCi/gm if all daughters are present and in equilibrium, for enriched uranium it is 1000 pCi/gm if the uranium is soluble and 2500 pCi/gm if insoluble, and for depleted uranium it is 1000 pCi/gm if the uranium is soluble and 3000 pCi/gm if insoluble.

With respect to natural uranium with daughters present and in equilibrium, the concentration that may be buried under this option is 200 pCi/gm of U-238 plus U-234, i.e., 100 pCi/gm Ra-226. This concentration is based on a limited exposure of 2.4 hours per day to limit the radon dose to less than 0.5 working level month (WLM) which is equivalent to continuous exposure to 0.02 working level (WL). Depending upon local soil characteristics, burials at depths greater than 4 feet may be required.

SUMMARY OF MAXIMUM CONCENTRATIONS PERMITTED UNDER DISPOSAL OPTIONS

Kind of Material	Disposal Options			
	1[1]	2[2]	3[3]	4[4]
Natural Thorium (Th-232 + Th-228) with daughters present and in equilibrium	10	50		500
Natural Uranium (U-238 + U-234) with daughters present and in equilibrium	10		40	200
Depleted Uranium:				
*Soluble	35	100		1,000
*Insoluble	35	300		3,000
Enriched Uranium:				
*Soluble	30	100		1,000
*Insoluble	30	250		2,500

[1] Based on EPA cleanup standards.
[2] Concentrations based on limiting individual doses to 170 mrem/yr.
[3] Concentration based on limiting equivalent exposure to 0.02 working level or less.
[4] Concentrations based on limiting individual doses to 500 mrem/yr and, in case of natural uranium, limiting exposure to 0.02 working level or less.

5. Storage of licensed concentrations of thorium and uranium onsite pending the availability of an appropriate disposal site.

When concentrations exceed those specified in option 4, long term disposal other than at a licensed disposal site will not normally be a viable option under the provisions of 10 CFR 20.302. In such cases, the thorium and uranium may be permitted to be stored onsite under an NRC license until a suitable method of disposal is found. License conditions will require that radiation doses not exceed those specified in 10 CFR Part 20 and be maintained as low as reasonably achievable.

Before approving an application to dispose of thorium or uranium under options 2, 3, or 4, NRC will solicit the view of appropriate State health officials within the State in which the disposal would be made.

Dated at Silver Spring, Maryland this 19th day of October, 1981.

Richard E. Cunningham,

Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards

[FR Doc. 81-30608 Filed 10-22-81; 8:45 am]

BILLING CODE 7590-01-M

OFFICE OF PERSONNEL MANAGEMENT

Postponement of Application Deadline for Fund-Raising Privileges Among Federal Employees by Private Voluntary Organizations

Section 5 43 of the "Manual on Fund-Raising Within the Federal Service for Voluntary Health and Welfare Agencies" sets December 1 of each year as the deadline by which national voluntary agencies must submit applications for participation in the Combined Federal Campaign (CFC) to be conducted in the fall of the following year. This year's deadline is being postponed from December 1, 1981, to February 1, 1982. In June 1981, the U.S. Office of Personnel Management (OPM) announced that the eligibility criteria for participation in the 1982-83 CFC are being reviewed. The deadline date is being postponed to avoid national voluntary agencies having to revise their applications to meet eligibility criteria which may be changed.

Donald J. Devine,

Director

[FR Doc. 81-30730 Filed 10-22-81; 8:45 am]

BILLING CODE 8325-01-M

OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

Resolution of Complaint of Price-Undercutting of Subsidized Cheese Imports

On October 1, 1981, the United States Trade Representative received a letter from the Secretary of Agriculture informing him of the Secretary's finding that imported Grade A Swiss type cheese produced in Finland has been offered for sale in the United States at duty-paid wholesale prices which are five cents per pound less than the domestic wholesale market price of similar cheese produced in the United States.

In accordance with Section 702(c)(2) of the Trade Agreements Act of 1979 (the Act) (19 U.S.C. 1202 note), the Office of the United States Trade Representative notified Finland of the price undercutting determination made by the Secretary of Agriculture, requested that corrective action be taken, and asked for appropriate assurances concerning the commitments made in the Arrangement Between the United States and Finland Concerning Cheese.

On October 14, 1981, Finland notified the United States Trade Representative that measures have been taken to ensure that the duty-paid wholesale price of imported Grade A Swiss type cheese produced in Finland will not be less than the domestic wholesale market price of similar cheese produced in the United States. In addition, Finland gave assurance that it will respect the price commitments in the Arrangement. Since the above notification by Finland has occurred within the 15-day period provided in Section 702(c)(3) of the Act, the United States Trade Representative has notified the Secretary of Agriculture of his belief that no further action is required.

William E. Brock,

United States Trade Representative

[FR Doc. 81-30684 Filed 10-22-81; 8:45 am]

BILLING CODE 3190-01-M

SECURITIES AND EXCHANGE COMMISSION

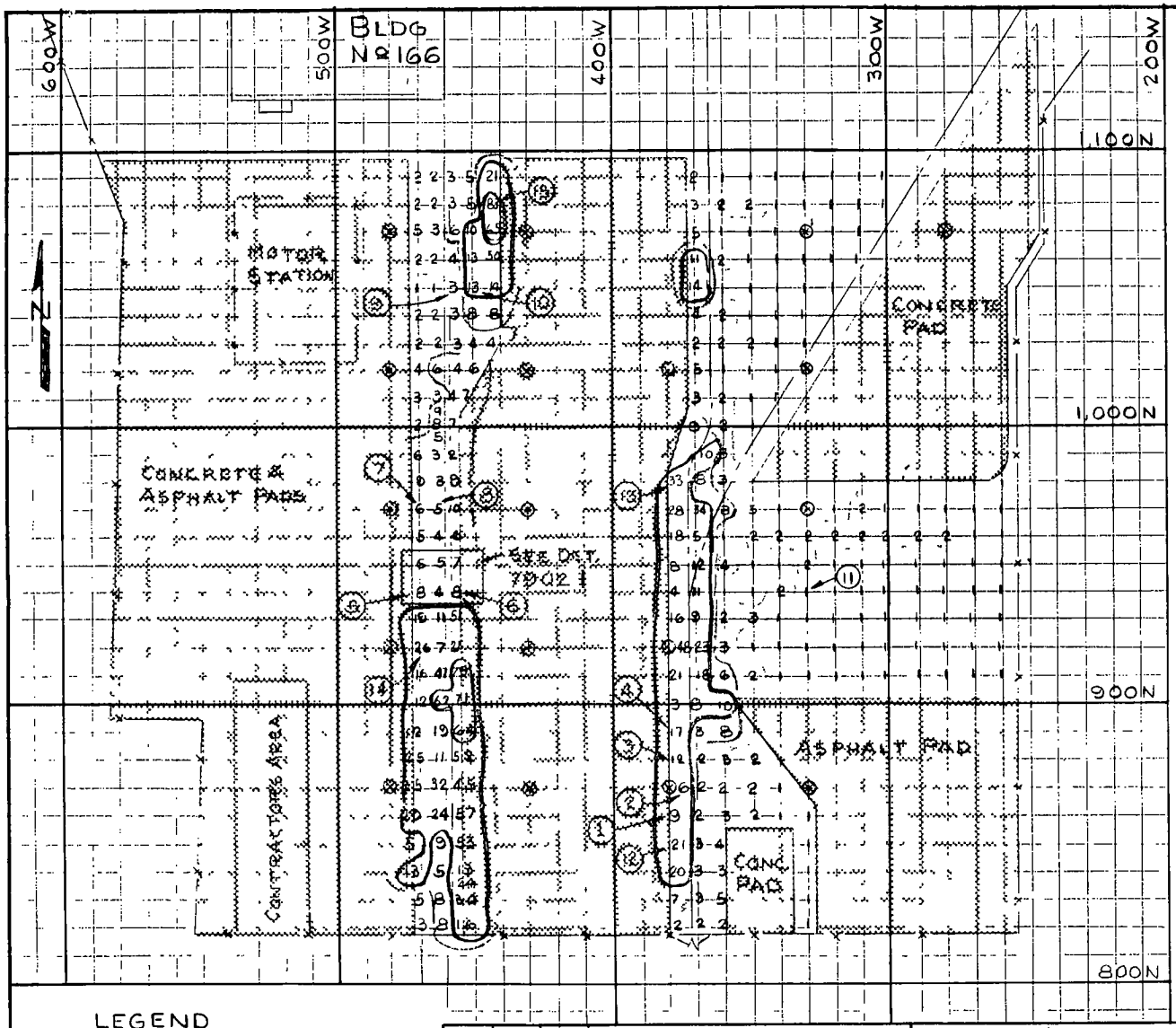
[Release No. 22236, 70-6650]

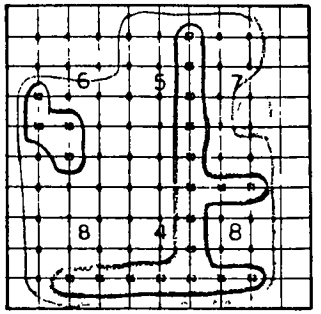
Arkansas Power & Light Co.; Proposed Issuance and Sale of First Mortgage Bonds

October 19, 1981

Arkansas Power & Light Company

UCCNHT0000873





ENLARGED DETAIL 7902 1
2 x 2 GRID

SAMPLE NO	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm DEPTH IN INCHES 0	3	6	9	12	15	21	24	36	GAMMA K Bkg SURFACE
1	14/40									9
2	11/19									6
3	26/61									12
4	25/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/7		4.3/3						1
12	42/105	4.3/1		4.3/3	4.3/3					21
13	82/201		4.3/8.1		4.3/8					33
14		57/164		4.3/8.6		4.3/1	7/2		3/3	25
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm
THORIUM 37 pCi/gm (See report for calc.)

NRC PROPOSED REGULATIONS UNLICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

> 1 Times Background
> 5 Times Background
> 9 Times Background
> 60 Times Background

LEGEND

⊗ - SURVEY STAKES
○ - SAMPLE NO
READINGS - NO TIMES BACKGROUND @ SURFACE

REV	DATE	BY	DESCRIPTION

TITLE
RADIOLOGICAL SURVEY - BALL FIELD AREA

UNION CARBIDE CORPORATION
METALS DIVISION

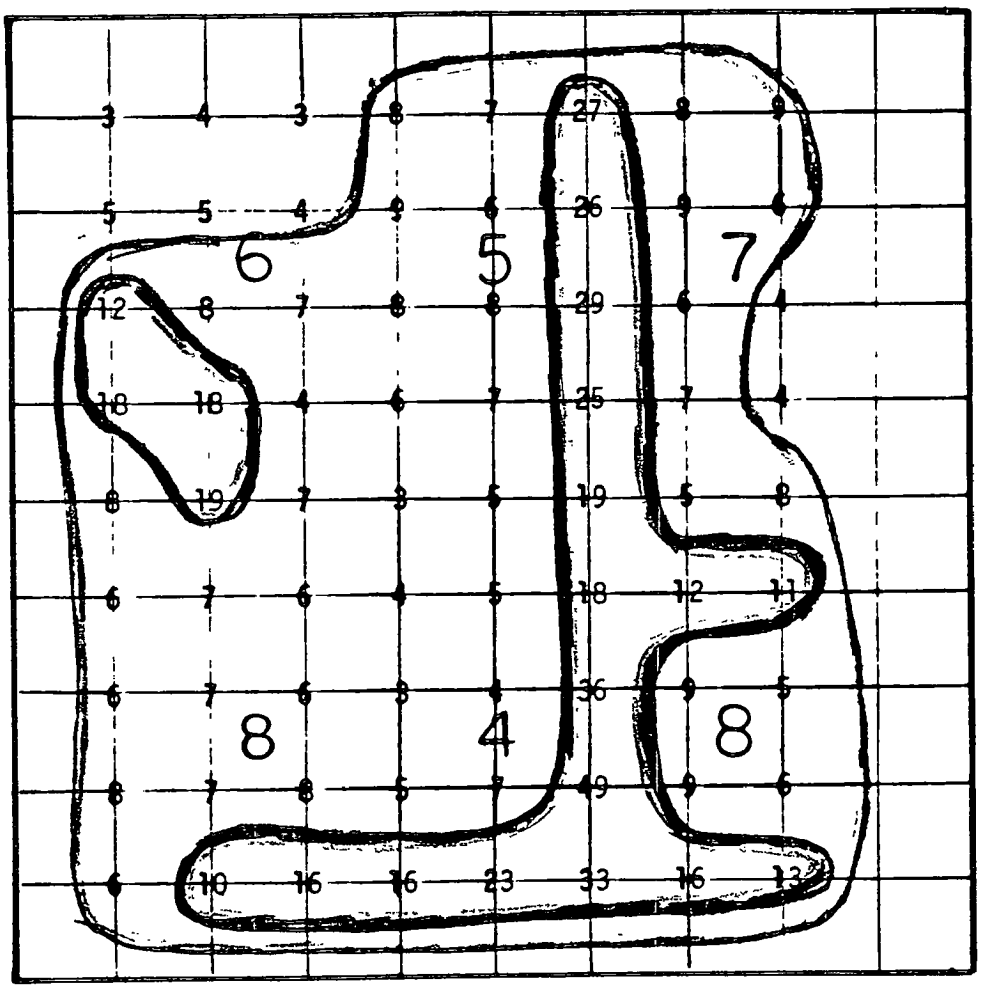
PLANT	BLDG NO	DWN BY	CHKD BY	STAFF ENG	ACC ENG	EX	DATE	DRAWING NUMBER
NIAGARA		DGF			LJE		1 14 83	SF-7902

FILE NUMBER 930/256
DRAWING SCALE 1" = 40' 0"

BRUNING 44-132 46593

UCCNHT0000874

FIGURE I



ENLARGED DETAIL 7902-1
2' x 2' GRID

> 1 Times Background
> 5 Times Background
> 9 Times Background

UCCNHT0000875

TABLE III

SAMPLE NO.	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm — DEPTH IN INCHES									GAMMA X BKg SURFACE
	0	3	6	9	12	15	21	24	26	
1	14/40									9
2	11/19									6
3	26/61									12
4	26/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/<1		<3/2					33
14		57/164		<7/<8		<7/3	7/2		3/3	26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm
THORIUM 37 pCi/gm (See report for calc.)

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

UCCNHT0000876

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr. Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation. The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No. 950-0139.

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site. We found four areas with radiation significantly above background. In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed.

The location of the radioactivity and the levels of radiation observed are shown in Table I.

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce. Rm.)	5-10 µR/hr.		
	- I-beam south of 30 Fce.		200 µR/hr.	20
	- Trunion support north of 30 Fce.		420 µR/hr.	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr.		
	- Area below dust collector		170 µR/hr.	15
2/20/86	Yard East of #6 Fce. Rm.	8-12 µR/hr.		
	- 6' x 6' Areas near slag pile		200 µR/hr.	20
2/20/86	Yard East of #6 Fce. Rm.			
	- 2' x 2' area near Bldg. 191		210 µR/hr.	20

UCCNHT0000877

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984. (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986).

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446.

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce. Rm. #6)	5-10 µR/hr.	Area next to Fce. 30 above background.
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr.	Some sample cans >1mR/hr.
	32 (#2 Packing)	8-10 µR/hr.	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr.	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr.	Area below Dust Coll. above background.
2/20/86	(Storage Shed N.W. Corner of Umetco Property)	8-12 µR/hr.	OK
2/25/86	7 (Storeroom)	8-10 µR/hr.	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr.	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr.	OK
2/27/861	13, 14 (Aux. Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr.	OK
3/14/86	111 (Eng. Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg.)	7-8 µR/hr.	OK

UCCNHT0000878

The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers.

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No. 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24.

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority.

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above.

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
R. G. Tisch
C. T. Wentzel

UCCNHT0000879

UNION CARBIDE

INTERNAL CORRESPONDENCE

METALS DIVISION

P O BOX 579 4625 ROYAL AVE, NIAGARA FALLS, NEW YORK 14302

To (Name) C. R. Allenbach
Division D. R. Brosnahan
Location F. M. Charles
W. Chynoweth
R. F. X. Fusaro
H. K. Jackson
E. W. Kantz/File
W. M. Kelly
R. J. Klotzbach
J. G. Oxaal
S. H. Shumway
J. J. Sibley
J. A. Simpkin
F. T. Temple

Date January 15, 1981

Originating Dept Safety, Health and Environmental Affairs

Answering letter date

Subject Results of Survey of Union Carbide Corporation Site, Niagara Falls, NY Formerly Used by the Manhatten Engineer District

Additional information has recently become available concerning the status of the former Manhatten Engineer District (MED) project area on the Union Carbide, Metals Division, Niagara Falls, NY plant site.(1) As of January 12, 1981, Department of Energy (DOE) officials had received the survey report written by the Oak Ridge National Laboratory (ORNL) personnel who performed the original site evaluation. The ORNL report will be issued by the DOE when a cover letter has been written and approved. A response from DOE is expected within a month.

From telephone conversations with a DOE representative, some results were obtained and opinions were offered as to the eventual disposition of the property in question. The results of two soil samples analyzed at ORNL indicate variations in the type of radioactive contamination in the soil. One sample contained high levels of Uranium 238 which would indicate contamination by the MED supervised project. The other sample contained high Thorium 232 levels which would probably have resulted from Union Carbide activities. This discrepancy in the two soil samples has the DOE questioning their responsibility for the clean-up of the site. They will probably recommend a more detailed survey of the area in question.

The scenarios which would follow the outcome of the proposed comprehensive survey would be as follows:

1.) If results indicate DOE is responsible for clean-up, they would wait for Congress to enact legislation authorizing DOE to perform remedial work. The wording of this legal authority would probably parallel that of the Uranium Mill Licensing Requirements of October 3, 1980 (10CFR Parts 30, 40, 70, 150). Once the authority is approved, DOE would assign this area to a "Low Priority." This designation means that final clean-up could take place years from now.

(1) Preliminary findings were discussed in Dr. C. R. Allenbach's October 10, 1980 letter titled "Niagara Property Radiation Levels."

UCCNHT0000880

2.) Again, if results indicate DOE responsibility for clean-up Union Carbide could sponsor clean-up of the site. Upon completion of this action, Union Carbide could petition the DOE (and eventually Congress) for reimbursement. The DOE representative estimates that these expenses may not be recovered for years.

3.) If a comprehensive survey indicates Union Carbide is responsible for clean-up of the contamination, then the only DOE involvement would be in the final site clearance.

With these possibilities in mind the time frame for clean-up becomes quite extended. More information concerning the proposed comprehensive survey of the area will be developed after the DOE issues its report.

The possible existence of New York State regulations applicable to sale or lease of the contaminated property has been investigated. As of now, no restrictions have been located that may impact on on the sale or lease of the property.

WRPioli

WRPioli/krh
Attach.

UCCNHT0000881

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

726

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

To (Name) Mr. F. V. McMillen
Umetco Minerals Corporation
Division Danbury, CT

Date August 6, 1986

Originating Dept

Location

Area

Area

Answering Letter Date

Subject
Environmental Issues
Niagara Fall, NY

Copy to
Messrs:
J.F. Frost
T.J.Kagetsu
D.G. Millenbruch

Dear Frank:

As I mentioned in my letter of July 21 I plan to be in Canada the balance of the month of August. The following is the status of the environmental issues at Niagara Falls:

1. The stacks on the Boiler House at Niacet were removed by Scrufari Construction on July 22, 23, & 24, 1986. It was discovered that the tallest stack was constructed with a double wall and it was necessary to bring in a second crane to complete the removal. This resulted in an overrun of the budget of about $2,000.00.

2. The weather has not co-operated or the reclamation of the Elkem Property would have been completed by now. The clay removal is complete and one-half of the area has been backfilled with crushed stone and compacted. The job should be finished by the end of this week.

3. The clay that was removed from Elkem Property is being used as fill for the low area between No. 6 Furnace Room and the L-Tec Plant. This adds to the cost of the leveling of the area but is an overall saving since we do not have to pay for the disposal of the clay.

4. Stratcor has completed the identification of the samples that have been stored in the plant over the years. It is now our responsibility to segregate the contents into hazardous and non-hazardous composites for appropriate disposal. I have hired Al Gonas through Mesh Associates to complete this task. As you may recall, Al supervised the disposal of the chemicals in the Technology Department earlier this year.

UCCNHT0000882

5. Niagara Insulations, Inc. has received the contract to remove the asbestos from the Niagara Site. They will be bringing in equipment, Thursday, August 7 and will begin removal on Monday, August 11. I have arranged to have Al Gonas keep an eye on this job during the month of August since both Jack Kagetsu and I will be away.

Again, I am enclosing a copy of a work sheet which summarizes the status of all the environmental issues.

Regards,

Donald J. Hansen

/mau
Enclosure

UCCNHT0000883

8/5/86

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
1.0 Halide Scrubber 1.1 Install Venturi Scrubber 1.2 Install trough to collect heels from returned cylinders. 1.3 Enclose trough and install a fume collection system.	1.1 Complete 1.2 Complete 1.3 Discussed with R. Miller on 7/9/86.	1.3 Peter Sherman in conjunction with Ron Sullivan to complete design	9/30/86		100	67.7 (to date)
2.0 Asbestos Removal Elevator shaft, Bldg. 111, storage room, boiler rooms (Niacet), six (6) pipes running 800' on pipe rack.	Contract let to Niagara Insulations, Inc., July 30, 1986 - EPA notified July 30, 1986	Follow job which is scheduled to begin 8/11/86.	9/30/86		90	61.8
3.0 Sample Cans Approximately 300 one quart cans containing different alloys, slags, and ores to be classified as toxic or non-toxic and disposed of.	Took over responsibility from G. P. Parker - July 30, 1986	Arrange to have A.M. Gonas separate to hazardous and non-hazardous and dispose of accordingly.	9/30/86		10	

UCCNHT0000884

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
4.0 Supersucker Dust					$/M	$/M
Dust collected from rafters of plant in commercial vacuum cleaner and dumped in piles throughout yard area.	Disposed of through Modern Disposal on 7/11/86	Complete		7/11/86	1.5	
5.0 Fill in Lake						
Low area east of No. 6 Furnace room collected rainfall and discharge from L-Tec Plant. Drain and level.	Initial grading complete - using this location for clay from Elkem.	Finish grading after clay removed from Elkem.	7/25/86 (old) 8/15/86 (new)		2.5 4	
6.0 Remove Radioactive Waste						
Slag and contaminated soil from No. 30 Furnace (twenty 55-gallon drums). Radioactive samples.	Have arranged to have Chem Nuclear broker shipment to Barnwell, S.C. second week of September.	Weigh each of 20 drums - check moisture, paint. Have cement for setting of radioactive samples	9/30/86 (old) 9/15/86 (new)			

UCCNHT0000885

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
7.0 Remove Radioactive Source Previously used to calibrate x-ray equipment in VA1.	Found that source is Cs137 and only 5μCi. Does not require license.	None required.			$/M	$/M
8.0 Reclaim Elkem Property Hold over from "Tiger" project. UCC agreed to remove clay and backfill when State released property for unrestricted use.	Dube Construction removing clay - backfilling with crushed stone	Follow work - Obtain written acceptance from Elkem Metals	9/18/86 (old) 8/15/86 (new)		20 18	
9.0 Terminate Licenses 9.1 210-0090 Technology sources.	Waiting for NY Dept. of Labor to act.					

UCCNHT0000886

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
9.0 Terminate Licenses (cont'd)						
9.2 950-0139 Processing Columbium Ores	On hold	When last of radioactive material is removed from property, another request for license termination will be made.	12/31/86		0	
9.3 955-0139 Plant Sources	G. P. Parker turned over files on 7/3/86. Waiting for NY Dept. of Labor to act.					
10.0 Patents Finish filings. Respond to Patent Examiners.	Responded to Statcor Attorney on objection of Patent Office to J. B. Goddard's application on leaching Flexicoke, 8/1/86	Complete	7/31/86	8/1/86	0	0

UCCNHT0000887

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
11.0 Files					$/M	$/M
11.1 Uranium to Gr. Jct.	Files catalogued and boxed.	Boxes to be banded for shipment to Grand Junction.	7/25/86 (old) 8/15/86 (new)		1.0	
11.2 V & W Files	Personal files of former employees combined.	Organize and provide general index. Will not attempt to consolidate with Technology Files.	8/31/86		3.0	
11.3 Active Files to Gr.Jct.	Spoke to J. Frost on 7/1/86. He plans to visit Niagara Falls to discuss.	None required.				

UCCNHT0000888

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
12.0 Surplus Equipment	Technology Equipment sale in hands of Investment Recovery. No action. Received forms for return of auto.	Collect title - fill out form and return to Investment Recovery	7/31/86 (old) 9/15/86 (new)		0	
13.0 Remove Stacks Two stacks at old Boiler Room in Niacet.	Completed		7/25/86	7/24/86	2.3	4.4

UCCNHT0000889

EDA Instruments Inc.
5151 Ward Road
Wheat Ridge CO 80033
Telephone (303) 422 9112

Invoice

Sold to

Umetco Minerals
P.O. Box 579
4625 Royal Avenue
Niagara Falls, NY 14302

ATTN: D.J. Hansen

Shipped to

Invoice date	Date shipped	Our order no	Your order no		Invoice no
April 11, 1986	April 11, 1986	5640	615-31383		L-5640
		Shipment no	Partial/Final	Rel note no	Via
			Final		Mail

Item	Qty	Description		Unit price	Total
1	10	Radium 226	(soil)	29.00	290.00
2	10	Uranium	(soil)	8.00	80.00
3	10	Isotopic Thorium	(soil)	32.00	320.00
		2 day Urgent Processing			1,600.00
		net 30, plus 2%/month			
			Total		2,290.00

White - Customer Copy
Green - Remittance Copy
Yellow - Canada Copy
Pink - Accounting Copy

UCCNHT0000890

EDA Instruments Inc
5151 Ward Road
Wheat Ridge CO 80033
Telephone (303) 422 9112

Report of Analysis

To - Umetco Minerals
P.O. Box 579
4625 Royal Avenue
Nigara Falls, NY 14302

ATTN: D.J. Hansen

Client No	Log No	Client P O No	Date Collected	Date Received	Date Reported
	5640	615-31383	4/7/86	4/8/86	4/11/86

Sample Identification	Ra 226 pCi/g ±Precision*	Th 232 pCi/g ±Precision*	Th 230 pCi/g ±Precision*	Th 228 pCi/g ±Precision*	U µg/gm
2446-40-1	14 ± 2	36 ± 3	15 ± 2	38 ± 3	34.7
2446-40-2	33 ± 3	74 ± 4	25 ± 2	74 ± 4	33.8
2446-40-3**	4.4 ± 1.1	16 ± 2	299 ± 7	4.0 ± 0.9	20.2
2446-40-4**	7.0 ± 1.4	37 ± 3	466 ± 9	14 ± 2	18.6
2446-40-5	550 ± 10	241 ± 7	186 ± 6	241 ± 7	389
2446-40-6	19 ± 2	16 ± 2	12 ± 2	17 ± 2	28.9
2446-40-7	31 ± 3	37 ± 3	22 ± 2	39 ± 3	44.3
2447-41-1	180 ± 10	139 ± 5	76 ± 4	145 ± 5	122
2446-41-2	42 ± 3	35 ± 3	19 ± 2	35 ± 3	68.4
2446-41-3	43 ± 3	9.0 ± 1.3	6.0 ± 1.0	9.3 ± 1.3	24.9

* Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 2σ

** Samples 2446-40-3 and 2446-40-4 appear to contain Th 229 (or similar element with like properties) at approximately 17 ± 2 and 40 ± 3 pCi/g respectively.

Approved by David Lashen

UCCNHT0000891

Umetco Minerals
P.O. Box 579
4625 Royal Avenue
Niagara Falls, NY 14302

ATTN: D.J. Hansen

LGN: 5640

EDA

QUALITY CONTROL DATA SHEET

Time Received: 9:00 Date: 4/8/86 By: Julie Sealock Via: Federal Express

Sample Container Type: Envelopes

Preservative When Received: As received

Additional Lab Preparation: 1. -100 mesh

Parameter	Reference	LLD	Preservative	Analyst	Date(s) of Analysis
Radium 226	4,7	0.2 pCi/g	1	S. Randall	4/8-10/86
Thorium 230	3	0.2 pCi/g	1	O. Haas	4/8-10/86
Thorium 228	3	0.2 pCi/g	1	O. Haas	4/8-10/86
Thorium 232	3	0.2 pCi/g	1	O. Haas	4/8-10/86
uranium	9,10	0.2 pCi/g	1	B. Tonning	4/9-10/86

DUPLICATES

Sample Identification	Parameter	Result	Result	Relative Deviation From Mean
2446-41-3	Thorium 230	6.2 ± 1.1	5.9 ± 1.0	2.5%
2446-41-3	Thorium 228	9.5 ± 1.3	9.2 ± 1.3	1.6%
2446-41-3	Thorium 232	9.6 ± 1.3	8.5 ± 1.3	6.1%

QUALITY CONTROL STANDARDS

Parameter	Result	Certified Result	Acceptable Target Range	Relative Deviation From Known
Radium 226	102	101	96-106	1.0%
Thorium 230	101	98	93-103	3.1%
Thorium 228	80	90	85-95	11%
Thorium 232	85	90	85-95	5.6%
Uranium	1870	1770	1680-1860	5.6%

Approved By: David Locke

UCCNHT0000892

Umetco Minerals Corporation

RECEIVED
FEB 3 1986
D. G. MILLENBRUCH

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To (Name) Mr. D G Millenbruch
Umetco Minerals
Division Danbury, CT - J1398

Location

Area

Copy to

Messrs.
H. K. Jackson - J1385
T. J Kagetsu

Date January 31, 1986

Originating Dept TECHNOLOGY

Area

Answering Letter Date

Subject
Remedial Work on Technology Property

Dear Don.

I am enclosing a copy of a proposed letter to John Oxaal, Elkem Metals, drafted by R. J. Klotzbach in August 1984 which enumerates the steps to be taken to return the excavated and clay filled area behind Building 166 to unrestricted use I could not find a signed copy but notice that Klotz admits to making an agreement with Oxaal

I have called the New York state Department of Labor and written a follow-up letter to try to accelerate their termination of our Radioactive Materials License No 950-0139

This may not be pertinent to the "GLOW" Project but I draw your attention to it

Regards,

D. J. Hansen

mau/321h
Enclosure

UCCNHT0000893

Wanged to Pusaro & Thurber 8/6/84
0112k

August 6, 1984

Mr. John Oxaal
Elkem Metals Company
Niagara Falls, NY

Subject: Decontamination of Technology Property

Dear John:

We are decontaminating the south portion of the railroad tracks shown in Figure 2, "Location of Elevated Gamma-Ray Levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY", appended to Tiger Project letter in conjunction with closing June 30, 1981, signed by F. C. Kroft, Jr. Our purpose is to cancel New York State License No. 950-0139 which allows us to possess and process natural radioactive thorium-bearing pyrochlore ore used for the production of ferrocolumbium and meet NRC proposed regulations for delicensing and unrestricted land use.

To accomplish these ends we are backfilling the area excavated with clay because our experience at Marietta shows we must provide a covered area suitable for soil sampling. Elkem's position is the backfilling with clay is inappropriate cover for access and full use of the loading pads in the area which they intend to use for bulk storage.

Accordingly, after our license has been cancelled and full and unrestricted use of the area is allowed, without reservations regarding ground cover or New York State imposed restrictions concerning future work, Union Carbide at its sole cost and expense will perform the following work:

(1) Reexcavate the area to a minimum depth of six inches, but not to the original depth of the excavation which ranges from nine inches to over two feet in some areas.

(2) Install a permeable liner over the remaining clay as a free draining support for crushed stone.

(3) Backfill the newly excavated area with gravel to a depth to be determined by your engineers but not exceeding six inches.

(4) Dispose of the approximately 300 yards of clay which is excavated.

The work as outlined is contingent on Union Carbide receiving permission for unrestricted access without conditions imposed by New York State Department of Labor, Division of Safety and Health or the Federal Nuclear Regulatory Commission or the Federal Environmental Protection Agency.

If the foregoing correctly sets forth the understanding and agreement of the parties, kindly execute this letter agreement in the space provided below.

Very truly yours,

Union Carbide Corporation

By: _____

Title: _____

Agreed To and Accepted:

Elkem Metals Company

By: _____

Title: _____

cc: Mr. R. F. X. Fusaro
Mr. W. C. Thurber

Note to Fusaro and Thurber:

I made this agreement with Oxaal but it probably requires Thurber's signature.

UCCNHT0000895

UMETCO MINERALS CORPORATION
Internal Correspondence

39 Old Ridgebury Road
Danbury, CT 06817

To F. V.McMillen

Date: February 6, 1986

CC: H. K. Jackson
R. G. Tisch

Subject: Niagara Falls Environmental Status

Dear Frank:

On February 4th I met at Niagara Falls with Rich Miller, Craig Wentzel and his staff and reviewed the environmental areas of concern vis-a-vis the SAC/Umetco divestiture. Although the letter agreement of December 23rd with SAC does not stipulate what the arrangements might be with regard to current environmental problems, I took the approach, just as in Arkansas, that Umetco has agreed in principle to accept the liability for all environmental situations that it has created.

I will list the various areas of environmental concern and review our discussions and my thoughts:

1. The most immediate environmental concern is PCB that exists in various transformers and capacitors throughout the facility For your information Frank, the regulations stipulate that any electrical equipment which contains oils that contain less than 50 parts per million PCBs are categorized as non-PCB equipment. Those that contain 50 to 500 ppm are referred to as PCB Contaminated Electrical Equipment and the third category, referred to as PCB Equipment, is that equipment with higher than 500 parts per million PCB in the oil. No remedial action is required for that equipment with less than 50 parts per million PCB, nor for the other two categories, as long as the equipment, i.e. transformers, capacitors, etc., is not leaking. The last two categories must be inspected upon schedules required by the EPA and if a leak or seepage is detected, then the clock starts running and within limited time periods equipment must either be retrofilled, i.e. the oils removed and replaced with non-PCB oil, or the equipment must be disposed of. In the latter case, that means removing the oil and then land filling the carcass. From a practical standpoint, if the equipment contains oils containing high amounts of PCBs, it may not be possible to retrofill them, whereas the gaskets and other materials within the equipment may absorb and hold sufficient PCBs so that when refilled, the oil would simply be recontaminated. When you retrofill, it is required that after three months of operation, the equipment must again be sampled to ensure that it is non-PCB.

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The Niagara plant has made a survey amd sampled all known electrical equipment that they believe might contain PCBs. Where they have found contaminated equipment they have made correction recommendations. I have reviewed those recommendations and inspected the various equipment and I concur with their recommendations. Seven relatively large transformers can probably be successfully retrofilled, which would be the most economic route. Those are transformers 33, 34, 35, 110, 111, 21 and 22. The estimated cost of retrofilling and disposing of the PCB contaminated oil, which must be burned by a qualified disposal firm, is approximately $60M. Firm quotes are currently being obtained and it will probably require three to four months to complete, plus a three month running period to retest the transformers. A second group of transformers, numbers 4, 23, 24, 122, and 161, are no longer required and in some cases are highly contaminated with PCBs. It is recommended that they be disposed of. We do not have a recent quote on the costs of performing that disposal, but it is estimated to be in the vicinity of $90M. It would also require three to six months to complete disposal and again, the plant is obtaining firm quotes. There are two relatively small transformers; no. 119 and 143, which would be cheaper to dispose of and replace at a total estimated cost of $2M.

There are 113 PCB capacitors that are no longer required and again, we are obtaining firm quotes for disposal. I would guess the cost could be in the $15M to $20M range. There are three medium sized capacitors in storage, plus twenty smaller PCB capacitors in the control cubicles for the shaft furnace. These capacitors are in acceptable storage and there is no evidence of leakage so I see no reason to either dispose of them or replace them. If SAC plans to use the shaft furnace, they may want larger capacitors since, as you will recall, these are underpowered.

There are three PCB transformers on the roof of 94 building and, as you probably recall, our Legal Department advised us that those are the responsibility of Elkem. The plant has been inspecting and maintaining them and is on record with the Niagara Falls Fire Department as performing those functions. I will ask our Legal Department to advise Elkem in writing that we will no longer perform that maintainance and that those transformers are their responsibility.

Beyond the electrical equipment, the plant has also accumulated seven drums of waste and sludge from clean up of PCB that has leaked from transformers and there will probably be another thirty or so drums that will accumulate from clean up when the above described equipment is either removed or retrofilled. It will be necessary to dispose of that material by a qualified agent. The estimated cost for that is $15M to $20M.

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Three of the above transformers already discussed are sitting outside and are known to have leaked. That leakage could possibly have contaminated a fair amount of soil and it will be necessary to sample that soil and if contaminated, remove and drum it, and dispose of it. There could be as much as ten or twenty barrels and the approximate disposal costs are $300 to $500 per barrel.

The main switching station at Niagara Falls has been the responsibility of Umetco and it is now to be transferred to Linde. That station contains 1,008 PCB capacitors, all of which are sealed, are carefully enclosed, and none have ever been known to leak, nor are there any leaking now. I understand that Linde has already indicated that they would like to see those removed and replaced and have obtained an estimate for removal and disposal of $250M. Our own estimate is less, i.e. $150M. We have no quotes on the reinstallation and replacement costs but I suspect the total cost would be in excess of half a million dollars. There is no legal requirement as long as there are no leaks and as long as the proper inspections are made to replace those capacitors. It makes absolutely no sense to me from the standpoint of Union Carbide's exposure, etc., to replace them at this time, and there may never be a need to.

The only area regarding PCBs that is undefined at Niagara involves the many oil filled switches around the plant. No testing has ever been done. The plant will randomly sample some of the oil fill switches in the near future and have PCB assays run. Hopefully, we will find none and, that being the case, there will be no problem there.

The approximate cost of all of the actions listed above is something in the order of $200M to $250M, not counting the main switching station, for clean up of the PCB situation.

2. The second most critical environmental item is the discharge from the halide cylinder dumping and cleaning operations that we have discussed before. There has been an air discharge of HCl and chlorine gas and a liquid discharge into the Elkem sewer. On occasion, low Phs occur due to HCl and there is also some vanadium. The Engineering group and the plant has designed and tested a new fume control scrubbing system, which is in the process of being installed, to control and correct those problems. This involves a new venturi scrubber and a high pressure blower to collect the fumes and scrub them so that only clean air is discharged and so that the liquid can be released in a controlled fashion. The current schedule is to complete the installation of that facility by the end of April. Tests have shown that the system should collect from 95% to 97% of the particulate fumes which should be acceptable. When complete it will be necessary to obtain an air discharge permit from the

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DEC, which should be no problem, except they may ask why we have not obtained that permit heretofore. It may also be necessary to obtain a water permit, unless we are covered under permits held by Elkem. Craig Wentzel and Don Hansen will attempt to find the answer to the latter question.

I'm sure you appreciate that as we proceed to obtain permits, the discussions we have had in the past with Elkem with regard to discharging into their sewer may arise again. An estimate has been made to install a new sewer extension, so that the discharge would go into our own sewers of about $35M. There is no environmental reason to do so and the new scrubber should alleviate Elkem's previous concerns.

3. Chrome Oxide - There are about 64 drums of a chrome oxide material at Niagara which came from the Strasbourg facility. At this time, there is no obvious home for this. It does classify as a hazardous waste and the quickest and simplest way to resolve the problem would be to have it buried as a hazardous waste. We obtained an estimate of $6M to $7M to do that.

GONE

4. There is 78M pounds at Niagara of a high antimony tungsten moly oxide material, which resulted as a part of the Bishop problem some time in the past. There have been efforts to market this unsuccessfully through Investment Recovery and by George Lincoln. This material, unfortunately, is in paper bags, which are beginning to break open. It does classify as a hazardous waste and to dispose of it would require repackaging the material into steel drums and disposal by a qualified agent. Perhaps the material is marketable but if not the disposal would probably cost about $30M.

GONE

5. You should be aware, Frank, that there is a collapsed, buried sewer on our property, which was filled many years ago with some kind of a crushed fly ash or slag. We understand it is leaking into the Elkem sewer and the city may be giving Elkem some problems. The source of the leakage is not from us. We understand it is material coming from Hooker's property which is passing through and under this crushed filled sewer, which is merely providing a route to Elkem's sewer. No action is required on this.

OPEN

6. The freight elevator in the globar area, at some time in the past, was lined with asbestos for "fire protection?" Due to a leak in the roof a few months ago, some fell off, dropped down through the elevator shaft and contaminated the area. The plant had to bring in people to clean it up and since it represents an environmental hazard an estimate has been obtained for an outside firm to remove the asbestos and get rid of it. The cost estimate was $12M, and probably should be done. As far as other asbestos throughout the plant, over the last year or so the plant has encapsulated or removed most of the asbestos pipe

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insulation throughout the plant. They believe they have corrected over 95% of that problem. There is some asbestos stored in the plant that needs to be disposed of at a minimal cost.

7. Twice a year, an outside firm, referred as Super Sucker, comes in and vacuums all of the crane rails, etc.. The dust is collected as a sludge which is dumped in the yard. It is scattered over a relatively wide area and no testing has ever been done to determine whether this material qualifies as a hazardous waste. The plant will sample the material and if it is a hazardous waste, an inventory will be taken. To dispose of the material it would have to be drummed and disposed of at a cost of $200 to $300 per drum. I have no firm feel for the quantity of this material, but there could be over a hundred drums.

8. There are in storage in the globar area thousands of small coffee cans, which represent samples of material that have been made at Niagara Falls since 1906. No one knows what is in these cans; whether they are "hazardous waste", radioactive, etc. A program has been started with plant people in their spare time to open each and every can, identify it, categorize it, and separate it for disposal. At the current rate this is proceeding, it probably won't be completed for well over a year. I have recommended that we get an outside firm to quote on coming in and doing that work so that it could be wrapped up and completed in a reasonable time. I would estimate we are talking in the order of $10M to $15M for that task.

IN PROGR.

9. We talked about numerous other small piles of miscellaneous materials lying around, i.e. lime, etc., and there are no other significant items at issue. However, there is about 20M pounds of moly vanadium aluminum remelts, which is not a hazardous material, but it is the plant's position that they should be written off to the account of Umetco. Perhaps at some stage it may be necessary to landfill them.

There is some concern that there might be material lying around from ancient history that could be thorium bearing and thus radioactive, such as the material we cleaned up in the yard last year. I believe it would be better to determine if there is any potential problem now and have asked Don Hansen to conduct a radiation survey throughout the plant and yard to see if anything crops up. If we find nothing from a surface radiation survey, that should alleviate all concerns.

10. There is a pile in the yard of approximately 4M tons of slag that has come from the various furnacing operations. That slag is currently being sold under contract to Federal Cement Company, who is purchasing the material for $12.00 per ton. The rate at which they are purchasing is at about the rate that it

UCCNHT0000900

is being produced. However, they have shown a strong interest in purchasing all of the material in due course. This material is not hazardous and I do not view it as any liability for Umetco.

11. There are some empty drums scattered around the plant but those can be used by SAC or disposed of, if necessary, by simply washing them out. I view this as no environmental liability.

12. The plant was advised by a Union Carbide Security inspection that it may be advisable to erect a fence between what will be the SAC facilities and the L-Tech facilities. That fence would go across the yard and across where all the various and sundry piles of slag, etc., are and would also go right across the middle of a large pond called Lake Linde. The plant is obtaining an estimate for this fence. Not only will the fence be expensive, it will be extremely difficult to install due to the lake. I do not consider this item an environmental matter and would question that the fence is really needed for security. The fence would be approximately 1500 feet long, would need to be chain length, and, as I say, will not be cheap.

13. Frank, the Lake Linde area that I referred to above and the general yard area, although not representing any immediate environmental probem, does raise some concerns. There have been many different types of materials dumped out there for 60 or 70 years. No one knows whether any of the materials have been leachable, whether they have in any way contaminated the soil, and if so, to what depth, or if there could be any potential ground water contamination. As we dump and identify the contents of the sample cans, we should get some guidance as to what might be out there. Lake Linde has collected drainage from the area and L-Tech is discharging into it and no one really knows the characteristic of that water. The concern I have is that when Umetco no longer has any control over the property, the lessees, i.e. L-Tech, SAC, etc., could dump or discharge in the area, creating environmental problems and a liability for UCC. Ideally, it would be good to go in and sample the area; maybe even by drilling, and establish a base for UCC's liability at this time. The radiation survey will help there. The only danger of this is that with all of the industrial contamination that is either known or suspected in that vast industrial area, we could find something that would open up a real Pandora's box, and so I, therefore, hesitate to recommend that course of action. I suggest we should discuss this particular issue further and perhaps in depth with legal counsel.

14. When the property to the north of our current facility was sold to Niacet, Union Carbide retained ownership of three large boilers and the building and associated equipment contained therein. Prior to 1980 or '81, the boilers were operated to provide steam for our facility. I do not know exactly the legal

situation, i.e. who's responsibility they are, but Umetco has been the UCC manager and, in any event, they are still owned by Union Carbide. The Niacet individual who showed me around is aware of that. He pointed out that the supports on two huge stacks on the top of the building are failing and if the stacks are not resupported or removed, they will fall down. The boilers themselves have asbestos insulation on the external piping and they may have asbestos insulation internally throughout the boilers. I have asked the fellows at Niagara to try and find drawings so that we can determine how severe the asbestos problem is. If we are legally responsible for these boilers, it may be necessary to either remove the asbestos, certainly to either support the stacks or tear them down, and possibly demolish the boilers. These are large units and the costs would be significant. I will ask our Legal Department to give me an opinion as to what our responsibilities are. This issue does not involve SAC except perhaps for a service agreement but may have to be resolved before Umetco can withdraw from Niagara Falls.

15. Under the agreement with SAC, Carbide has said that they will share the final and eventual reclamation costs of the site, if and when it is ever abandoned. To fix that liability now, we could get a demolition contractor to make an estimate now of demolishing and reclaiming the facility. However, the logical final solution would probably be to clean out and scrap the equipment and sell the buildings at that time. If the parties agree to resolve Items 1 through 14, I suggest the final buildings reclamation be left and the cost or credit be shared based on relative time of occupancy.

16. Miscellaneous - We touched on numerous other minor areas, such as underground tanks, and there are no problems there. We talked about bulk storage and although initially there appeared to be a caustic tank problem, it was tested and checked out okay. We talked about the 86 or so vanadium halide tanks scattered around the country, and they seem to be under control and all in good condition. There is no major waste oil problem, etc. There are no radiation sources on the site. I believe, Frank, that if the situations described in this memo are addressed, we can fairly well define the environmental liabilities of Union Carbide at Niagara Falls.

Very truly yours,

D. G. MILLENBRUCH

DGM:blb
0214b

UCCNHT0000902

A R BROSNHAN

RECEIVED
JUN 3 1981
SHEA DEPT.

Department of Energy
Washington, D.C. 20545

MAY 28 1981

Mr. R. C. Allenback, Manager
Environmental, Health and
Product Safety Affairs
Union Carbide Corporation
4625 Royal Avenue
P.O. Box 579
Niagara Falls, New York 14302

Dear Mr. Allenback:

In response to a request from William Pioli of your staff, I am enclosing a copy of the preliminary radiological survey report on the Union Carbide Corporation, Metals Division (former Electro Metallurgical "Electromet" Company), Niagara Falls, New York. We have also transmitted a copy of this report to Mr. Jack Spath, New York Energy Office.

As stated in the report, a detailed radiological survey of the Technology Area at the Union Carbide Corporation, Metals Division is needed. The Department of Energy (DOE) has no present plans to conduct this survey since it does not appear, based on available data, that the present contamination onsite is related to the DOE or one of its predecessor agencies, i.e., the Manhattan Engineer District (MED) or the Atomic Energy Commission (AEC). If, however, you can provide us with any additional information on the source of contamination, please call it to our attention. If no additional information is provided to us, we plan to certify that this site does not contain residual radioactive material above acceptable guidelines as a result of MED/AEC activities and will delete the site from the Formerly Utilized Sites Remedial Action Program.

We will be pleased to send you additional information as required.

Sincerely,

William E. Mott

William E. Mott, Director
Environmental and Safety
Engineering Division (EP-14)
Office of Environmental Protection,
Safety, and Emergency Preparedness

Enclosure

cc: William Piolo, Union Carbide, w/encl.
Jack Spath, New York Energy Office, w/o encl.
Herb Fish, U.S. Dept. of Energy, EP-7, w/encl.

PRELIMINARY SURVEY OF THE UNION CARBIDE CORPORATION METALS DIVISION PLANT, NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

December 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

UCCNHT0000904

PRELIMINARY SURVEY OF THE UNION CARBIDE CORPORATION METALS DIVISION PLANT, NIAGARA FALLS, NEW YORK

B. A. Berven and R. W. Doane

Introduction

On September 24, 1980, two representatives from Oak Ridge National Laboratory visited Union Carbide Corporation's Metal Division Plant (UCC-MD) in Niagara Falls, New York. The purpose of the visit was to perform a radiological survey of property where anomalously high levels of radiation were observed during an earlier preliminary survey of this site (see attachment). This report presents the results of this radiological survey.

A diagram of the technology area of the UCC-MD plant is shown in Fig. 1. The location of the anomalous radiation levels was between Buildings 163 and 166 where beta-gamma dose-rate levels were measured at 0.1 mrad/h at the ground surface.

Survey Methods

The preliminary radiological survey of the UCC-MD Technology Area consisted of the following measurements or samples: (1) a gamma-ray scan of the outside ground surface; (2) two bias surface soil samples from outside locations where external gamma radiation levels were significantly above background; (3) a gamma-ray scan of the inside floor and wall surfaces of Building 163; (4) bias alpha measurements inside Building 163 where external gamma radiation levels were significantly above background; (5) five smear samples from inside Building 163 measuring transferable alpha and beta contamination.

Portable instrumentation used in this survey included a gamma-ray scintillator [NaI (Tl)] survey meter, an alpha scintillation [ZnS (Ag)] counter, and a Geiger-Mueller (G-M) survey meter.

Survey Results

Outside

The gamma-ray scanning of the ground surface in the Technology Area at UCC-MD indicates wide-spread contamination over an extensive portion of this property (see shaded area in Fig. 2). Relatively high concentrations

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of gamma-emitting radionuclides were observed in localized areas. External gamma exposure rates on ground surfaces were measured, ranging from background (approximately 10 μR/h) to a maximum of 3 mR/h. The contamination appeared to be low-level but uniform under several asphalt pads, and high-level and "spotty" following two railroad spurs traversing the property.

The highest external gamma levels (3 mrad/h)* observed in the area where surface soil sample NF_1 (see Fig. 3) was located. Potentially contaminated material appeared to be located beneath the asphalt pads surrounding Buildings 163 and 171. Surface exposure rates were a general 30 μR/h around Building 171, but appeared to be highly variable around Building 163, ranging from 17 to 100 μR/h.

The location of two surface soil samples (0-15 cm) taken in the Technology Area are shown in Fig. 3. The results are listed below:

Sample	External Gamma Exposure Rate at Ground Surface (μR/h)	Radionuclide Concentration (pCi/g)		
		^{238}U	^{226}Ra	^{232}Th
NF_1	3000	3200 ± 3%	3300 ± 4.8%	860 ± 7.1%
NF_2	83	81 ± 3%	72 ± 1.7%	190 ± 7.2%

The highest external gamma readings were found at the surface of the soil, with the levels decreasing rapidly with increasing depth.

Inside Building 163

Low-level contamination was found inside Building 163 during a cursory survey. The surface external gamma levels from the walls and floor were within typical background ranges (13 to 17 μR/h). The alpha activity on the walls and floor were elevated but not significantly above background levels at 68 dpm/100 cm^2.

Cracks in the floor of Building 163 exhibited elevated radiation levels, with external gamma activities ranging from 17 to 50 μR/h, and alpha activity over these cracks ranging from 100 to 150 dpm/100 cm^2.†

*This exceeds Nuclear Regulatory Commission's maximum beta-gamma level guideline of 1.0 mrad/h at 1 cm (see Ref. 1).

†This exceeds Nuclear Regulatory Commission's guideline of 100 dpm/100 cm^2 for alpha activity originating from ^{226}Ra (see Ref. 1).

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Five smear samples were taken to determine the amount of transferable alpha and beta contamination. The location of the smear samples are identified in Fig. 4. The levels of transferable alpha and beta-gamma contamination were all at background levels.

At location "b", surface external gamma levels measured 83 μR/h and alpha activity measured approximately 530 dpm/100 cm^2 (also above NRC guidelines). At location "c", beta-gamma levels of 0.12 mrad/h were observed.

Discussion

Relatively high concentrations of radionuclides in the ^{232}Th and ^{238}U decay chains exist in the surface soil in the Technology Area at UCC-MD in Niagara Falls, New York. These materials also appear in cracks and seams in the walls and floor of Building 163.

Dr. C. R. Allenback, Manager of Environmental, Health, and Product Safety Affairs at the UCC-MD, indicated thorium-bearing ores were used during operations at this site, however, these operations were unrelated to Manhattan Engineer District (MED)/Atomic Energy Commission (AEC) activities. In view of the nature of past MED/AEC operations (limited to reacting of UF_4 to uranium metal), it seems unlikely that the present contamination on-site is related to those MED/AEC activities. However, because uranium appears to be present in the soil in significant amounts, contamination due to MED/AEC activities cannot be eliminated, but only considered improbable.

Recommendations

Based on the results of this preliminary survey, it is recommended that a formal detailed radiological survey of the Technology Area at the UCC-MD Plant in Niagara Falls, New York, be conducted by some responsible agency since radiation levels exceed Nuclear Regulatory Commission guidelines for unrestricted use.

References

Nuclear Regulatory Commission, "Guidelines for Decontamination of Facilities or Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Product, Source, or Special Nuclear Material," November 1976.

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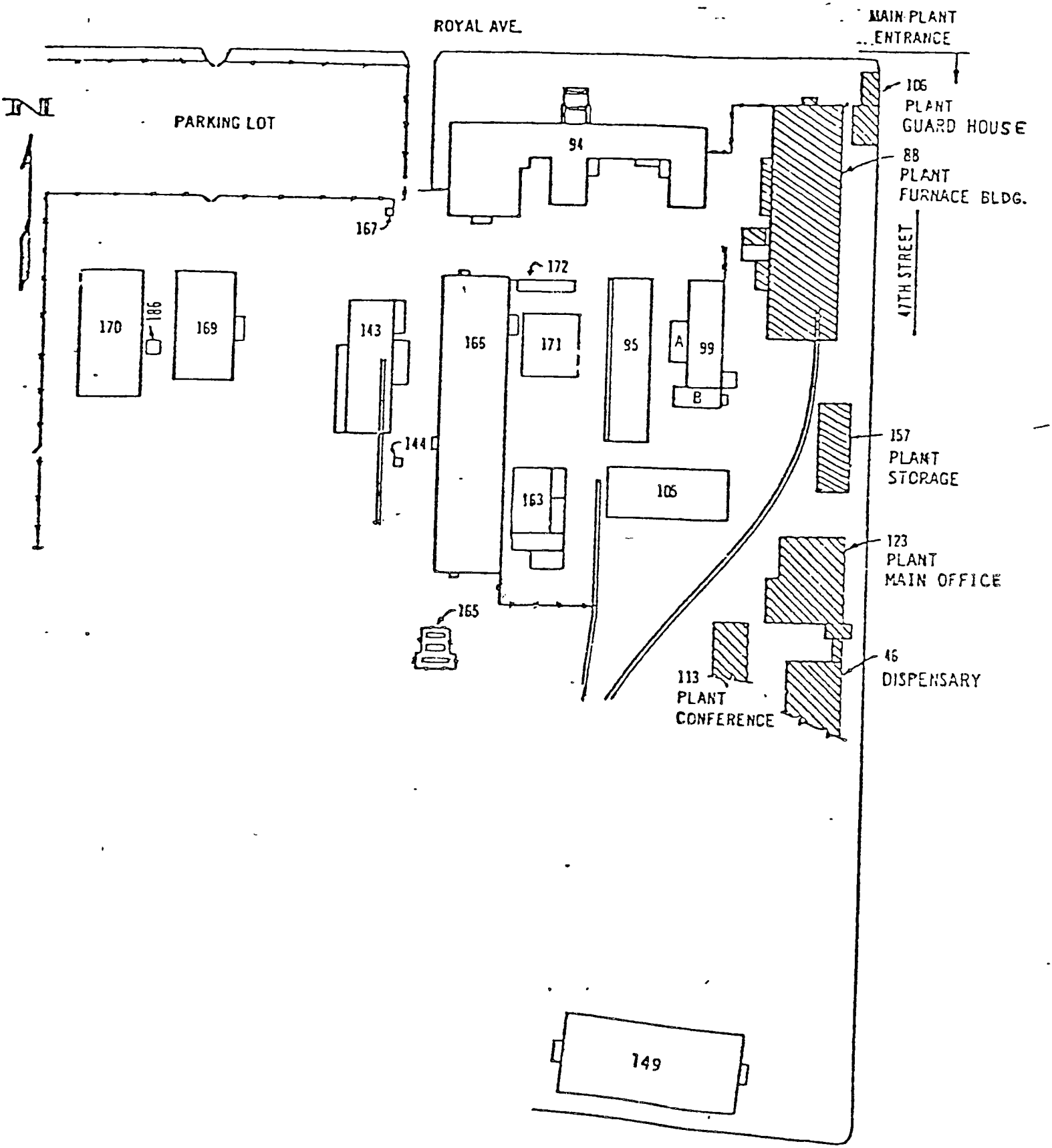

Fig. 1. Technology Area at the Union Carbide Corporation - Metals Division Plant (former Electromet site) in Niagara Falls, NY (adapted from UCC-MD drawing).

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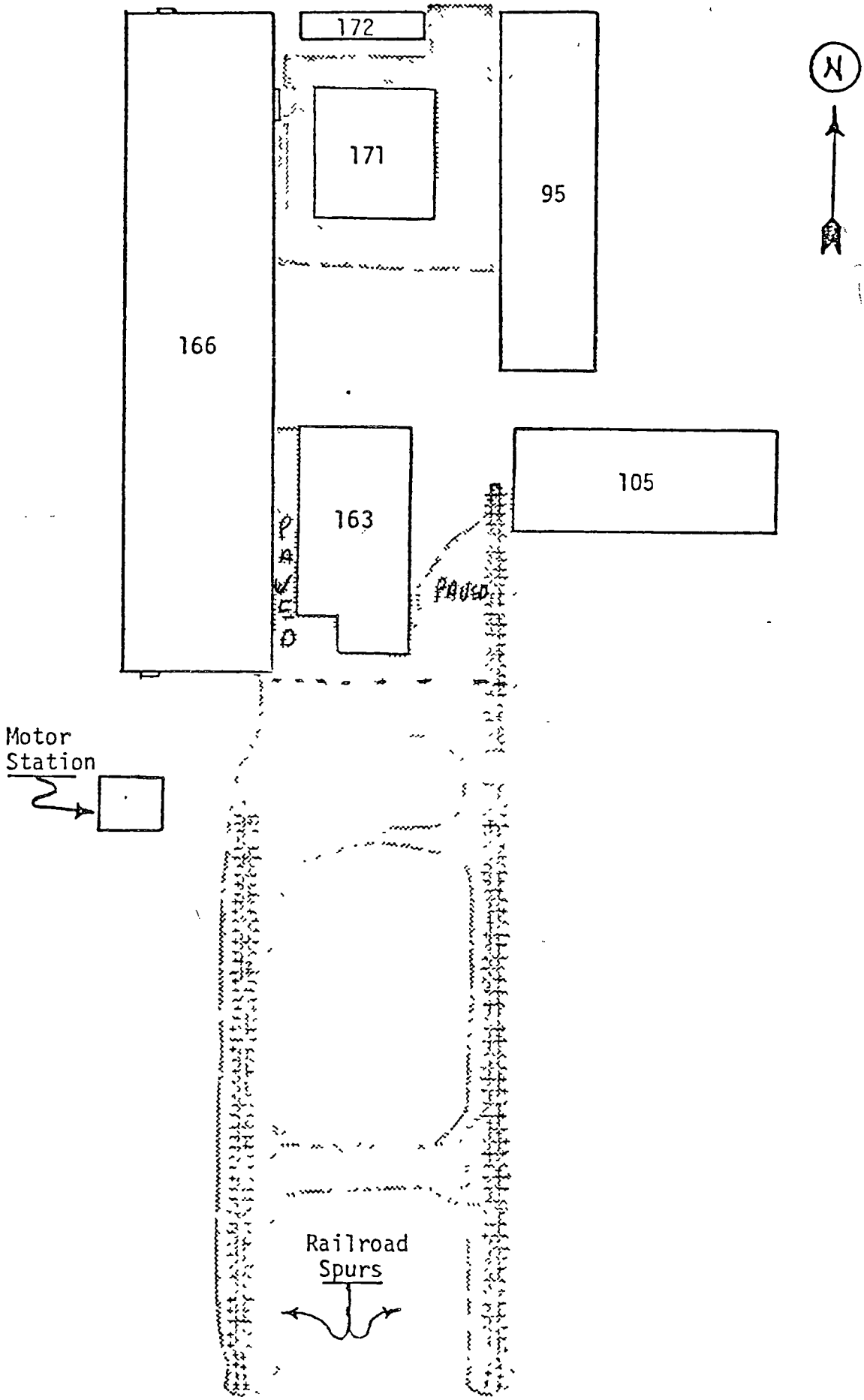

Fig. 2. Location of elevated surface gamma-ray levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY.

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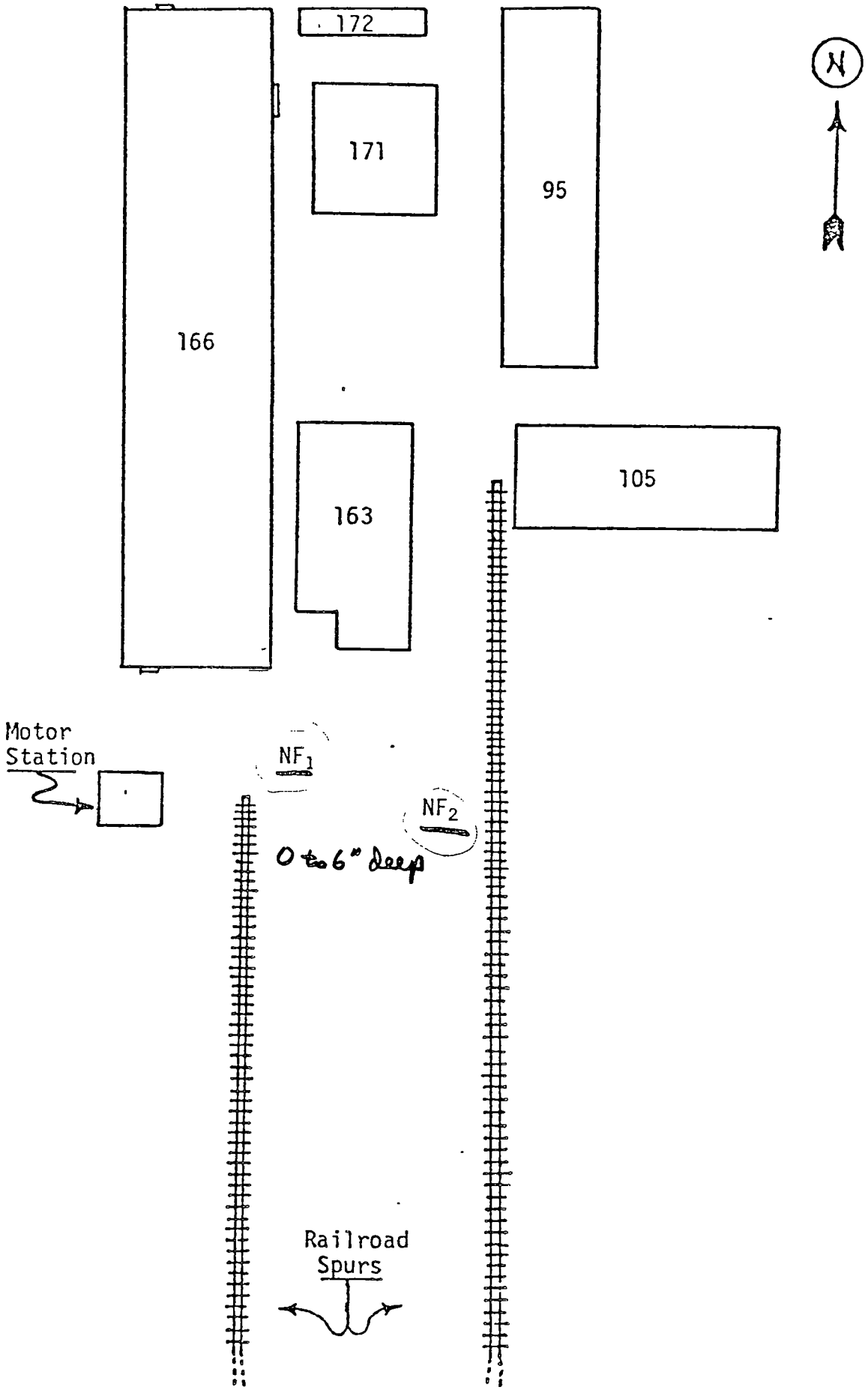

Fig. 3. Location of surface soil samples taken in the Technology Area of UCC-MD in Niagara Falls, NY.

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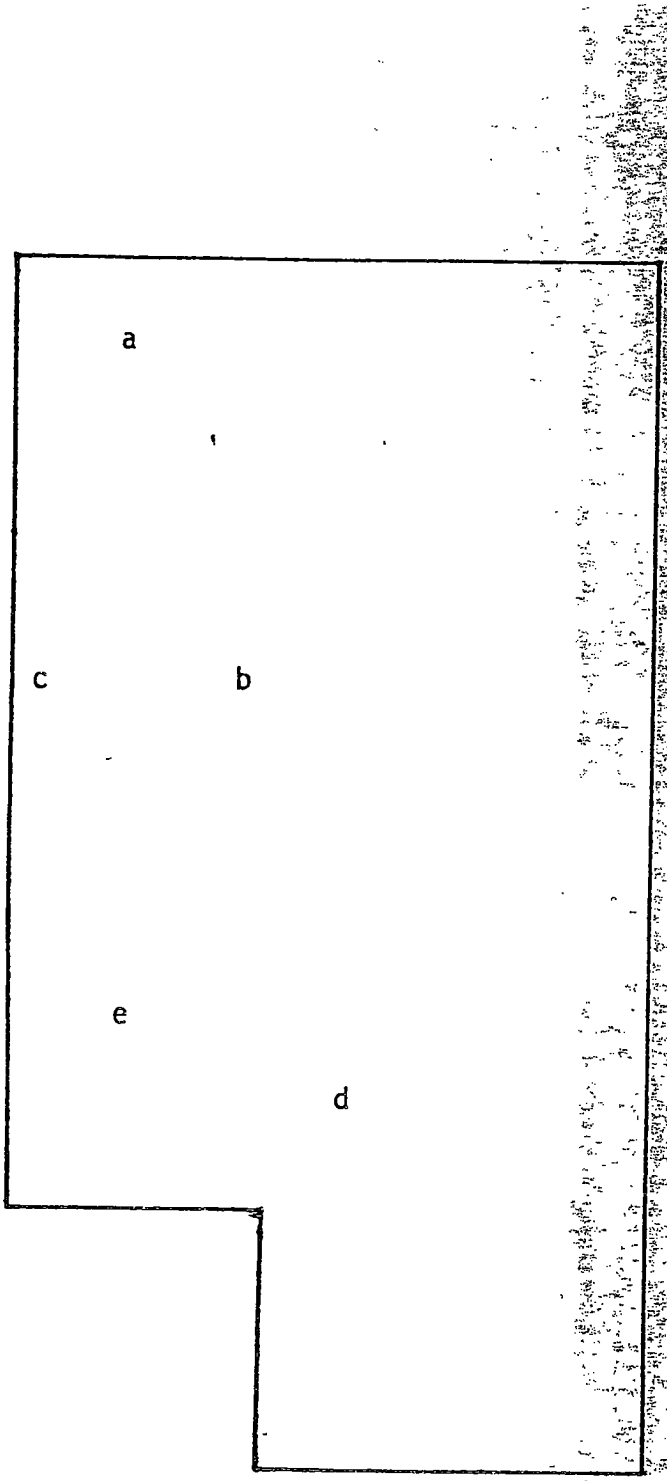

Fig. 4. Location of smear samples in Building 163 in the Technology Area of UCC-MD in Niagara Falls, N.Y.

This bldg also stores processed uranium ores used in on-site leach tests.

UCCNHT0000911

ATTACHMENT

PRELIMINARY SURVEY OF ELECTROMET CORPORATION UNION CARBIDE METALS DIVISION NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

March 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

UCCNHT0000912

ELECTROMET CORPORATION
UNION CARBIDE METALS DIVISION
NIAGARA FALLS, NEW YORK

At the request of the Department of Energy (DOE, then ERDA), a preliminary survey was performed at the former Electromet Plant (currently Union Carbide Corporation - Metals Division plant) in Niagara Falls, New York (see Fig. 1), on August 24, 1976, to assess the radiological status of those facilities utilized under Manhattan Engineer District (MED) contract during the period 1943 through 1946. Robert D. Forgeng, Plant Manager, provided information about the contract operations and identified the former site of the one building (a cinder block and wood structure) utilized in the process. C. R. Allenbach and Don Hawkes also provided information as to the building location and project operations. Also, Bill Chynoweth, an employee at the plant during the MED contract period, provided information about operational processes and assisted in identifying the location of the building which was demolished about 1958.

The project involved receiving Green Salt (UF_4) in drums from the Linde Air plant at Tonawanda, New York, reacting the Green Salt in furnaces, converting it to metal, and then recasting it into ingots. The building was formerly located where Building 166 now stands and just west of Building 163 (see Figs. 2 and 3) which existed at the time of the project. The former process building was constructed of wood and cinder block and was about 18 x 46 m at one end and 14 x 46 m at the opposite end. Waste from the operation was disposed at the Lake Ontario Ordnance Works depot. Residues of dolomite slag liners (MgF_2 slag), uranium chips, and crucible dross associated with the process were shipped to other sites for uranium recovery.

Present Use of Facilities

The building utilized in the MED project was washed, vacuumed, and, in some locations, the concrete floor and some wood platforms were removed (see Report N04600). Following the project (post-1946), the building was used for zirconium processing from 1947 to 1948, and later titanium was processed prior to demolition. Building 166 (see Fig. 4)

UCCNHT0000913

was constructed on the site of the former process building, and it is currently used by Union Carbide's Metal Division operations.

Results of Preliminary Survey

The preliminary survey was performed by H. W. Dickson of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office (then ERDA). Accompanying Dickson and Thornton during the survey was C. R. Allenbach, Don Hawkes, and Bill Chynoweth. Measurements taken at this site included external gamma-ray exposure rates taken at 1 m in height and beta-gamma dose rate taken at 1 cm from the surface. Results of the survey measurements were within background levels with the exception of slightly elevated background with maximum beta-gamma dose-rate readings of 0.1 mrad/hr at a location between Buildings 163 and 166. Survey measurements in sections of the old Union Carbide dump (200 to 300 acres and now owned by CECOS International, Inc.) located to the north of Pine Avenue (see Figs. 5 and 6) resulted in radiation levels that were not significantly above background levels. Some of the waste from the process and rubble from the demolition of the old building has been buried at this dump.

In view of the near background radiation measurements taken at this site, a comprehensive, formal survey will probably not be required. However, it is suggested as a precautionary measure to (1) obtain further measurements between Buildings 163 and 166 to define extent of elevated readings, (2) obtain a soil sample at location in (1) where maximum β-γ and external gamma measurements are observed, (3) drill core samples in the old Union Carbide dump to determine if any radioactive material has been deposited in this area.

A formal survey of this facility was performed as part of the dismantlement and decommissioning of Electromet by the Health and Safety Division of the AEC on August 11 and 14, 1953. The results of this survey are reported in the attached document.

UCCNHT0000914

JUL 18 1986

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

July 15, 1986

Mr. R. A. Crago
Elkem Metals Company
4625 Royal Avenue
Niagara Falls, NY 14302

Dear Mr. Crago.

Mr. Louis Cabasino of the New York State Department of Labor, Brooklyn, NY called me this morning to inform me that the soil samples taken south of Building 166 showed no evidence of any radionuclides. These samples were obtained by Mr. Robert Kelly, Department of Labor, on March 20, 1986, to verify that removal of contaminated soil in 1984 was complete. Because of the results, Mr. Cabasino agreed that we could proceed to restore the area.

I have contacted Dube Construction Company and requested a bid to remove 8-inches to one foot of clay and to backfill with crushed stone. Assuming the cost is reasonable we will proceed with the restoration later this summer. The work will be completed before September 30, 1986.

Very truly yours,

D. J. Hansen

/mau

cc. Dr. F. J. Bradley
Mr. J. F. Frost
Mr. R. F. Kelly
Mr. F. V. McMillen
Mr. D. M. Millenbruch
Mr. J. Oxaal

UCCNHT0000915

NGM

7.26

UMETCO MINERALS CORPORATION
Internal Correspondence

39 Old Ridgebury Road
Danbury, CT 06817

July 7, 1986

To: Messrs.
R. G. Tisch
L. E. Barron

cc: J. F. Frost
D. J. Hansen
F. V McMillen (w/o attach.)

Re: Niagara Falls
Environmental Issues

Gentlemen:

Richard spoke to me regarding Umetco's action plan to address the environmental issues at Niagara Falls identified in the corporate audit. I indicated there is no official detailed action plan but that we are addressing the issues as covered under the Stratcor environmental agreement. I have attached a copy of Schedule A of that agreement as well as numerous memos and reports addressing the various issues. We plan to have a written agreement with Stratcor when each item on Schedule A is complete.

Briefly, the status of the items on Schedule A is as follows:

A. All PCB replacement, retrofitting or disposal etc., has been completed and we are awaiting completion of the three month power test to totally complete this item.

B. The scrubber is complete, has been tested and operated well. A minor modification to a fume hood is needed to totally complete this item and should be done shortly.

C. Complete and acknowledged by Stratcor.

D. Quotes are being obtained for removal of this asbestos as well as asbestos in Bldg. 111, the Niacet boilers and associated piping (Bldg. 4A) and some incidental asbestos in storage. It is expected to let a contract (+ $50M) for that work in 2 or 3 weeks.

E. Complete and acknowledged by Stratcor.

F. More than 50% complete and should be totally complete within one month.

UCCNHT0000916

G. Has been tested as non-hazardous and currently being disposed of in local landfill.

H. Yard has been tested and found to have no hazardous waste and a radioactive survey has been completed and any radioactive material removed.

I. Lake is drained and is currently being filled and graded by El-Tech and Umetco. Should be completed within one month.

J. All radioactive areas have been cleared and cleanup material is being disposed of through appropriate channels and at approved disposal sites. This entire activity including H above has been coordinated with and approved by N.Y. State, with the objective of terminating all radioactive licenses at the old Umetco site. When that is completed will depend upon the states' schedule.

If you have any questions about the attachments or other issues please contact me. We will forward copies of the completion acknowledgements with Stratcor for all Schedule A items when they are completed.

Very truly yours,

D. G. Millenbruch

DGM:er
0069e

UCCNHT0000917

Schedule A

Niagara Falls, New York

Description of the Work

Work to be Done	Estimated Cost M$	Estimated Completion Date
A. Replace, retrofill or dispose of PCB containing transformers, capacitors and dispose of cleanup materials.	200-250	8/86
B. Complete halide scrubber.	100	8/86
C. Dispose of chrome oxide	8-10	6/86
D. Remove globar elevator asbestos.	12-15	8/86
E. Dispose of hi antimony tungsten.	15-25	10/86
F. Dispose of sample cans	15-25	10/86
G. Sample, test and dispose of, if necessary, supersucker dust.	5-75	10/86
H. Yard area sampling and cleanup, if necessary.	25- ? (big)	3/87
I. Drain and fill Lake Linde	25-50	12/86
J. Clean up radioactive areas of plant.	25-50	8/86

UCCNHT0000918

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

To [Name] Mr. K. E. Forrest
Umetco Minerals Corporation
Division Grand Junction, CO

Location

Area

Copy to Messrs:
--- J. F. Frost
T. J. Kagetsu
H. M. Wilber
K. A. Wood

Date December 19, 1986

Originating Dept

Area

Answering Letter Date

Subject Invoices from Advanced Environmental Systems Inc.

I am enclosing two (2) approved invoices from Advanced Environmental Systems Inc., No. 3687 for $104 and No. 3521 for $401.

The first (3687) was a flash point analysis on sand removed from below a leaking gasoline tank. Our responsibility for this charge is addressed under Section 3(k) of the Environmental Agreement (Niagara Falls) "Storage Tanks" which states in part:

"If in the future USV is required by law, to modify, repair or remove the underground gasoline ----- tank(s) due to evidence of leaking, Buyer and Seller agree to share the cost ------- based upon their respective period of occupancy of the Niagara Falls Facility --------."

In view of the short time involved for U. S. Vanadium, I suggest we pay the whole thing.

The second (3521) involves the clay cap used to cover an area on Elkem property from which radioactive soil had been removed. Note that this invoice dates back to August 1, 1986.

Donald J. Hansen

/mau
Enclosures

UCCNHT0000919

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

MONITORING AND SUPPORT LABORATORY

P O Box 165
Niagara Falls, N Y 14304
(716) 285 8883

SOLD TO
U.S. Vanadium
Accounts Payable
P.O. Box 66
Niagara Falls, New York 14302

TERMS Net 30 Days

DATE	INVOICE No	CUSTOMER ORDER No	OUR JOB No
10/30/86	3687	Verbal - Herb Wilber	BVR

PROFESSIONAL SERVICES:

Sampling and Analysis of Sand Bin For Flashpoint
October 24, 1986 Report

TOTAL AMOUNT DUE $104.00

RECEIVED
NOV - 3 1986
INVOICING DEPT.

Approved for payment
D J Hansen 12/19/86

- QUALITY ASSURANCE -

UCCNHT0000920

615-31149

PO NO	DEPT CODE	SUB DEPT	CONT / WORK CODE	REQUISITION NO	VENDOR CODE	NAME	LOCATION
	0400	F	84-0615	--			

VENDOR'S REFERENCE NO	INV REC DATE	INVOICE DATE	D/C	DUE DATE	NET AMOUNT	D/C	DISCOUNT AMOUNT	S/H

*** LATE PROCESS REASON CODE
- ☐ 1 PURCHASE ORDER NEEDED
- ☐ 2 POCN NEEDED
- ☐ 3 RECEIVING REPORT NEEDED
- ☐ 4 AUTHORIZATION NEEDED
- ☐ 5 INVOICE HELD FOR CAUSE
- ☐ 6 INVOICE RECEIVED LATE
- ☐ 7 USED MIT ACCOUNT

Umetco Minerals Corporation
P.O Box 66 (137-47th Street)
Niagara Falls, NY 14302
HEREINAFTER CALLED BUYER

* ATTACHMENT NEEDED *
- ☐ 1 UMC DOCUMENT
- ☐ 2 SPECIAL VENDOR DOCMNT
- ☐ 3 CORRECTED VENDOR'S INVOICE

PAGE 1 OF 1

VENDOR
Advanced Environmental
P.O. Box 165
Niagara Falls, NY 14304
HEREINAFTER CALLED SELLER

MAIL INVOICES IN DUPLICATE TO
Umetco Minerals Corporation
P O Box 1029
Grand Junction, CO 81502
ADDRESS CORRESPONDENCE TO
P O BOX 66, NIAGARA FALLS, NEW YORK 14302

SHIP TO
U.S. Vanadium Corporation
137 - 47th Street
Niagara Falls, NY 14302

BUYER HEREBY ORDERS UPON THE TERMS HEREIN CONTAINED INCLUDING THE ADDITIONAL TERMS ON THE REVERSE SIDE HEREOF

TERMS OF PAYMENT						TRANSPORTATION TERMS				F O B POINT		
SHIP TO ARRIVE BY	NET 30	% DISC	10 DAYS	10TH PROX	OTHER	PREPAID (ACCT OF BUYER 1 / ACCT OF SELLER 2)	OTHER 3	SHIP POINT 1	DEST 2	OTHER 3
7/31/86	X						N/A			N/A

SUBJECT TO STATE/LOCAL SALES USE TAX YES	NO	TAX %	TEXAS SEE SPECIAL INSTRUCTIONS	TAX EXEMPTION NO	SHIP VIA	PARCEL POST	TRUCK	UPS	RAIL	AIR FRT	OTHER (SPECIFY ROUTING)	BUYER	COM CODE	VENDOR CODE	REC LOC
	X		☐								N/A		0400F		615

ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U / M	DESCRIPTION	UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	MATERIAL CODE SUB	FIRST NO	SECOND NO	SHOP ORDER
1	1 LOT	X			1	Lot	Perform sampling ignitability test and eptoxicity for heavy metals test of contaminated sand as instructed by Owner's Representative. M. M. Wilber	$435.00	740	14080	88	2501		

RECEIVED
NOV - 4 1986
INVOICING DEPT.

REQUISITIONER'S DESCRIPTION (17) CHARACTER LIMITATION

PURCHASING AGENT'S NAME (TYPE OR PRINT NAME)

X	LOT HR NO	DATE REC'D	LOC	REC'D BY	REC LOC	ORIGIN IN	ORIGIN OUT DATE	TRANS PPD	TRANS COLL	TRANS (CONT)	CARRIER	DATE OF PRO	PRO NO	CAR NO	CONTAIN COUNT	PRODUCT WEIGHT	TOTAL WEIGHT	PRODUCT CLASS
	1	8/22/86		J. Briggs		7/29/86	√	√		Katherine T.T.	T.T.	8/29/86	#3556					

5 RECEIVING DEPARTMENT TO INVOICE AUDITING

UCCNHT0000921

ATTN OF ① ROUTING ② LOCATION ③ LOCATION LOCATION

RETURN TO _____ DEPT LOCATION BY _____ DATE

ORDER NUMBER 615-31149

R/R NUMBER

INVOICE DATE

INVOICE NUMBER

INVOICE AMOUNT

VENDOR Advanced Environmental
P.O. Box 165
Niagara Falls, NY 14304

REQUISITIONER D. V. Gambolan

LOCATION OF MATERIAL

DIFFERENCE TO BE RECONCILED

ITEM	PURCHASE ORDER READS	RECEIVING REPORT READS	INVOICE READS

DISPOSITION OF DIFFERENCE

☐ RETURN OVERAGE
☐ ACCEPT OVERAGE
☐ CHANGE R/R TO READ _____
☐ ACCEPT SUBSTITUTE IN LIEU OF MATERIAL ORDERED
☐ RETURN FOR REPLACEMENT AS ORDERED
☐ RETAIN MATERIAL REQUEST SHIPMENT AS ORDERED
☐ OTHER _____

REMARKS

APPROVED FOR RECEIVING _____ DATE _____ REQUISITIONER'S APPROVAL _____ DATE _____

PURCHASING DEPARTMENT DISPOSITION

☒ CHANGE PURCHASE ORDER AND PASS AS INVOICED
☐ RETURN INVOICE TO VENDOR FOR CORRECTION
☐ FORMAL PURCHASE ORDER CHANGE NOTICE WILL BE ISSUED
☐ ADD TO PURCHASE ORDER
☐ RETURN TO VENDOR FOR CREDIT

Please add: $104.00 for testing, authorized by H. M. Wilber 740-14880-88-2501

BUYER S. M. Davis 11/5/86 DATE

OTHER AUTHORIZED SIGNATURE _____ DATE

MM 67 107

ACCOUNTS PAYABLE CONTROL - IDENTIFER

INTERNAL CHANGE NOTICE/EXCEPTION

ON DELIVERY - SUPPLEMENTAL RECEIVING REPORT - SUPPLEMENTAL REQUISITION

UCCNHT0000922

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

MONITORING AND SUPPORT LABORATORY

P O Box 165
Niagara Falls, N Y 14304
(716) 285 8883

SOLD TO
Umetco Minerals Corporation
Accounts Payable
P.O. Box 66
Niagara Falls, New York 14302

TERMS Net 30 Days

DATE	INVOICE No	CUSTOMER ORDER No	OUR JOB No
7/30/86	3521	P.O. #615-31628 B	BSY

PROFESSIONAL SERVICES:

Sampling and Analysis of Clay Cap
For EP Toxicity Metals
July 28, 1986 Report

TOTAL AMOUNT DUE $401.00

RECEIVED
AUG - 1 1986
INVOICING DEPT.

Approved for payment
D J Hansen 12/19/86

QUALITY ASSURANCE

UCCNHT0000923

ATTN OF ① ROUTING ② LOCATION ③ LOCATION LOCATION

RETURN TO DEPT LOCATION BY DATE

ORDER NUMBER 615-31628

R/R NUMBER

INVOICE DATE

INVOICE NUMBER

INVOICE AMOUNT

VENDOR Advanced Environmental Systems
4625 Royal Avenue
Niagara Falls, NY 14303

REQUISITIONER R. D. Legg

LOCATION OF MATERIAL

DIFFERENCE TO BE RECONCILED

ITEM	PURCHASE ORDER READS	RECEIVING REPORT READS	INVOICE READS

DISPOSITION OF DIFFERENCE

- ☐ RETURN OVERAGE
- ☐ ACCEPT OVERAGE
- ☐ CHANGE R/R TO READ
- ☐ ACCEPT SUBSTITUTE IN LIEU OF MATERIAL ORDERED
- ☐ RETURN FOR REPLACEMENT AS ORDERED
- ☐ RETAIN MATERIAL REQUEST SHIPMENT AS ORDERED
- ☐ OTHER

REMARKS

APPROVED FOR RECEIVING DATE REQUISITIONER'S APPROVAL DATE

PURCHASING DEPARTMENT DISPOSITION

- ☒ CHANGE PURCHASE ORDER AND PASS AS INVOICED
- ☐ RETURN INVOICE TO VENDOR FOR CORRECTION
- ☐ FORMAL PURCHASE ORDER CHANGE NOTICE WILL BE ISSUED
- ☐ ADD TO PURCHASE ORDER
- ☐ RETURN TO VENDOR FOR CREDIT

Please add the following:

$401.00 for additional work authorized by D. Hansen Charge: 34523-20301

BUYER S. M. Davis 11/6/86 DATE

OTHER AUTHORIZED SIGNATURE S M Davis 11/6/86 DATE

MM 67 107

ACCOUNTS PAYABLE CONTROL

INTERNAL CHANGE NOTICE/EXCEPTION ON DELIVERY SUPPLEMENTAL RECEIVING REPORT SUPPLEMENTAL REQUISITION

UCCNHT0000924

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

MAY 19 1986

May 12, 1986

Dr. F. J. Bradley
Principal Radiophysicist
New York State Department of Labor
Division of Safety and Health
Radiological Health Unit
One Main Street - Room 813
Brooklyn, NY 11201

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr. Bradley:

I have reviewed an April 9, 1986 letter from Mr. Edward G. DeLaney of the Office of Nuclear Energy in the Department of Energy advising me of Umetco's elimination from consideration for inclusion in the Formerly Utilized Site Remedial Action Program. Mr DeLaney references surveys and a report, both prepared for the Niagara Falls site in 1980, and states that, among other things, concentrations of thorium and uranium were found in soils at the site.

As you are aware, since 1982 we have been actively engaged in removing the residual radioactivity and to date have expended in excess of $500,000. In March of this year Mr. Robert Kelly of your department visited the site and obtained samples to verify that the cleanup was complete. We understand, pending the results of these analyses, the area in question will be restored to unrestricted use and our Radioactive Material License will be terminated We wish to thank you for the assistance you have provided in this regard

Very truly yours,

George P. Parker

George P. Parker
Manager
Employee Relationship
Safety, Health and Environmental
Affairs

cc: Mr. R. F. Kelly, DOL
Mr. W. Librizzi, USEPA
Mr. D. G. Millenbruch

Blind Copies:
Mr. R. G. Tisch
Mr. F. V. McMillen
Mr. C. T. Wentzel
Mr. D. J. Hansen

UCCNHT0000925

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

MAY 19 1986

May 15, 1986

Dr. F. J. Bradley
Principle Radiophysicist
New York State Department of Labor
Room 813
One Main Street
Brooklyn, NY 11202

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr. Bradley:

In our phone conversation of Tuesday, May 13 we discussed disposal of two low level radioactive materials that were discovered in a radiation survey of the Umetco property in Niagara Falls, NY. The first was illmenite sand (an iron titanium ore) that had been used to backfill a 10' x 10' concrete pit. The second was an isolated quantity of slag (calcium-aluminum oxide) from the furnacing of ferrovanadium. The illmenite sand was removed from the pit and currently is contained in 125 (one hundred twenty-five) 55-gallon drums. I would estimate total weight at approximately 40 to 50 tons. The slag is in lumps in a pile that I would estimate to contain 50 to 75 tons. Analyses of the materials are presented in the following Table 1.

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

	Analyses				
	URANIUM SERIES			THORIUM SERIES	
Description	Uranium µg/g	Th-230 pCi/g	Ra-226 pCi/g	Th-232 pCi/g	Th-228 pCi/g
Illmenite Sand - Top of Pit	28 9	12±2	19±2	16±2	17±2
Illmenite Sand - 7' in Pit	44.3	22±2	31±3	37±2	39±3
Dark Slag-Yard East of Fce. Bldg.	20.2	299±7	4.4±1.1	16±2	4±9
Light Slag-Yard East of Fce. Bldg.	18.6	466±9	7.0±1.4	37±3	14±2

Industrial Code Rule 38, Table 5 "Limits for Uncontrolled Areas" limits source material to 0.05 percent by weight (500 µg/g or 500 ppm). For Thorium 232 this converts to 55 pCi/g. The concentrations of Th-232 reported in picocurries in Table 1 were converted to µg/g and added to the weight of uranium to determine the total source material present. This is shown in Table 2

UCCNHT0000926

The gamma radiation measured at the surface during excavation of the pit and within the slag pile is also reported in Table 2.

TABLE 2

Weight of Source Material

Sample	Uranium µg/g	Th-232 µg/g	Total Source Material µg/g	Gamma Radiation µR/hr*
Illmenite-Top of Pile	28.9	145.5	174.4	170
Illmenite-7' In Pit	44.3	336.4	380.7	150
Dark Slag	20.2	145 5	165.7	150
Light Slag	18.6	336.4	355.0	200

*Ludlum Model 19 Micro R Meter - Reading at Surface

As we discussed the total source material in both materials is less than 500 µg/g, the limit for uncontrolled areas and the radiation is less than 250 µR, the limit for fixed surface contamination.

Although technically the material was not sufficiently radioactive to be controlled you convinced me that it was not a good idea to use it to fill a low area in the yard. If this were done then a rider would have to be appended to the lease that would restrict future building. Since this is not an attractive option I propose to dispose of both the slag and illmenite in a local hazardous waste repository.

Unless I misunderstood, you did not voice an objection to this during our phone conversation. Therefore, I plan to immediately begin the paper work to initiate this course of action. However I will not remove anything from the property before June to allow you time to reconsider. I will not expect to hear from you unless you disapprove.

I enjoyed talking to you on Monday and I want to thank you again for the assistance you provided.

Sincerely

Donald J. Hansen

D. J. Hansen
Assistant Director - Technology

cc: Messrs:
R. F. Kelly
R. G. Beverly
F. V. McMillen

Blind Copies: Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch
R. L. Miller
W. D. Smith
C. T. Wentzel

UCCNHT0000927

Niagara Falls, New York
July 13, 1983

Design Memo No. 1

File No. 11309

SUBJECT: Radiological Survey, Cleanup Options and Cost Estimates

DISTRIBUTION:

DANBURY, CT

W. G. Beattie
C. L. Dudnick
R. F. X. Fusaro
W. C. Thurber

GRAND JUNCTION, CO

R. G. Beverly
J. F. Frost
H. B. Rhodes

NIAGARA FALLS, NY

F. R. Angelori
D. R. Brosnahan
L. G. Evans
D. J. Hansen
T. J. Kagetsu
R. J. Klotzbach
D. H. McGuire
C. G. Richardson
P. J. Sitzenstatter
F. T. Temple
R. G. Woolery

UCCNHT0000928

UC 145 2

INTERNAL CORRESPONDENCE

METALS DIVISION • P O BOX 97, NIAGARA FALLS, NEW YORK

To (Name) Mr. R. J. Klotzbach
Division UCC-Metals Division
Location Niagara Falls, NY

Date July 13, 1983

Originating Dept Engineering Department

Answering letter date

Copy to See Attached Distribution

Subject Design Memo No. 1
Radiological Survey, Cleanup
Options and Cost Estimates
File No. 11309

Dear Bob:

Attached is Design Memo No. 1 "Radiological Survey, Cleanup Options and Cost Estimates".

Union Carbide Corporation presently is out of compliance with its New York Radioactive Materials License No. 950-0139 due to radioactive source concentrations in excess of 500 ppm behind Niagara Building 166, where access to employees is unrestricted. To identify the area and depth of contamination, the area south of Building 166 was surveyed by Mr. D. R. Brosnahan and the author. The results indicate that a soil volume of 5130 ft.^{3} must be restricted or removed for compliance with New York State regulations. An additional 1700 ft.^{3} must be removed for delicensing and unrestricted use.

The following five alternatives have been considered and cost estimates prepared as part of the design memo.

Alternative	Description	Cost
1	Fence in Place	$ 10,000
2	Remove & Fence on Elkem Property	65,000
3	Remove & Fence on UCC Property	120,000
4	Remove & Bury - UCC Niagara	175,000
5	Remove & Ship to a Repository	335,000

The recommendation is to proceed with Alternative No. 3, based primarily on the condition that the property will be deeded to Elkem Metals Company. The material remains available for implementing Alternative No. 4, "Bury on UCC Property", or Alternative No. 5, "Ship to an Approved Repository", in the future. An R & D effort can also proceed to investigate ways to reduce the volume. Far less expense is required for the alternative to "Fence in Place", which is recommended if property ownership does not change.

L. G. Evans

LGE/dac
Attachments

UCCNHT0000929

Union Carbide Corporation
Metals Division
Technology Department - Engineering
Niagara Falls, New York

File No. 11309

DESIGN MEMORANDUM
SPONSOR: T. J. KAGETSU

PROJECT: Soil Decontamination - South of Building 166, Niagara

BY: L. G. Evans/D. R. Brosnahan

DATE: May 20, 1983

Design Memo No. 1
Revision 0
Subject: Radiological Survey, Cleanup Options and Cost Estimates

1.0 INTRODUCTION

1.1 Scope

To include an engineering evaluation of the alternatives available for disposal of the radioactive contaminants from areas south of Building 166.

1.2 History

The U. S. Department of Energy performed surveys in 1976 to assess the radiological status of facilities utilized under Manhattan Engineer District contract during the period 1943-1946. UCC's Metals Division at Niagara was one of those sites. They discovered contamination South of Building 166 and notified Union Carbide and New York State.

As a result, New York State Department of Labor performed a follow up survey on December 1, 1981 and cited UCC for violation of its New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access to employees.

Later, thorium was found to be a major radioactive contaminate indicating that the radiation is unrelated to the Manhattan Engineer Project.

This problem is further complicated by the divestiture of the ferroalloys business and anticipated eventual ownership of the property by Elkem Metals Company.

UCCNHT0000930

2.0 DISCUSSION

2.1 General

All phases of a waste clean up project are directly affected by the quantity of waste to be handled. Therefore, the first priority was to develop a reasonably good estimate of the volume.

A gamma radiation survey was performed over the entire fenced area behind Building 166 to determine the area of involvement excluding areas covered by asphalt or concrete. Soil samples were obtained from several areas and analyzed for % U_3O_8 and % ThO_2. Samples were extracted at various levels in five holes to determine depth of involvement. Samples were also taken to obtain a rough correlation between gamma readings and uranium/thorium content.

2.2 Cleanup Criteria

2.2.1 General

The cleanup criteria is dependent upon the use or future use of the property. New York State Regulations would apply with continuance of license. NRC Regulations would apply for delicensing.

2.2.2 New York State Regulations

NYS requires restriction of access to areas where the radioactive contaminants exceed 500 ppm of source materials. Below 500 ppm radioactive materials can be stored with unrestricted access.

To facilitate a comparison of this limit to the NRC limits a conversion to pCi/gm is made assuming a 2:1 (thorium:uranium) ratio. (See calculations attached).

These limits for unrestricted access are the total of the following:

$\leq$36 pCi/gm Thorium
$\leq$57 pCi/gm Uranium

These limits are used only for determination of compliance with our license for restricted or unrestricted access.

If the State is approached by UCC for criteria for delicensing they probably will require compliance with NRC Regulations due to Agreement State principles.

2.2.3 NRC Regulations

The NRC proposed regulations[1] provide four options for burial and delicensing. A fifth option deals with continuing the license.

[1] Federal Register/Vol. 46 No. 205/Friday Oct. 23, 1981, Notices (attached).

UCCNHT0000931

Option 1 $\leq$10 pCi/gm Thorium and/or 10 pCi/gm Uranium - unrestricted use and delicensing. (Burial not required).

Option 2&3 $\leq$50 pCi/gm Thorium and 40 pCi/gm Uranium - deed amendment and delicense, restricted access by burial with minimum four foot cover. No residential building. Option 2 specifies thorium and Option 3 uranium.

Option 4 $\leq$500 pCi/gm Thorium and 200 pCi/gm Uranium - much more restricted use of the land than Options 2 and 3. No excavation or building.

Option 5 of the Regulation deals with on-site storage of higher concentrations pending the availability of space at an approved repository. No burial is permitted.

2.3 Radiological Survey

2.3.1 Gamma Survey

The survey was performed with a portable gamma ray spectrometer, Model GR-410 manufactured by Geometries Exploranium and detector Model No. GPX-21 employing a sodium iodide thallium activated crystal as a scintillation phosphor.

All of the area south of Building 166 and bounded by the chain link fence was surveyed except areas covered by concrete or asphalt. The actual area surveyed was approximately 26,000 ft.^{2}. Concrete and asphalt cover 63,000 ft.^{2}.

A 10' x 10' grid was established and readings were taken at the intersection points. Extra readings were taken along the west track center line and near the edge of the concrete on both sides.

A resurvey of a 400 ft.^{2} area was done using a 2' x 2' grid to assess the reliability of the general survey. The location of this area is shown on Drawing SF-7902 as Detail 1. The data are also displayed in Figure I (attached).

All gamma meter readings were reduced to the number of times background and are reported on Drawing SF-7902.

2.3.2 Analytical Survey

Soil Samples - The physical samples were essentially 'grab' samples. No systematic sampling technique was used. The analytical work was performed by Elkem's laboratory at Niagara Falls. The results are shown in Table III (attached) and on Drawing SF-7902.

The chemical analyses of the surface soil samples ranged from 0.006% to 0.40% ThO_2 and from 0.002% to 0.17% U_3O_8.

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2.4 Survey vs Regulations

The following Table I is a comparison of the surface soil sample analyses converted to pCi/g and the gamma radiation readings (times background). Below the table is a guide comparing gamma readings to cleanup or storage criteria. The gamma range is estimated based on the analyses of Table III (attached).

TABLE I

GAMMA X BKG	URANIUM pCi/gm	THORIUM pCi/gm	SAMPLE NO.	CONTAMINANTS PPM
1	3	2	11	20
3	11	11	9	131
5	6	6	8	70
6	11	19	2	210
8	8	22	5	228
9	14	40	1	401
12	26	61	3	650
13	8	12	10	140
17	26	66	4	674
21	42	105	12	1094
26	57	164	14	1664
33	82	201	13	2091
83	466	382	5	4957

GAMMA RANGE	NYS/NRC REQUIREMENTS
1 - 5	Will meet NRC proposed regulations for delicensing and unrestricted land use. NRC Option 1 (Sec. 2.3.3) - no burial required.
6 - 9	NYS allows unrestricted access and continue license. NRC allows burial and delicensing. Options 2 and 3 - burial required.
10 - 60*	NYS requires restricted access. NRC allows burial and delicensing - Option 4.
>60	NYS requires restricted access. NRC requires restricted access and storage until space is available at an approved repository, e.g., Barnwell, SC.

*Interpolated

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2.5 Contamination Volume

2.5.1 General

The gamma survey, surface and subsurface soil analyses and the guide above are combined to estimate the quantity of material of each class in each area.

The depth of contamination varies throughout the area of involvement, but is generally less than six inches. However, to expedite cleanup, the rails and ties must be removed, requiring a minimum removal depth of eight inches.

2.5.2 High Concentration Area

This area contains material which exceeds NRC burial limits and must be disposed of (eventually) at an approved repository. Gamma readings are above 60 times background. This area is the most heavily contaminated both in radiation level and depth of contamination. Contamination can be found 12 inches below the surface.

Volume = 400 $ft.^2$ x 1 ft. deep = 400 $ft.^3$

2.5.3 Medium Concentration Area

This area contains material which requires restricted access. Gamma readings are 10-60 times background.

Volume = 6400 $ft.^2$ x 2/3 ft. deep = 4267 $ft.^{3*}$

*Approximately 30% of the area found to be low concentration on the general survey (10' x 10' Grid) was found to be medium concentration upon resurvey (2' x 2' Grid). See Drawing SF-7902 or Figure I. This volume is included.

2.5.4 Low Concentration Area

This area contains material which must be removed to delicense but which can remain with unrestricted access under current license. Gamma readings are 6-9 times background.

Volume = 2200 $ft.^2$ x 2/3 ft. deep = 1467 $ft.^3$

2.5.5 Summary

The following summarizes the above volumes including a 15 percent contingency:

High Concentration	-	230 $ft.^3$
Medium Concentration	-	4900 $ft.^3$
Low Concentration	-	1700 $ft.^3$
TOTAL		6830 $ft.^3$

UCCNHT0000934

NOTE: No exploration was done beneath any of the concrete or asphalt pads. The depth of involvement and the location of contamination along the railroad tracks indicates the radioactive materials were spilled during handling from rail cars and contamination under the pads is unlikely.

3.0 DESCRIPTION OF CLEANUP ALTERNATIVES

3.1 Summary

Five cleanup alternatives are considered in this memorandum. The major factors influencing final selection of an alternative are: term of solution (short or long), delicensing, property transfer to Elkem, compliance with NYS Regulations, and cost.

Table II below summarizes the alternatives opposite these factors.

TABLE II

ALTER-NATIVE NO.	DESCRIPTION	TERM	DELICENSE*	TRANSFER PROPERTY TO ELKEM	COST $000
1	Fence in place	Short	No	No	10
2	Remove & fence on Elkem Property	Short	No	No	65
3	Remove & fence on UCC Property	Medium	No	Yes	120**
4	Remove & bury - UCC Niagara	Long	Yes	Yes	175
5	Remove & ship to repository	Permanent	Yes	Yes	335

* Assumes that this is the only contaminated area in the plant.

**If a concrete pad is available the cost would be $90,000.

3.2 Alternative No. 1 - Fence in Place

Simply enclose the contaminated area thus restricting access.

Requirements - 400 feet of fence.

Advantages - Quick solution to come into compliance with NYS.
- Minimum cost.

Disadvantages - Contamination remains requiring future action.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

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3.3 Alternative No. 2 - Remove and Fence on Elkem Property

As mentioned earlier, much of the area South of Building 166 is covered with concrete and asphalt. The material (soil) could be removed and stored on an existing pad in the Southeast corner of the property. The pad and a plastic covering would provide stability and a fence would provide restricted access until final disposal.

Requirements
- Removal of railroad tracks.
- Disposal of scrap and debris**.
- 100 ft. fence required - S & E corner site.
- Concrete/asphalt pad - already available.
- Replacement of railroad track.

Advantages
- Consolidation of contaminants.
- Access can be restricted.
- This work is required for ultimate disposal in any event.

Disadvantages
- Short term solution.
- 1/10 acres of land would not be available for Elkem use.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

**This includes
- Three flat bed railroad cars loaded with induction furnaces.
- Stacks of deteriorating 55 gallon drums.
- Stacked wooden boxes containing steel shot, etc.
- Numerous 5' x 5' x 5' steel boxes.
- Various ladles, furnaces, carbon electrodes, etc.

3.4 Alternative No. 3 - Remove and Fence on UCC Property

The work required here is essentially the same as in 3.3 above. Costs increase and extra care must be taken to avoid contamination of other areas of the plant. However, the property can then be released for transfer to Elkem. An area in the Niagara Plant has been designated by plant personnel for possible use.

Requirement
- Same as 3.3 except more fence and a new concrete pad may be required.

Advantage
- Same as 3.3 except it has the additional advantage of not interfering with Elkem property use. Property can be transferred to Elkem.

Disadvantage
- Medium term solution.

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3.5 Alternative No. 4 - Remove and Bury - UCC Niagara

Burial on Union Carbide owned property was explored for the Marietta TaCb cleanup project. The main problems are: finding a suitable burial site, getting State and Local approval, future use or transfer of the burial site is restricted, and long term monitoring of the site is necessary.

Requirements
- Remove and replace railroad tracks.
- Dispose of scrap and debris at approved repository.
- A suitable burial site.
- Containers (55 gallon drums) may be required.
- Dispose of 400 $ft.^3$ soil at approved repository.

Advantages
- Long term solution.
- Delicense.

Disadvantages
- Use of the burial site will be restricted - no construction.

3.6 Alternative No. 5 - Remove and Ship to Repository

This alternative is permanent. Once the material is received at the repository, the host state becomes owner and the licensee's accountability ends. However, this is the most expensive alternative.

Requirements
- Remove and replace railroad tracks.
- Disposal of scrap and debris at approved repository.
- Containers.
- Loading system.

Advantage
- Permanent solution.

Disadvantage
- Highest cost.

3.7 Remove and Ship to Uravan

This alternative was selected for the TaCb residue cleanup project in Marietta. The uranium content of the TaCb residue was 0.13% U_3O_8 and processing to recover uranium values was feasible and acceptable to the Colorado Department of Health. The material (soil) analyses at Niagara indicate 0.01% U_3O_8. Therefore, transfer to Uravan cannot be considered.

4.0 COST ESTIMATES

As discussed in Section 2.4, the radiological survey indicates three levels of contamination above NRC delicensing limits. They are: 6-9 x BKG (background), 10-60 x BKG and greater than 60 x BKG. Volumes were calculated

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for each area with the thought that some alternatives would not require the removal of the combined total volume but only those areas with the highest concentrations. However, to simplify costings and cost comparison, only the total volume of Section 2.5.5 is considered. All medium and high concentration material requires fencing or removal. The low concentration material adds an additional 25% to the volume, but adds only 10% to the cost. The volume for cost estimating is then 6830 ft.^{3}.

Cost Estimates No. 6342 through 6346 are attached.

Cost Estimate No. 6342	Fence in Place	$ 10,000
Cost Estimate No. 6343	Remove and Fence - Elkem	$ 65,000
Cost Estimate No. 6344	Remove and Fence - UCC Niagara	$120,000
Cost Estimate No. 6345	Remove and Bury - UCC Niagara	$175,000
Cost Estimate No. 6346	Remove and Ship to Barnwell	$335,000

Note: Costs do not reflect removal of debris which is assumed to be Elkem's accountability.

5.0 RECOMMENDATIONS

Removal and relocation of the contaminated soil to the Niagara plant as described in Alternative No. 3 is recommended based on the following:

1. The property will be deeded to Elkem Metals Company.

2. Any restriction to the use of the property behind Building 166, or any potential cleanup liability to Elkem, is unacceptable.

3. EPA and NRC regulatory uncertainties exist concerning burial. (Perpetual maintenance costs are not included in the estimate for Alternative No. 4.) Burial also makes the material unavailable for disposal at an approved repository as discussed below. New York state may ban all burial within the state in the near future.

4. Disposal at Barnwell, SC is too costly and there is reason to believe that a new repository will be opened in the Northeast by 1986 which may reduce the cost of that option.

Any remedial effort must be approved by the State of New York, Department of Labor. For the material to be left on-site, Radioactive Materials License No. 950-0139 must be amended. This amendment or some form of approval should be received prior to the beginning of any cleanup.

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Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6342

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - FENCE IN PLACE (ALTERNATIVE 1)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	MATERIAL				
101	400' Fence (6 ft.) Along 1100N	-	8	8	-
	TOTAL		8	8	-
	TOTAL DIRECTS		8	8	-
	ENGINEERING			-	-
	CONTINGENCY			2	
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			-	-
	TOTAL			10	-

FRANGELORI/dac

cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000939

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6343

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE ELKEM (ALTERNATIVE 2)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3}	-	5	-	5
102	Fence 6 ft. - 100 ft.	-	2	-	2
	TOTAL		7		7
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
	TOTAL DIRECTS		40	23	17
	ENGINEERING			7	5
	CONTINGENCY			8	3
	RADIOLOGIST/HEALTH PHYSICS			2	-
	TOTAL			40	25

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000940

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6344

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

‹FEASIBILITY STUDY COST ESTIMATE›
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE - UCC NIAGARA (ALTERNATIVE 3)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Concrete Pad - 60 cy.	-	30	30	-
103	Fence 6 ft. - 200 ft.	-	4	4	-
	TOTAL		44	34	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	-
	TOTAL DIRECTS		77	57	20
	ENGINEERING			9	6
	CONTINGENCY			10	2
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			14	2
	TOTAL			90	30

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000941

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6345

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND BURY - UCC NIAGARA (ALTERNATIVE 4)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Clay Lined Pit w/Drain System 40 ft.^{2} x 5 ft.	-	15	15	-
103	Clay Cap	-	15	15	-
	TOTAL		40	30	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation	-	1	-	1
302	Burial Fee (200 ft.^{3})	1	8	-	9
	TOTAL	1	9		10
	TOTAL DIRECTS	1	82	53	30
	ENGINEERING			8	8
	CONTINGENCY			15	5
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	SITE SELECTION			35	
	TOTAL			125	50

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0000942

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6346

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND SHIP TO BARNWELL, SC (ALTERNATIVE 5)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove Soil 7000 ft.^{3} (haul)	-	5	-	5
102	Containers (80 boxes - 100 ft.^{3})	20	-	-	20
103	Loading Trucks (incl. Pallets, etc.)	5	4	-	9
	TOTAL	25	9		34
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation 1000_3$(10 loads)	-	10	-	10
302	Burial Fee (8000 ft.^{3} incl Container)	-	160	-	160
	TOTAL		170		170
	TOTAL DIRECTS	25	212	23	214
	ENGINEERING			5	28
	CONTINGENCY			3	46
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	TOTAL			45	290

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

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CALCULATIONS

New York State regulations require that access be restricted to areas where the source material exceeds 500 ppm. For the purpose of comparison with NRC regulations a Thorium/Uranium ratio of 2:1 is assumed.

Therefore, the maximum activities for unrestricted access are:

NYS maximum Thorium activity equals:

$$330 \text{ parts/million} \times 1.09 \times 10^5 \text{ pCi/gm} = 36 \text{ pCi/gm}$$

NYS maximum Uranium activity equals:

$$170 \text{ parts/million} \times 3.33 \times 10^5 \text{ pCi/gm} = 57 \text{ pCi/gm}$$

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The Assistant Secretary finds that good cause exists for not publishing the supplement to the Puerto Rico State Plan as a proposed change and making the Regional Administrator's approval effective upon publication for the following reasons:

1. The standards are identical to the Federal standards which were promulgated in accordance with Federal law meeting requirements for public participation.

2. The standards were adopted in accordance with the procedural requirement of State Law and further participation would be unnecessary.

The decision is effective October 23, 1981.

(Sec. 18 Pub. L. 91-596, 84 Stat. 1608 (29 U.S.C. 667))

Signed at New York City, New York, this 15th day of June 1981.

Roger A. Clark,

Regional Administrator.

[FR Doc. 81-30745 Filed 10-22-81 8:45 am]

BILLING CODE 4510-26-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards, Subcommittee on Callaway Plant; Location Change

The ACRS Subcommittee on Callaway Plant will hold a meeting on November 4 and 5, 1981, at the HOLIDAY INN-WEST, 1900 I-70 Drive Southwest, Columbia, MO instead of the Hilton Inn.

Notice of this meeting was published in the Federal Register on October 19, 1981 (46 FR 51329), and all other items remain the same except for the location change as indicated above.

Dated: October 19, 1981.

John C. Hoyle,

Advisory Committee, Management Officer.

[FR Doc. 81-30733 Filed 10-22-81 8:45 am]

BILLING CODE 7590-01-M

Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Discussion of options for NRC approval of applications for disposal or onsite storage of thorium or uranium wastes; interim use and public comment.

SUMMARY: This notice discusses five options for NRC approval of disposal or onsite storage or thorium or uranium wastes from past nuclear operations. The options are contained in a Branch Technical Position for administration by the Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

DATES: Comments on the options for disposal or onsite storage of thorium or uranium are encouraged. Such comments will be considered in any subsequent revision of the Branch Technical Position. Comments are due December 22, 1981.

Note.—Comments received after the expiration date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments filed on or before that date.

FOR FURTHER INFORMATION CONTACT: Ralph G. Page, Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, telephone 301-427-4309.

SUPPLEMENTARY INFORMATION:

I. Introduction

Some of the sites formerly used for processing thorium and uranium are known today to be contaminated with residual radioactive materials. Some are currently covered by NRC licenses. Others were once licensed, but the licenses to possess and use material have expired. In many cases, the total amount of contaminated soil is large, but the activity concentrations of radioactive materials are believed sufficiently low to justify their disposal on privately owned lands or storage onsite rather than their transport to a licensed radioactive materials disposal (commercial) site. In many instances packaging and transporting these wastes to a licensed disposal site would be too costly and not justified from the standpoints of risk to the public health or cost-benefit. Furthermore, because of the total volume of these wastes, limited commercial waste disposal capacity, and restrictions placed on receipt of long-lived wastes at commercial sites, it is not presently feasible to dispose of these wastes at commercial low-level waste disposal sites.

Effective January 28, 1981, NRC regulations in 10 CFR 20, "Standards for Protection Against Radiation", were amended (45 FR 71761-71762) to delete § 20.304 which provided general authority for disposal of radioactive materials by burial in soil. Under the amended regulations, licensees must apply for and obtain specific NRC approval to dispose of radioactive materials in this manner under the provisions of 10 CFR 20.302. A case-by-case review was believed needed to assure that burial of radioactive wastes would not present an unreasonable health hazard at some future date.

The deleted provisions of § 20.304 previously permitted burial of up to 100 millicuries of thorium or natural uranium at any one time, with a yearly limitation of 12 burials for each type of material at each site. The only disposal standards specified were (1) burial at a minimum depth of four feet, and (2) successive burials separated by at least six feet. Thus a total of 1.2 curies of these materials were permitted to be disposed of each year by burial in a 12 foot by 18 foot or larger plot of ground.

Under the amended regulations, it is incumbent on an applicant who wants to bury radioactive wastes to demonstrate that local land burial is preferable to other disposal alternatives. The evaluation of the application takes into account the following information:

Types and quantities of material to be buried
Packaging of waste
Burial location
Characteristics of burial site
Depth of burial
Access restrictions to disposal site
Radiation safety procedures during disposal operations
Recordkeeping
Local burial restrictions, if any

For applications involving disposal of soils contaminated with low level concentrations of thorium and uranium (other than concentrations not exceeding EPA cleanup standards), the matters of principal importance are:

Concentrations of thorium and uranium (either in secular equilibrium with their daughters or without daughters present)
Volume of contaminated soil
Costs for offsite and onsite disposal
Availability of offsite burial space
Disposal site characteristics
Depth of burial and accessibility of buried wastes
State and local government views

II. Branch Technical Position

There are five acceptable options for disposal or onsite storage of thorium and uranium contaminated wastes. Applications for disposal or storage will be approved if the guidelines discussed under any option are met. Applications for other methods of disposal may be submitted and these will be evaluated on their own merits.

1. Disposal of acceptably low concentrations (which meet EPA cleanup standards) of natural thorium with daughters in secular equilibrium, depleted or enriched uranium, and

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uranium ores with daughters in secular equilibrium with no restriction on burial me[illegible]

[illegible]his option, the concentrations of natural thorium and depleted or enriched uranium wastes are set sufficiently low that no member of the public is expected to receive a radiation dose commitment from the disposed materials in excess of 1 millirad per year to the lung or 3 millirads per year to the bone from inhalation and ingestion, under any foreseeable use of the material or property. These radiation dose guidelines were recommened by the Environmental Protection Agency (EPA) for protection against transuranium elements present in the environment as a result of unplanned contamination (42 FR 60956–60959). In addition, the concentrations are sufficiently low so that no individual may receive an external dose in excess of 10 microroentgens per hour above background. This is compatible with guidelines EPA proposed as cleanup standards for inactive uranium processing sites (46 FR 2556–2563).

For natural uranium ores having daughters in equilibrium, the concentration limit is equal to that set by the EPA (46 FR 2556–2563) for radium-226 (i.e., 5 pCi/gm, including ba[illegible]ound) and its decay products. [illegible]concentrations specified below are believed appropriate to apply. It is expected, however, that currently licensed operations will be conducted in such a manner as to minimize the possibility of soil contamination and when such occurs the contamination will be reduced to levels as low as reasonably achievable.

Kind of material	Concentration (pCi/gm)
Natural thorium (Th-232 plus Th-228) if all daughters are present and in equilibrium	10
Depleted Uranium	35
Enriched Uranium	30
Natural Uranium Ores (U-238 plus U-234) if all daughters are present and in equilibrium	10

The analysis upon which the Branch Technical Position is based is available for inspection at the Commission's Public Document Room at 1717 H St., N.W., Washington, D.C.

The concentrations specified under this option may be compared with naturally occurring thorium and uranium ore concentrations of 1.3 pCi/gm in ig[illegible]ous rock and uranium c[illegible]ntrations of 120 pCi/gm in Florida p[illegible]sphate rock and 50–80 pCi/gm in Tennessee bituminous shale. Concentration limits for natural thorium and natural uranium ore wastes containing daughters not at secular equilibrium can be calculated on a case-by-case basis using the applicable isotopic activities data.

2. Disposal of certain low concentrations of natural thorium with daughters in secular equilibrium and depleted or enriched uranium with no daughters present when buried under prescribed conditions with no subsequent land use restrictions and no continuing NRC licensing of the material.

Under this option the concentrations of natural thorium and uranium are set sufficiently low so that no member of the public will receive a radiation dose exceeding those discussed under option 1 when the wastes are buried in an approved manner absent intrusion into the burial grounds. This option will require establishing prescribed conditions for disposal in the license, such as depth and distribution of material, to minimize the likelihood of intrusion. Burial will be permitted only if it can be demonstrated that the buried materials will be stabilized in place and not be transported away from the site.

Acceptability of the site for disposal will depend on topographical, geological, hydrological and meteorological characteristics of the site. At a minimum, burial depth will be at least four feet below the surface. In the event that there is an intrusion into the burial ground, no member of the public will likely receive a dose in excess fo 170 millirems to a critical organ. An average dose not exceeding 170 millirems to the whole body for all members of a general population is recommended by international and national radiation expert bodies to limit population doses. With respect to limiting doses to individual body organs, the concentrations are sufficiently low that no individual will receive a dose in excess of 170 millirems to any organ from exposure to natural thorium, depleted uranium or enriched uranium.

The average activity concentration of radioactive material that may be buried under this option in the case of natural thorium (Th-232 plus Th-228) is 50 pCi/gm, if all daughters are present and in equilibrium; for enriched uranium it is 100 pCi/gm if the uranium is soluble and 250 pCi/gm if insoluble; for depleted uranium it is 100 pCi/gm if the uranium is soluble and 300 pCi/gm if insoluble. Natural uranium ores containing radium 226 and its daughters are not included under this option, because of possible radon 222 emanations and resultant higher than acceptable exposure of individuals in private residences if houses were built over buried materials.

3. Disposal of low concentrations of natural uranium ores, with all daughters in equilibrium, when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the specified land contains buried radioactive materials and are conditioned in a manner acceptable under state law to impose a covenant running with the land that the specified land may not be used for residential building. (There is no continuing NRC licensing of the material.)

Disposal will be approved if the burial criteria outlined in option 2 (including burial at a minimum of 4 feet) are met. Depending upon local soil characteristics, burials at depths greater than 4 feet may be required. In order to assure protection against radon 222 releases (daughter in decay chain of uranium 238 and uranium 234), it is necessary that the recorded title documents be amended to state in the permanent land records that no residential building should be permitted over specified areas of land where natural uranium ore residues (U-238 plus U-234) in concentrations exceeding 10 pCi/gm has been buried. Industrial building is acceptable so long as the concentration of buried material does not exceed 40 pCi/gm of uranium (i.e., Ra-226 shall not exceed 20 pCi/gm).

4. Disposal of land-use-limited concentrations of natural thorium or natural uranium with daughters in secular equilibrium and depleted or enriched uranium without daughters present when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the land contains buried radioactive material and are conditioned in a manner acceptable under state law to impose a covenant running with land that the land (1) may not be excavated below stated depths in specified areas of land unless cleared by appropriate health authorities, (2) may not be used for residential or industrial structures over specified areas where radioactive materials in concentrations higher than specified in options 2 and 3 are buried, and (3) may not be used for agricultural purposes in the specified areas. (There is no continuing NRC licensing of the disposal site.)

Under this option, conditions of burial will be such that no member of the public will receive radiation doses in excess of those discussed under option 1 absent intrusion into the burial ground. Criteria for disposal under these conditions is predicated upon the assumption that intentional intrusion is less likely to occur if a warning is given

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in land documents of record not to excavate below burial depths in specified areas of land without clearance by health authorities, not to construct residential or industrial building on the site, and not to use specified areas of land for agricultural purposes. Because of this, we believe it appropriate to apply a maximum critical organ exposure limit of 500 millirems per year to thorium and uranium buried under this restriction instead of 170 millirems as used in options 2 and 3. In addition, any exposure to such materials is likely to be more transient than assumed (essentially continual exposure) under those options. These two factors combine to increase the activity concentration limits calculated under option 2 by about 10. Thus, the average concentration that may be buried under this option for thorium (Th-232 plus Th-228) is 500 pCi/gm if all daughters are present and in equilibrium, for enriched uranium it is 1000 pCi/gm if the uranium is soluble and 2500 pCi/gm if insoluble, and for depleted uranium it is 1000 pCi/gm if the uranium is soluble and 3000 pCi/gm if insoluble.

With respect to natural uranium with daughters present and in equilibrium, the concentration that may be buried under this option is 200 pCi/gm of U-238 plus U-234, i.e., 100 pCi/gm Ra-226. This concentration is based on a limited exposure of 2.4 hours per day to limit the radon dose to less than 0.5 working level month (WLM) which is equivalent to continuous exposure to 0.02 working level (WL). Depending upon local soil characteristics, burials at depths greater than 4 feet may be required.

SUMMARY OF MAXIMUM CONCENTRATIONS PERMITTED UNDER DISPOSAL OPTIONS

Kind of Material	Disposal Options			
	1[1]	2[2]	3[3]	4[4]
Natural Thorium (Th-232 + Th-228) with daughters present and in equilibrium	10	50	—	500
Natural Uranium (U-238 + U-234) with daughters present and in equilibrium	10	—	40	200
Depleted Uranium:				
*Soluble	35	100	—	1,000
*Insoluble	35	300	—	3,000
Enriched Uranium:				
*Soluble	30	100	—	1,000
*Insoluble	30	250	—	2,500

[1] Based on EPA cleanup standards.
[2] Concentrations based on limiting individual doses to 170 mrem/yr.
[3] Concentration based on limiting equivalent exposure to 0.02 working level or less.
[4] Concentrations based on limiting individual doses to 500 mrem/yr and in case of natural uranium, limiting exposure to 0.02 working level or less.

5. Storage of licensed concentrations of thorium and uranium onsite pending the availability of an appropriate disposal site.

When concentrations exceed those specified in option 4, long term disposal other than at a licensed disposal site will not normally be a viable option under the provisions of 10 CFR 20.302. In such cases, the thorium and uranium may be permitted to be stored onsite under an NRC license until a suitable method of disposal is found. License conditions will require that radiation doses not exceed those specified in 10 CFR Part 20 and be maintained as low as reasonably achievable.

Before approving an application to dispose of thorium or uranium under options 2, 3, or 4, NRC will solicit the view of appropriate State health officials within the State in which the disposal would be made.

Dated at Silver Spring, Maryland this 19th day of October, 1981.

Richard E. Cunningham,

Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards

[FR Doc. 81-30808 Filed 10-22-81 8:45 am]

BILLING CODE 7590-01-M

OFFICE OF PERSONNEL MANAGEMENT

Postponement of Application Deadline for Fund-Raising Privileges Among Federal Employees by Private Voluntary Organizations

Section 5 43 of the "Manual on Fund-Raising Within the Federal Service for Voluntary Health and Welfare Agencies" sets December 1 of each year as the deadline by which national voluntary agencies must submit applications for participation in the Combined Federal Campaign (CFC) to be conducted in the fall of the following year. This year's deadline is being postponed from December 1, 1981, to February 1, 1982. In June 1981, the U.S. Office of Personnel Management (OPM) announced that the eligibility criteria for participation in the 1982-83 CFC are being reviewed. The deadline date is being postponed to avoid national voluntary agencies having to revise their applications to meet eligibility criteria which may be changed.

Donald J. Devine,

Director.

[FR Doc. 81-30730 Filed 10-22-81 8:45 am]

BILLING CODE 6325-01-M

OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

Resolution of Complaint of Price-Undercutting of Subsidized Cheese Imports

On October 1, 1981, the United States Trade Representative received a letter from the Secretary of Agriculture informing him of the Secretary's finding that imported Grade A Swiss type cheese produced in Finland has been offered for sale in the United States at duty-paid wholesale prices which are five cents per pound less than the domestic wholesale market price of similar cheese produced in the United States.

In accordance with Section 702(c)(2) of the Trade Agreements Act of 1979 (the Act) (19 U.S.C. 1202 note), the Office of the United States Trade Representative notified Finland of the price undercutting determination made by the Secretary of Agriculture, requested that corrective action be taken, and asked for appropriate assurances concerning the commitments made in the Arrangement Between the United States and Finland Concerning Cheese.

On October 14, 1981, Finland notified the United States Trade Representative that measures have been taken to ensure that the duty-paid wholesale price of imported Grade A Swiss type cheese produced in Finland will not be less than the domestic wholesale market price of similar cheese produced in the United States. In addition, Finland gave assurance that it will respect the price commitments in the Arrangement. Since the above notification by Finland has occurred within the 15-day period provided in Section 702(c)(3) of the Act, the United States Trade Representative has notified the Secretary of Agriculture of his belief that no further action is required.

William E. Brock,

United States Trade Representative

[FR Doc. 81-30684 Filed 10-22-81 8:45 am]

BILLING CODE 3190-01-M

SECURITIES AND EXCHANGE COMMISSION

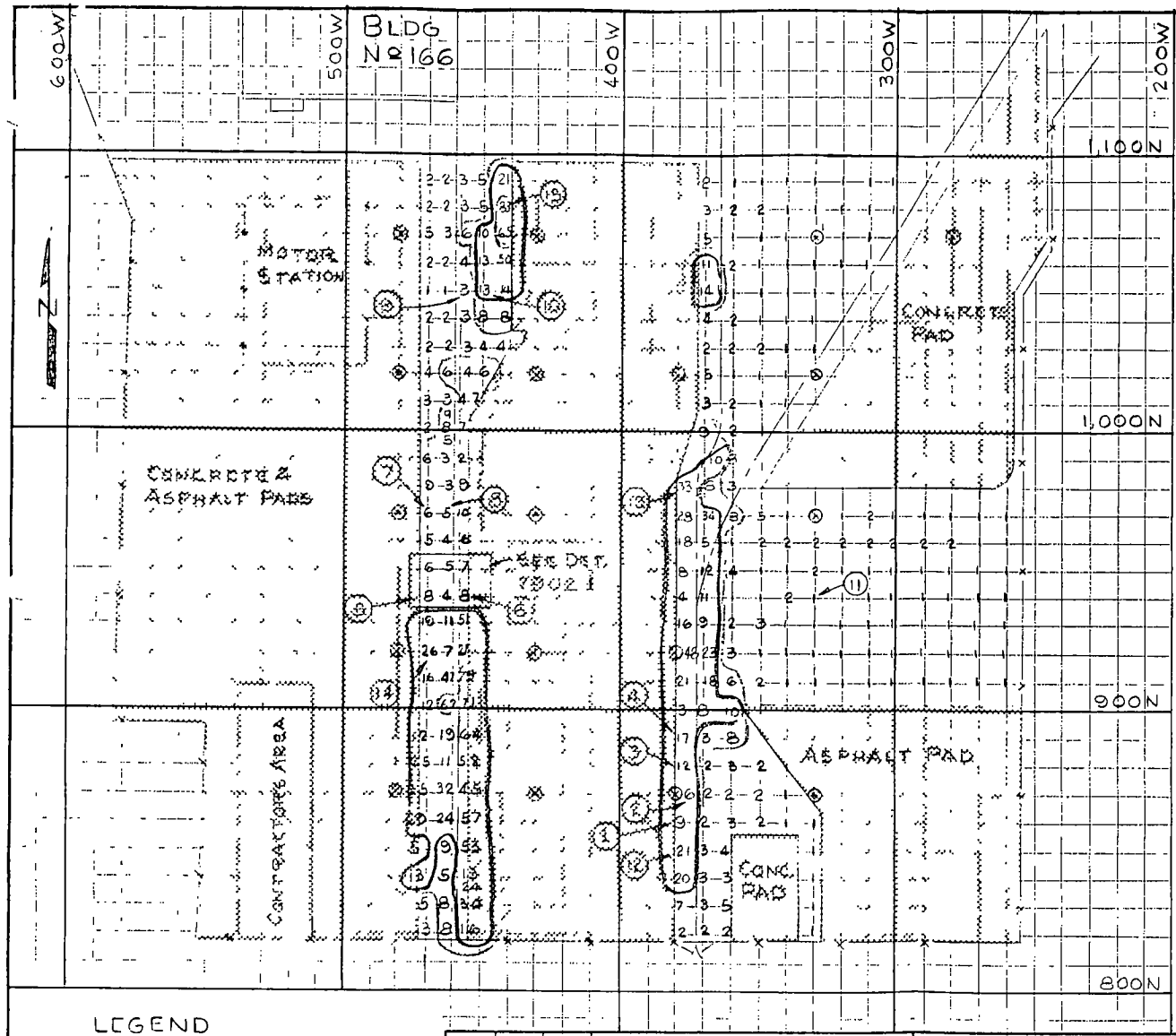
[Release No. 22236, 70-6650]

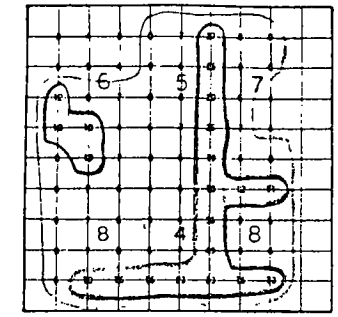
Arkansas Power & Light Co.; Proposed Issuance and Sale of First Mortgage Bonds

October 19, 1981.

Arkansas Power & Light Company

UCCNHT0000947





ENLARGED DETAIL 7902 I
2 x 2 GRID

SAMPLE NO	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm DEPTH IN INCHES 0	3	6	9	12	15	21	24	28	GAMMA 1 METER SURFACE
1	14/40									9
2	11/19									6
3	26/61									12
4	26/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/1		<3/2					33
14		57/144		<3/9		<3/3	7/2	3/3		26
15	466/382		27/7	30/12		30/5		23/3		83

NEW YORK STATE REGULATIONS LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm (See report for calc.)
THORIUM 57 pCi/gm

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

> 1 Times Background
> 5 Times Background
> 9 Times Background
> 60 Time Background

LEGEND

- SURVEY STAKES
- SAMPLE NO
READINGS - NO TIMES BACKGROUND @ SURFACE

REV	DATE	BY	DESCRIPTION

TITLE
RADIOLOGICAL SURVEY - BALL FIELD AREA

UNION CARBIDE CORPORATION
METALS DIVISION

PLANT	BLDG NO	DWN BY	CHKD BY	STAFF ENG	ACC ENG	EX	DATE	DRAWING NUMBER
NIAGARA		DGF					1 14 83	SF-7902

FILE NUMBER 9307256 | DRAWING SCALE 1" = 40'-0"

UCCNHT0000948

TABLE III

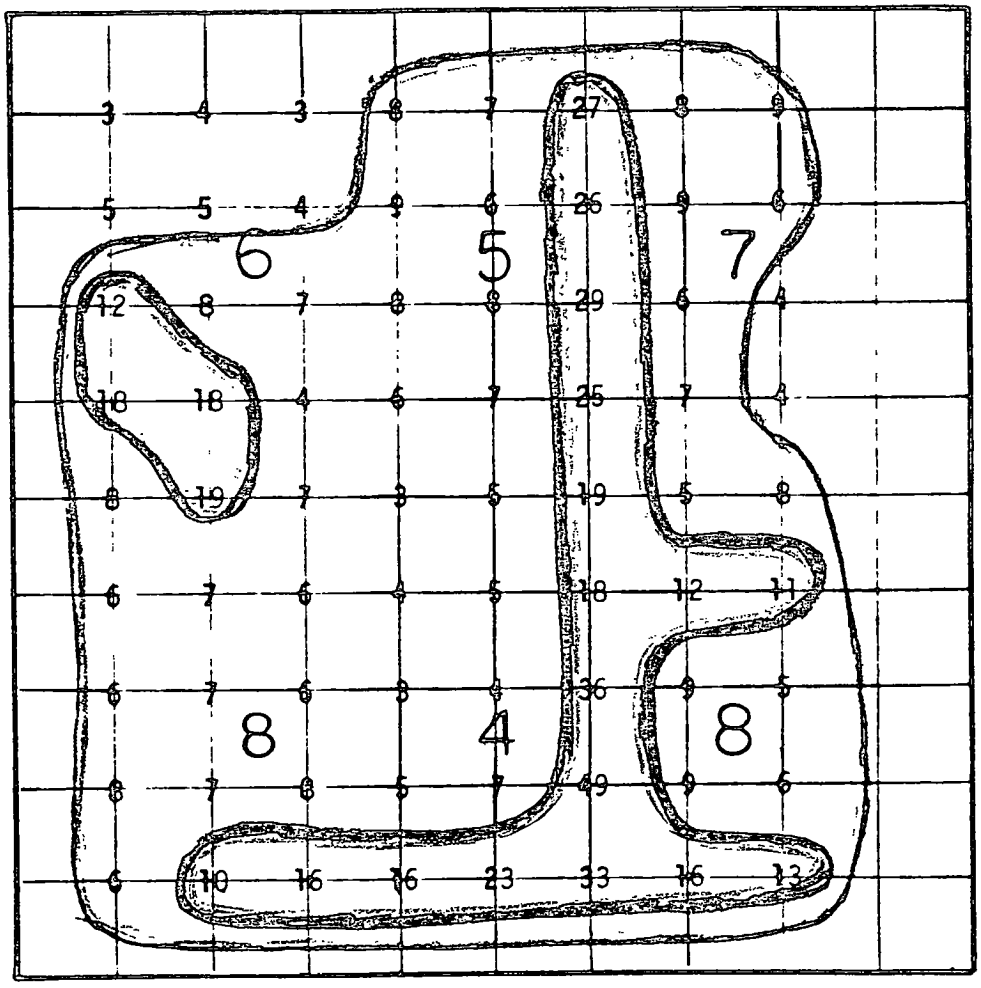
SAMPLE NO.	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm — DEPTH IN INCHES									GAMMA X BKg SURFACE
	0	3	6	9	12	15	21	24	26	
1	14/40									9
2	11/19									6
3	26/61									12
4	26/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/<1		<3/2					33
14		57/164		<7/<8		<7/3	7/2		3/3	26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm
THORIUM 37 pCi/gm (See report for calc.)

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

UCCNHT0000949

FIGURE I



ENLARGED DETAIL 7902-1

2' x 2' GRID

> 1 Times Background

> 5 Times Background

> 9 Times Background

UCCNHT0000950

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET, P O BOX 97 NIAGARA FALLS, N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710 524 1664

TECHNOLOGY DEPARTMENT
-- ENGINEERING

October 1, 1984

South Carolina Department
Health Environmental Control
2600 Bull Street
Columbia, SC 29201

ATTENTION: HEYWARD G. SHEALY, CHIEF
BUREAU OF RADIOLOGICAL HEALTH

Dear Sir:

This letter is in response to your letter of September 18, 1984, which requires our submittal of corrective measures being taken to eliminate the stated violation of section 1.2, Department Regulation 61-83, and compliance with all applicable requirements and regulations.

There is, of course, no excuse for the omission of the package label "Class A," but an explanation of the circumstances under which it happened will clarify the problem.

We were making simultaneous shipments to Chem-Nuclear at Barnwell, South Carolina, and our plant at Uravan, Colorado. The material being shipped to both locations is from the same cleanup activity. Clean soil with higher concentrations (0.13%) of uranium is being shipped to Uravan for processing while soil with debris and low uranium concentrations is being shipped to Barnwell. Our contractor mistakenly labeled the Uravan shipments "Class A" and omitted the label on the Barnwell shipment. All shipping to Uravan is completed. Therefore, a mix up like this will not happen again.

We apologize for the inconvenience and appreciate that no further enforcement action is anticipated. If additional information is required, please contact the writer.

Sincerely,

Lee G Evans

Lee G. Evans
Project Engineer

lb

UCCNHT0000951

UNION CARBIDE

INTERNAL CORRESPONDENCE

LGC

UNION CARBIDE CORPORATION

METALS DIVISION

P.O. BOX 579 4625 ROYAL AVE
NIAGARA FALLS NEW YORK 14302

To Name: Mr. W. C. Thurber
Division: Umetco Minerals Corporation
Location: Danbury, CT
Area:

Date: August 8, 1984

Originating Dept: TECHNOLOGY

Area: Niagara Falls, NY

Copy to:

Subject: Decontamination of Niagara Technology - Tiger Project

The latest estimate to complete the work is $700,000 vs an Engineering estimate of $360,000 and an actual budget request of $400,000 including management contingency. It is Marietta repeated, even though the area was thoroughly sampled over a three year period by UCC, New York State Department of Health and the DOE. Several things conspired to increase the cost.

1. Sampling indicated activity decreased with depth and an 8" excavation would remove the pyrochlor ore. This was not true. We have hit several bad spots. One in particular is an area 30' long and 3' wide where the activity hasn't decreased but rather increased. It extends under the concrete pads on both sides. It is a hard agglomerate which has required hammers to break it up. The source is unknown but obviously could not have fallen off rail cars and had to be there before the concrete unloading pads were poured. At a depth of 3' we are still 15 times background with no signs of abatement. The backfill will cut surface gamma radiation to background but we don't dare go any deeper. There are other spots that required going down to a meter in depth including holes and trenches in the concrete pads not shown on the drawings. Our total shipping volume is now estimated at 15,700 ft^3 vs a budget estimate of 7,000 ft^3.which included a contingency.

2. Barnwell increased it's burial costs by 3.00$/$ft^3$.

3. The Engineering estimate based on the surface to volume ratio of the Marietta boxes included a 15% add on total box volume vs actual excavated volume. The actual boxes designed for the load increased the volume by 30%.

These three things jointly caused the overrun. We may have trouble getting to background and really have nothing left for future work which may be mandated, as was the case at Marietta. I will give you a complete rundown at the end of the month but for now it is bad news.

R. J. Klotzbach

/mau

Wanted to W C Thurber 8/8/84 1 0.5p

UCCNHT0000952

C Neal Carpenter
President
N Kent Baker
Eugene R Brauer
Gordon W Bruchner
Patrick C Dwyer
Robert J Shreve
Dale J Stetchen
Robert D Thomas
Gary R Windolph

ARIX

A Professional Corporation

Engineers Architects Planners

1005 North 12th Street
Suite 202
Grand Junction Colorado 81501
303 242 6203

Date September 20, 1984

Project No

To Mr. Lee Evans
Umetco Minerals Corporation
137 47th Street
Niagara Falls, New York 14302

Project Radiation Survey of Haulage Trucks

Gentlemen

We are transmitting Herewith X Under Separate Cover ____

No of Copies	Description or Remarks
1	Radiological Resease, Load. No. 615-4009
1	Radiological Release, Load No. 615-4010

- [ ] No Exceptions Taken
- [ ] Make Corrections Noted
- [ ] Amend & Resubmit
- [ ] Rejected - Resubmit
- [ ] As Indicated on Each Submittal

- [X] As Requested
- [ ] For Approval
- [ ] For Your Records
- [ ] _____

Respectfully,

ARIX, A Professional Corporation

By _____
J. Tell Tappan, Director
Radiological Assessments Dept.

UCCNHT0000953

C Neal Carpenter
President
N Kent Baker
Eugene R Brauer
Gordon W Bruchner
Patrick C Dwyer
Robert J Shreve
Dale J Steichen
Robert D Thomas
R Windolph

ARIX RADIOLOGICAL RELEASE
FOR
UNRESTRICTED USE OF EQUIPMENT

A Professional Corporation
Engineers Architects Planners

1005 North 12th Street
Suite 2B
Grand Junction Colorado 81501
303 242 6203

To Whom It May Concern·

The services of ARIX are governed by the legal doctrine of reasonable skill and care in the performance of our work. In the professional opinion of ARIX staff members, the equipment and associated radioactivity measurements listed below meet the criteria set forth by the U.S. Nuclear Regulatory Commission (ANNEX A, Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unrestricted Use, dated November 1976) and adopted by the Colorado Department of Health.

VEHICLE

Operator's Name: HAROLD WILLIAMS Truck I.D. 886

Load No. 615-4009 Trailer I.D. 253159

ALPHA RADIOACTIVITY (dpm/100cm^2)

Average: None detected (5,000 allowable) Maximum: None detected (15,000 allowable) Removable: None detected (1,000 allowable)

Inst. Type: Eberline Gas Proportional & Probe S/N 4076

Removable. Eberline SPA-2 Zinc Sulfide Detector

BETA-GAMMA RADIOACTIVITY (dpm/100cm^2)

Average: 714 (1,000 allowable) Maximum 1428 (3,000 allowable) Removable None detected (200 allowable)

Inst. Type Ludlam Pancake Probe S/N 17723

Surveyed By ARIX, A Professional Corporation

Rick Sartain — Signature
Rad Tech — Title
9-17-84 — Date

UCCNHT0000954

C Neal Carpenter
President
N Kent Baker
Eugene R Brauer
Gordon W Bruchner
Patrick C Dwyer
Robert J Shreve
Dale J Steichen
[illegible] D Thomas
[illegible] Windolph

ARIX RADIOLOGICAL RELEASE FOR UNRESTRICTED USE OF EQUIPMENT

A Professional Corporation
Engineers Architects Planners

1005 North 12th Street
Suite 2B
Grand Junction Colorado 81501
303 242 6203

To Whom It May Concern·

The services of ARIX are governed by the legal doctrine of reasonable skill and care in the performance of our work. In the professional opinion of ARIX staff members, the equipment and associated radioactivity measurements listed below meet the criteria set forth by the U.S. Nuclear Regulatory Commission (ANNEX A, Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unrestricted Use, dated November 1976) and adopted by the Colorado Department of Health.

VEHICLE

Operator's Name· Virgil Starchur Truck I.D. 84068

Load No. 615-4010 Trailer I.D. 254075

ALPHA RADIOACTIVITY (dpm/100cm^2)

Average. None detected (5,000 allowable) Maximum. None detected (15,000 allowable) Removable None detected (1,000 allowable)

Inst. Type Eberline Gas Proportional ∝ Probe S/N 4076

Removable. Eberline SPA-2 Zinc Sulfide Detector

BETA-GAMMA RADIOACTIVITY (dpm/100cm^2)

Average 714 (1,000 allowable) Maximum: 2857 (3,000 allowable) Removable None detected (200 allowable)

Inst. Type Ludlam Pancake Probe S/N 17723

Surveyed By ARIX, A Professional Corporation

Rick Sartain — Signature
Rad Tech — Title
Sept 17, 1984 — Date

UCCNHT0000955

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS, N Y 14302
METALS DIVISION

August 6, 1984

Mr. John Oxaal
Elkem Metals Company
Niagara Falls, NY

Subject: Decontamination of Technology Property

Dear John:

We are decontaminating the south portion of the railroad tracks shown in Figure 2, "Location of Elevated Gamma-Ray Levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY", appended to Tiger Project letter in conjunction with closing June 30, 1981, signed by F. C. Kroft, Jr. Our purpose is to cancel New York State License No. 950-0139 which allows us to possess and process natural radioactive thorium-bearing pyrochlore ore used for the production of ferrocolumbium and meet NRC proposed regulations for delicensing and unrestricted land use.

To accomplish these ends we are backfilling the area excavated with clay because our experience at Marietta shows we must provide a covered area suitable for soil sampling. Elkem's position is the backfilling with clay is inappropriate cover for access and full use of the loading pads in the area which they intend to use for bulk storage.

Accordingly, after our license has been cancelled and full and unrestricted use of the area is allowed, without reservations regarding ground cover or New York State imposed restrictions concerning future work, Union Carbide at its sole cost and expense will perform the following work:

(1) Reexcavate the area to a minimum depth of six inches, but not to the original depth of the excavation which ranges from nine inches to over two feet in some areas.

(2) Install a permeable liner over the remaining clay as a free draining support for crushed stone.

(3) Backfill the newly excavated area with gravel to a depth to be determined by your engineers but not exceeding six inches.

(4) Dispose of the approximately 300 yards of clay which is excavated.

UCCNHT0000956

The work as outlined is contingent on Union Carbide receiving permission for unrestricted access without conditions imposed by New York State Department of Labor, Division of Safety and Health or the Federal Nuclear Regulatory Commission or the Federal Environmental Protection Agency.

If the foregoing correctly sets forth the understanding and agreement of the parties, kindly execute this letter agreement in the space provided below.

Very truly yours,

Union Carbide Corporation

By: _____

Title: _____

Agreed To and Accepted:

Elkem Metals Company

By: _____

Title: _____

cc: Mr. R. F. X. Fusaro
Mr. W. C. Thurber

Note to Fusaro and Thurber:

I made this agreement with Oxaal but it probably requires Thurber's signature.

NUS PROCESS SERVICES

August 3, 1984

Mr. Lee G. Evans
Umetco Minerals Corporation
P.O. Box 97
Niagara Falls, NY 14302
Cornelius, NC 29031

Dear Lee:

This is to advise you that NUS Process Services, acting as your agent at the Barnwell, South Carolina Waste Disposal Site First Come/First Serve Volume Allocation Plan, has obtained 1859 ft^3 of burial space for use in the month of November, 1984.

Thank you for utilizing our services, and if I can be of any further service, please do not hesitate to contact me at (803) 256-4355.

Sincerely,

Earl E. Reagan, Jr.

Earl E. Reagan, Jr.
Supervisor
Transportation Services

EERjr/fmw
cc: R. Voit

UCCNHT0000958

NUS PROCESS SERVICES

June 7, 1984

Mr. Lee Evans
UMETCO Minerals Corporation
P.O. Box 97
Niagara Falls, New York 14302

Dear Mr. Evans:

This is to advise you that NUS Process Services, acting as your agent at the Barnwell, South Carolina Waste Disposal Site First Come/First Serve Volume Allocation Plan, has obtained 1916 ft^3 of burial space for use in the month of September, 1984.

Thank you for utilizing our services, and if I can be of any further service, please do not hesitate to contact me at (803) 256-4355.

Sincerely,

Earl E. Reagan

Earl E. Reagan, Jr.
Supervisor
Transportation Services

EER/fmw

UCCNHT0000959

South Carolina Department of Health and Environmental Control

2600 Bull Street
Columbia, S C 29201

Commissioner
Robert S Jackson, M D

Board
Moses H Clarkson, Jr , Chairman
Leonard W Douglas, M D , Vice-Chairman
Gerald A Kaynard, Secretary
Barbara P Nuessle
Oren L Brady, Jr
James A Spruill, Jr
William H Hester, M D

September 18, 1984

Mr. Lee G. Evans, Project Engineer
Union Carbide Corporation
Metals Division
P.O. Box 97
Niagara Falls, New York 14302

Dear Mr. Evans,

As a result of an investigation conducted by the South Carolina Department of Health and Environmental Control on September 13, 1984, of your radioactive waste shipment upon its arrival at the Chem-Nuclear burial facility in Barnwell, South Carolina, certain violations of applicable state and federal regulations were determined.

The violation is identified as follows:

Radioactive Waste Shipment No. 0984-214-A, classified as Radioactive Material, LSA, n.o.s., described as solid metal oxides of soil, rubble, and hardware, and contained in 6 wooden crates was found not to have the waste classification marked on the packages. This is contrary to the requirement of Condition 31 of S.C. Radioactive Material License No. 097, issued to Chem-Nuclear Systems, Inc. and constitutes a violation of Section 1.2, Department Regulation 61-83.

Please be advised that this is a warning communication. The Department does not anticipate further enforcement action for this particular violation. However, repeat offenses of this nature will result in stricter sanctions. Therefore, you are required to submit to the Department no later than October 8, 1984, your corrective measures to ensure full compliance with all applicable requirements and regulations.

UCCNHT0000960

Should you have any questions, please contact Mr. Virgil R. Autry at (803) 758-7951.

Very truly yours,

Heyward G Shealy

Heyward G. Shealy, Chief
Bureau of Radiological Health

HGS:kn

UCCNHT0000961

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

May 4, 1984

Mr. H. Michaels
New York State Department of Labor
Division of Safety & Health
69th Floor
2 World Trade Center
New York, NY 10047

Subject: Radioactive Materials License 950-0139

Dear Mr. Michaels:

Attached is a plot plan of the area you wish to sample. Gamma readings on 10-foot centers are shown as times background.

The center lines of the railroad tracks are shown. This plan should give you a good basis for planning your sampling and estimate the amount of time involved.

"Ball Field Area" is a phrase which should be ignored in that it is 60-years old terminology used for internal descriptive orientation. It has not been a ball field since before World War II.

Grab sample areas are shown as circled numbers. Uranium and thorium analysis converted to pCi/gram are indicated in the box on the right with reference to the sample locations.

Please inform me of your schedule.

Very truly yours,

R. J. Klotzbach

/mau
Attachment

cc: Messrs: L.G. Evans
W.C. Thurber
R.A. Crago/R.E. DeWeese - Elkem

UCCNHT0000962

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

May 2, 1984

Ref'd to TJK / File
For

RECD MAY 3

Noted by
File
Subject 11309

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139 - Status Report

Dear Mr. Kelly:

We have obtained burial allocation at Barnwell, SC for August 1984 in the amount of 1900 ft^3.

Based on our volume estimate of 7000 ft^3, it will take us all of 1984 and into 1985 to complete the burial because competition for space tends to intensify at the end of the year.

However, your verbal request to delay the work pending a New York State Department of Health survey, not scheduled by H. Michaels until the end of May, will seriously delay the project resulting in loss of allocated burial space. Future schedules depend on the rapidity with which you receive analytical results, make your judgements and issue approval to proceed.

We cannot commit any manpower or funding to a project which has not received the approval of your department. That is the nature of any endeavor involving a state or federal license where a clear cut approved end result is projected which must receive prior approval from the regulatory agency. I would be remiss in my accountability for our limited resources if I acted otherwise.

Up to this point we had your verbal approval as Health Department Representative to proceed with the action plan transmitted to you on April 4, 1984. Since this is not the case, when your department completes its investigation, written approval for the contemplated actions is necessary for the commitment of Union Carbide resources. I now doubt we can complete the work before July 31 and the schedule transmitted to you in my April 4 reply to your March 29, 1984 reissue of your notice of inspection findings, based on a previous New York State survey, is voided.

UC 149 2

INTERNAL
CORRESPONDENCE

UNION CARBIDE CORPORATION 137-47th Street P O BOX 97 NIAGARA FALLS NY 14302
METALS DIVISION

To (Name) Mr. R. J. Klotzbach
Division
Location Umetco Minerals Corporation
Area Niagara Falls, NY

Date May 1, 1984

Originating Dept TECHNOLOGY DEPARTMENT — ENGINEERING

Area

Copy to Messrs. T. J. Kagetsu
F. T. Temple
G. E. Walck
File: 11309

Subject Soil Decontamination -
South of Bldg. 166,
Niagara

We have obtained a burial allocation at Barnwell, SC, for August 1984 of 1900 ft.^{3}. Competition for space tends to intensify toward the end of each year. (we requested 3000 ft.^{3})

Based on our volume estimate of 7000 - 8000 ft.^{3}, it will take us all of 1984 and maybe into 1985 to complete the burial.

All of the soil, however, will be excavated and packaged by August 1 and stored in the Niagara Plant. I have contacted Frank Temple regarding a suitable storage site. This should bring us into compliance with our NYS Radioactive Material License (950-D139).

I'll keep you posted.

L. G. Evans

/dac8

UCCNHT0000964

Since our meeting in the first week of April we have performed the following:

April 6	1.	Hired agents at Barnwell, SC.
April 13	2.	Applied for shipping permit.
April 17	3.	Released $33,000 of engineering funds and started detail work.
April 18	4.	Began preparation of work descriptions and purchase orders.
April 25	5.	Cleaned up the area for equipment access.
April 25	6.	Received shipping permit.
May 1	7.	Received partial burial space allocation.

As you can see, in a period of three weeks we have actively pursued every phase of the project and acted in good faith by issuing documented status reports to you covering each of those items. Nobody has raised any question until the request for "holdup of cleanup." If you issue written approval to proceed, as planned, we will not hold up anything pending your survey except the actual excavation which we must be prepared to begin by June 15.

We will await your advice and approval for this corrective action.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau

cc: Messrs. W. C. Thurber
L. G. Evans
R. A. Crago/R. E. DeWeese - Elkem

UCCNHT0000965

cc TJK
FILE 11309

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

April 30, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139

Dear Mr. Kelly:

As you requested on this date I am forwarding the survey data we made to define our problem in the area contaminated by ore unloading operations.

You should have in your files the result of the New York State survey made in December 1981 which resulted in a citation for failure to meet licensing requirements. Your survey may be more accurate than ours.

In order to expedite this matter, I am attaching our internal design memo describing the problem and our alternates for solution. This memo should be considered Union Carbide confidential information released to your department in answer to questions which you have raised related to the citation.

The detailed cost estimates have been deleted from this copy but are summarized on Page 9. You can see we have adopted the permanent solution alternative requiring the highest expenditure of funds, contrary to the engineers' recommendation. In addition, our costs have escalated to $400,000 from the $335,000 estimate in the memo.

The information you require for the gamma probes is on Page 3. A drawing of the entire suspect area is enclosed with gamma survey readings on 10 foot centers.

Chemical analysis of "grab" samples were made and a table is displayed converting to pCi/gram. These samples were taken primarily to determine the extent and depth of both thorium and uranium contamination since, at the time, we did not know the source of the original spillage. The high thorium is a definite signature that the source was primarily columbium bearing ores.

UCCNHT0000966

Table III shows that sampling for chemical analysis was done at depth for the areas displaying the highest surface contamination. Activity decreases dramatically with depth so we are certain we have no long standing problem and a fix can be made.

We intend to do in-house monitoring while the work is in progress. We will not complete our efforts until (1) an independent survey is made, and (2) your department conducts it's own survey on the decontaminated area. Our independent surveyors have not as yet been hired but the paper work for purchase and work scope agreements is in preparation. We will keep you informed.

Please feel free to call me about our progress or any other details you require. I will continue to send you status reports.

Very truly yours,

R J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber w/a
L. G. Evans
R. A. Crago/R. E. DeWeese - Elkem

UCCNHT0000967

cc TJK
FILE 11309

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE, NIAGARA FALLS N Y 14302
METALS DIVISION

April 26, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139 - Status Report

Dear Mr. Kelly:

The area around the railroad tracks which contains low level radioactive ore contamination has been cleared permitting work to proceed. Clearance of railroad flat cars and other stored materials was completed on April 25, 1984.

Detailed engineering for contractor work has begun with the release of engineering funding to an active project on April 17, 1984.

Very truly yours,

R J Klotzbach

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber w/a
L. G. Evans
R. E. DeWeese - Elkem w/a

UCCNHT0000968

4-25-89

MEMO TO LEE EVANS:

WENT OUT TO SITE SOUTH OF BLDG 166 (1:30 - 2:30 PM)

MET KLOTZ & MURPHY — LATER DICK CRAGO.

ELKEM IS SEPARATING MATERIAL TO REMAIN IN STORAGE AND SCRAP.

THE SCRAP WILL BE DISPOSED OF SHORTLY — OTHER MATERIAL STORED ON SOUTH END OF MAIN CONCRETE PAD.

DON HANSEN KNOWS HISTORY OF MATERIALS, WHICH UMTCO NEEDS TO MARK OR DISPOSE OF — SUCH AS K-R (Low Chrome) RIVETS IN WOODEN SKIPS (POSSIBLE RE-USE AS BACKFILL) AND FERROUS, IN RUSTY STEEL DRUMS — CONDITION OF SKIPS & DRUMS MAKE MOVEMENT OF THE MATERIALS VERY DIFFICULT.

IT WAS AGREED WITH KLOTZ & MURPHY AND AGAIN LATER WITH CRAGO THAT THE TRACKS TO BE TAKEN UP ~~ARE~~ ARE NOT TO BE REPLACED — RAILS ARE ELKEM PROPERTY (PER KLOTZ) AND ~~THEN~~ CAN BE CUT-UP AND STORED ON A PAD AND IF CLEAN BE SOLD BY ELKEM AS SCRAP, THE TIES CHECKED FOR RADIOACTIVITY AND ~~IF~~ AFTER CLEANING FOUND TO BE CLEAN CAN BE GIVEN AWAY, IF NOT, SHIP OUT IN BOXES.

KLOTZ WOULD LIKE BOXES LINED WITH A SUITABLE LINER TO INSURE NO LEAKAGE.

MURPHY SUGGESTED A LINER SIMILAR TO WHAT THEY USE IN THEIR 4' SKIP BOXES (THESE ARE SIMILAR TO THE "BOGS" WE USED)

WE WILL NEED TO SEE HANSEN ABOUT MOVING "OUR" MATERIALS.

RAILROAD FLAT CARS HAVE BEEN MOVED TO A LOCATION NEAR BLDG 105 OUT OF OUR WAY.

BUILDING 105 NOT AVAILABLE FOR STORAGE.

COPY TO: T.J.K
FILE 11309.

GIL

UCCNHT0000969

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

April 27, 1984

Mr. [illegible] F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
[illegible] Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 360-0139

Dear Mr. Kelly:

Attached is a copy of our permit to transport wastes in South Carolina, dated April 23, 1984, applicable to the disposal of wastes at Barnwell.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber
L. G. Evans
R. A. Crago/R. E. DeWeese - Elkem

UCCNHT0000970

RWK

Refr'd to _____
For _____

RECD APR 27 1984 RJK

Noted by _____
File _____
Subject _____

Form RHA-P
(10/80)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

SOUTH CAROLINA RADIOACTIVE WASTE TRANSPORT PERMIT

Pursuant to Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act, a Radioactive Waste Transport Permit is hereby issued to the below-named applicant (shipper). This permit shall not, in itself, be construed as authorizing a shipper to dispose of radioactive waste within the State of South Carolina. This permit shall not be transferred, assigned or in any manner disposed of, either voluntarily or involuntarily, directly, or indirectly, through transfer of control to any person, unless the Department shall, after securing full information, find the transfer is in accordance with the provisions of Act No. 429 and shall give written consent.

1. Name and Address of Applicant (Shipper): Union Carbide Corporation Metals Division P.O. Box 97 Niagara Falls, New York 14302 (Marietta, Ohio)	2. Permit Number: 0211-31-84-X 3. Expiration Date: December 31, 1984

1984

For the South Carolina Department of Health and Environmental Control

April 23, 1984
Date of Issuance
DHEC 801 (10/80)

By Heyward G. Shealy
Heyward G. Shealy, Chief
Bureau of Radiological Health

UCCNHT0000971

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS, N Y 14302
METALS DIVISION

April 18, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139

Dear Mr. Kelly:

My program for decontamination of the Union Carbide, Niagara, Royal Avenue Site outlined a two step program. Nevertheless we are proceeding on the basis of a one step program, without intermediate storage, provided our agents can obtain readily available burial space at Barnwell, South Carolina. We decided on this course of action on the assumption that Barnwell would not be accessible to a Northeastern zone client after 1985. Attached is a copy of our first step to insure proper channels to secure burial space. This is in accordance with my promise to keep you informed of new developments and possible changes in the program.

I assume that you are taking steps to modify or issue a new license for the unknown quantity radium source we examined on your last visit. Since I intend to dispose of that source at the same time as the radioactive ground cover I would appreciate receiving your advise on proper disposal containers and methods.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber
L. G. Evans
R. E. DeWeese - Elkem

UCCNHT0000972

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET P O BOX 97 NIAGARA FALLS N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710 524 1664

TECHNOLOGY DEPARTMENT
— ENGINEERING

April 6, 1984

Chem-Nuclear Systems, Inc.
P.O. Box 726
Barnwell, SC 29813

Attn: Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

This letter authorizes Messrs. Earl Reagan, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space at the Chem-Nuclear site in Barnwell, South Carolina.

If there are any questions regarding this matter, please contact Mr. L. G. Evans at Telephone No. (716) 278-3462 or Mrs. S. C. Zambotti at Telephone No. (716) 278-3232.

Sincerely,

S C Zambotti
Mrs. S. C. Zambotti
Purchasing Agent

SCZ/jl
cc: Earl Reagan
R. J. Klotzbach

UCCNHT0000973

UNION CARBIDE CORPORATION

P.O. BOX 579 4320 ROYAL AVE
NIAGARA FALLS NEW YORK 14302

To Mr. Mr. F. V. McMillen
Division Metals Division
Location Danbury, CT
Area

Date March 20, 1984

Originating Dept. TECHNOLOGY

Area Niagara Falls, NY

Copy to Messrs:
L. G. Evans
F. T. Temple
W. C. Thurber

Subject Cleanup of Radioactive Contamination Building 166

We should accrue $400,000 of corporate money to bring the Niagara site into compliance for delicensing of the New York State Radioactive Materials License No. 950-0139 because of radioactive source concentrations in excess of 500 ppm behind Niagara Building 166. We are also obligated to do this in accordance with the Tiger agreement for unrestricted use of the area by Elkem.

The volume to be removed and eventually shipped to a burial repository is 6800 ft^3. The cost covers removal, shipping and burial.

The preferred action plan is to relocate the waste temporarily on Niagara Plant property, in a fenced area for restricted access, and then ship and bury at a later date. The relocation cost for Phase 1 is $125,000 and the shipping and burial cost is $275,000 in Phase 2. The cost assumes burial at Barnwell, South Carolina.

Access to the repository at Barnwell will be restricted after 1985 to regional member states. New York will not be a regional member and at this time there is no Northeast Regional Repository. Also, we can't just ship any volume, at any time, to Barnwell but must fit into their schedule with definite specified volumes over a time frame. It seems unlikely this could be done in 1985. Phase 1 can proceed as soon as the area is sufficiently cleaned of interfering stored materials.

Klotzbach

R. J. Klotzbach

/MAU

015 149 880

UCCNHT0000974

March 19 19--

To RJK

from LSE

Subject: Clean up Options - Niagara

Attached is the design memo which is unchanged since being issued July 13, 1983. All estimates are in 1983 dollars. The following comments are offered in connection with money requests.

1) The contaminant volume reported 6850 ft^3 is confined to the area behind Bldg 166 Contamination may exist elsewhere in the Niagara Plant

2) Access to the Repository at Barnwell, SC. will be restricted after 1985. to regional member states. NE states not incl.

3) The cost to relocate to Niagara Plant $120,000

4) Cost to dispose at Barnwell, SC $335,000

5) Cost to relocate to Niagara Plant & later ship to Repository $390,000

cc TJK

UCCNHT0000975

UNION CARBIDE CORPORATION
METALS DIVISION
P O BOX 579 4625 ROYAL AVE NIAGARA FALLS NEW YORK 14302

July 7, 1982

Mr. R. F Kelly
Occupational Safety and Health
65 Court Street
Buffalo, NY 14202

Dear Mr. Kelly.

We would appreciate an extention to the 90-day deadline we received with your Notice of Inspection Findings concerning concentrations of source material Our intention at this time is to decontaminate the areas and store the material on site until disposal alternatives are fully investigated. I will be applying for a license amendment once we have determined details such as volume, storage site location, fencing, etc.

Very truly yours,

D. R. Brosnahan
Radiation Safety Officer

DRB smn

cc: Dr D. J Hansen

UCCNHT0000976

August 11, 1982

To: Dr. T. J. Kagetsu
Mr. L. G. Evans

From: F. A. Rutledge

Subject: Contaminated Area South of Building 166 -
Letter D. R. Brosnahan to D. J. Hansen, 6/17/82

I met with Lee Evans and Dave Brosnahan on Tuesday afternoon, August 10, 1982, to review decontamination requirements for the subject area. The following was discussed and may be used as a basis for an action plan:

1. Develop a sampling plan to firmly establish the area of contamination; i.e., pattern of sample holes and depth to check, etc.

2. Establish degree of clean-up required:

   a. Comply with State of New York requirements--55 pCi/g?
   b. Comply with EPA regulations for unrestricted use--10 pCi/g?
   c. Something in between?

3. Determine volume of material to be disposed of based on degree of clean-up established--2a, 2b, or 2c.

4. Determine disposal location:

   a. Load and ship to approved repository?
   b. Load and ship to Uravan for processing?
   c. Load and move to another area of UCC Niagara Plant, and fence?
   d. Some other approved disposal method?

5. Develop cost estimate based on degree of clean-up required and method of disposal agreed upon.

6. Develop plan to dispose of scrap and remove railroad tracks that interfere with removal of residue. Check scrap for contamination prior to disposal, especially embedded railroad ties.

7. Award contract to excavate material to satisfy conditions of 2a, 2b, or 2c and ship or relocate as determined by 4a, 4b, 4c, or 4d.

8. Check area for compliance.

9. Replace railroad tracks.

I recommend that a meeting be held to reach an agreement on options outlined in Items 2 and 4 above and also to establsh a general time frame for the project.

FAR/cep

F. A. Rutledge

UCCNHT0000977

AAXON INDUSTRIES INC
P O BOX 1317 GREENWICH CT 06830 · (203) 661-4712 (212) 686-2670

Dear Sir,

Would you like to:

- Reduce your radioactive or hazardous waste removal costs by as much as 80%?
- Meet stricter disposal requirements?
- Achieve these benefits immediately, using a new disposal system that operates on standard 110-volt electricity and occupies less floor space than a household refrigerator or less than 6½ square feet?

Then you should investigate the PAX compaction systems, the most economical devices available that can provide these important services.

Simplicity and design efficiency form the basis for PAX compactors. A powerful ram-generating 14,000 pounds of thrust over a 30-second cycle-reduces most laboratory wastes to one-fifth its original volume. That means five times as much material can be packed into a standard 55-gallon drum. Since most waste removal companies charge by the number of drums removed, your savings begin immediately. At some institutions, PAX compactors have paid for themselves in less than a year.

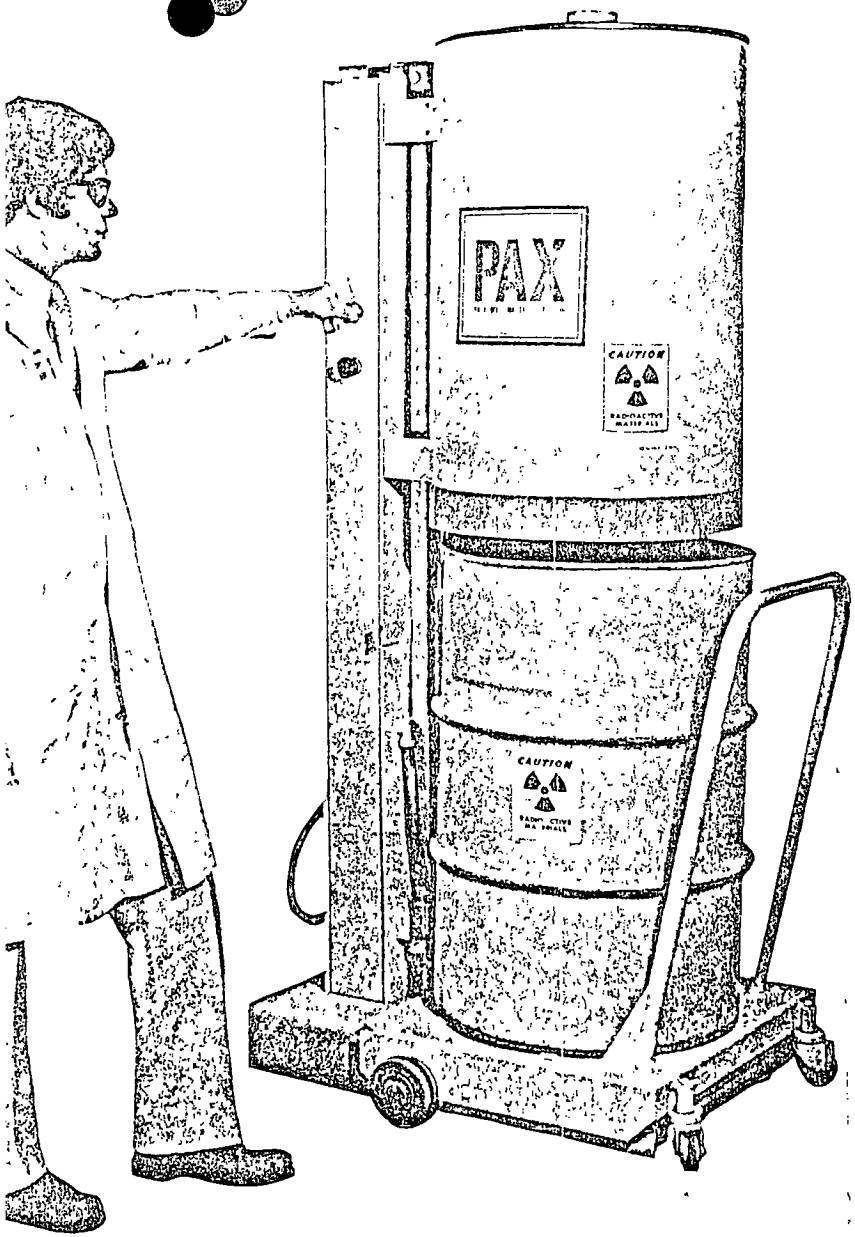
You can wheel it in and start compacting-and saving-immediately. No special installation is required. Best of all, the basic PAX system costs only $6500 and comes backed by the technical support of Aaxon Industries' engineering staff.

May I invite you to call or write us directly concerning any questions you may have about the PAX hazardous waste compaction systems.

Sincerely,

Robert J. Roth
President

UCCNHT0000978



The PAX combines safe, easy operation with low price Just plug the unit into any standard 20 amp, 110-volt electrical outlet Place the 55-gallon drum into clips on dolly Add waste materials and you are ready to start compacting

Insert and turn the key to unlock the controls and activate the powerful ram that will crush your wet or dry wastes with as much as 14,000 pounds of thrust When you reach your preselected unloading weight, slide the cart back and seal the drum That's all there is to it!

Technical support

Aaxon's engineering staff will assist you in designing a PAX system to meet your individual institution's needs

PAX options extend the systems

Satellite carts

55-gallon containers mounted on dollies with rugged casters can be stationed, at various satellite locations where waste originates When filled, the carts are rolled to the central compactor, then returned to the station, avoiding the purchase of compactors for each location

Venting systems, explosion proof systems, and remote controls

The PAX can be equipped with an exhaust system for venting hazardous aerosols or vapors generated during compaction When venting to the outside is impractical, the unit can be equipped with filter systems For applications involving flammable wastes, an explosion-proof system is available Remote controls are also available for isolated operation

AAXON DISPOSAL SYSTEMS

UCCNHT0000979

PAX systems handle wastes safely, efficiently, and saves money

Powerful compacting ram reduces most laboratory wastes to one-fifth original volume Since most waste removal companies charge by the number of drums removed, you start saving immediately In some institutions the compactor has paid for itself in less than a year

Flexible guard seals waste chamber when ram is activated minimizing dispersion of compacted materials Total ram enclosure is standard Available options include collar for venting, explosion—proof systems and remote controls

PAX systems run on standard 110-volt electric current, so no special installation is needed

Simple, efficient design provides trouble-free compacting The PAX system requires less floor space than the average refrigerator and fits through a standard doorway

Key-locked controls prevent tampering and unauthorized operation

Performance has been rated and certified by the National Solid Wastes Management Association (NSWMA)

Performance data and specifications

Compaction performance:

Total compaction thrust 14,000 pounds for 30-second cycle
Compaction thrust 50 PSI
Variable Compacted Weight 50 to 550 pounds with visual indicator to tell when to unload

Hydraulic specifications

Hydraulic pump gear type
Maximum operating pressure 3,000 PSI
Average Cycle Time 30 seconds
Cylinder 3" bore, 25" stroke

Electrical specifications:

Motor One horsepower, totally enclosed, 1725 RPM
Operates on 110 volt, 60 cycle current, 20 amp
Grounded outlet
Components UL approved

Controls·

Key activated control with locked "power-off" position
Safety stop button

Structure:

Upright, rigid C-frame configuration
heavy steel base integrally welded
Upright column is 6" x 8" rectangular tube of 3/16" thick steel for maximum rigidity and strength
Corrosion-resistant compacting ram is rigidized by internal grid pattern and fastened to a ½" steel support plate

Dimensions

Width 26½" Length 34½" Height 78½"

Shipping weight Approximately 950 pounds

PAX

HAZARDOUS WASTE COMPACTOR

Safely Compacts Low l Radioactive and Oth Hazardous Wastes

Compacts Directly ir an Approved 55-Gall Shipping Drum

Immediate Savings of to 80% in Waste Removal Cos

Requires Less Than 6½ of Floor Space

AXON DISPOSAL SYSTEMS

P.O. BOX 1317 GREENWICH, CT 06830

AXON DISPOSAL SYSTEMS

UCCNHT0000980

UC 149 2

UNION CARBIDE INTERNAL CORRESPONDENCE

METALS DIVISION • P O BOX 579 4625 ROYAL AVE , NIAGARA FALLS, NEW YORK 14302

To (Name) Dr. D. J. Hansen
Division
Location Niagara Falls, NY

Date May 7, 1982
Originating Dept Mineral Technology
Answering letter date

Copy to Messrs. L. G. Evans
R. J. Klotzbach
R. G. Woolery

Subject Technology Ball Field Area Cleanup

An inspection of the ball field area behind Building 166 by the New York State Department of Labor revealed four areas containing radioactive source material above limits for uncontrolled areas, as established by the State Labor Law. I crudely estimate, with little knowledge of the depth, the volume to be ∿200 cu. ft. Proposed cleanup actions will require the following:

1. Purchase of three Department of Transportation approved 70 cu. ft. caulked wooden boxes.
2. Backhoe and two to three man crew for one to two days.
3. Stone or topsoil backfill.
4. Burial space at Barnwell, S.C. ($14/cu. ft.).
5. Permit for direct shipment to Barnwell.
6. Transport by exclusive use truck.

Total estimated cost is ∿$10,000 plus contingency. Costs for burial at Barnwell are justified on the basis of low volume and unknown legal consequences of entering material into Ohio and Colorado. Burial space cannot be obtained until September 1, requiring storage to meet the present state deadline of July 2.

It must be emphasized that the above likely will not permit termination of license or release for unrestricted use, as may be required for transfer of property ownership. Large areas reported as 20 to 50 times background were within limits set by the State Department of Labor only. Nuclear Regulatory Commission guidelines for decontamination, which I have been referred to by the State concerning a license cancellation, require levels of two to three times background. In this case burial volume will increase tremendously necessitating reevaluation of place of burial, and costs will be astronomical.

D. R. Brosnahan
Radiation Safety Officer

DRB.jk

UCCNHT0000981

Lee,

Thought you might enjoy the enclosed. I would like to have it back, as I would like to have the copies of Mining Engineering back.

Why would you volunteer to clean the waste @ Marietta to background? If you have to clean up to background levels you may as well have Bob Beverly inform the State of Colorado that you plan on processing the E/Mang building at Uravan to extract the uranium.

The answer to your question yesterday, which I'm sure your very interested in, given that you never called back, is 105 ppm. This is calculated as follows:

$$U_3O_8 = 3.33 \times 10^{-7} \text{ Ci/gm} = 333{,}000 \text{ pCi/gm}$$

$$\frac{35 \text{ pCi/gm}}{333{,}000 \text{ pCi/gm}} = 0.0105\% = 105 \text{ ppm}$$

I would not increase the activity of U_3O_8 by taking the no. of Ci's/gm x 14 isotopes as you do in your calculation. I have a number from a quotable reference that shows that the activity of U_3O_8 ~~is 3.26×10^{-7}~~ in equilibrium with daughters is 3.26×10^{-7} Ci/gm. By increasing the activity of U_3O_8 you are decreasing the value to which you will clean @ Marietta. Given that the enclosed states that the evidence is indisputable that cancer incidences are lower where background radiation levels are higher, you may be responsible for an

UCCNHT0000982

increased risk of death because you went too far in cleaning up the residue. I can see it now -

Marietta Gazette

LEE EVANS - KILLER ON THE LOOSE

Madman Lee Evans ...

Dan

One other thing I just remembered. At technology here we are allowed to pour 3 g/lt V_2O_5 down the drain - be it dissolved or in particulate form. This cannot average more than 92 ppm over the year - based on permitted concentrations in water above natural background in NY State Industrial Code Rule 38 - Ionizing Radiation Protection. A study as to whether a sewer of sufficient gallonage exists in Marietta to permit disposal by way of the Ohio River may be warranted. I may be clear out to lunch on this but it is worth a look-see. (Dilution may be the solution to your pollution).

UCCNHT0000983

UNION CARBIDE INTERNAL CORRESPONDENCE

METALS DIVISION

P O BOX 579 4625 ROYAL AVE , NIAGARA FALLS, NEW YORK 1

To (Name) Dr. D. J. Hansen
Division
Location NIAGARA

Date June 17, 1982
Originating Dept Minerals Technology
Answering letter date

Copy to Messrs. R. G. Beverly
L. G. Evans
T. K. Kagetsu
R. J. Klotzbach
F. T. Temple
R. G. Woolery

Subject Technology Decontamination Requirements

In pursuing the State of New York for more of their radiological analyses, I have learned that in fact all nine areas sampled behind Bldg. 166 are out of compliance - not just the four cited. The inspector had assumed that the source material was natural uranium, allowing a maximum activity of 200 pCi/g. The source material is thorium, which due to a lower activity per unit weight, must be reduced to 55 pCi/g to be in compliance with the <0.05% (<500 ppm) requirement.

The state's analyses are as follows:

Area	Gross Activity - Raw pCi's		pCi/g	
	Surface	2 - 2-1/2" Deep	Surface	2 - 2-1/2" Deep
1	5.8	9.5	31.4	132.0
2	2.6	41.7	25.4	107.5
3	6.3	9.5	101.1	136.8
4	47.0	15.2	215.9	108.5
5	37.4	6.0	176.3	45.9
6	1400.6	861.2	3413.3	4056.5
7	34.6	35.8	312.3	207.8
8	17.3	72.9	154.7	249 5
9	9.6	16.6	50.6	98.9

Chemical analyses of surface samples I removed from Areas 5 and 8 are as follows:

	% U_3O_8	% ThO_2
Area 5	0.021	0.23
Area 8	0.039	0.48

Spectrographic analyses of these two areas and Area 6 are attached. The Ta, Cb, and Th contents indicate that the contamination is a residue of ferrocolumbium production and not from the former Area Plant.

Listed below are four possible actions which may bring us into compliance with state regulations:

UCCNHT0000984

Case	Action
1	Decontaminate east track to permit track usage request by Elkem. Relocate residue within west track and Area Fence and post to control access.
2	Decontaminate along both tracks and Area 6. Relocate residue to neighboring UCC property. Fence and post.
3	Decontaminate as in 2. Ship residue to Barnwell, SC for burial.
4	Decontaminate as in 2. Ship residue to Uravan, CO for processing and disposal as tailings.

Case 1 is the least expensive, but also a short term arrangement due to the char in property ownership. Case 2 offers the following. 1) Intermediate term solution allowing time to fully investigate disposal alternatives, including the possibility of a dump in the Northeast necessary by 1986 when present dumps can ban waste from outside states. 2) Frees Technology property for change in ownership. 3) Any additional material, such as may be found during any follow-up surveys, can be handled. This case, however, is subject to approval by the State Department of Labor by amendment of our Radioactive Materials License No. 950-0139 - the license authorizing possession of 6000 lb of thorium obtained for ferrocolumbium production.

Cases 3 and 4 would result in a permanent solution, but would be very expensive.

To obtain preliminary cost information, Lee Evans was consulted. Based on an assumption of 2000 cubic feet of contaminated material, the ballpark costs for Case 2 would be on the order of $100,000. Cases 3 and 4 both would be rough double this figure. The burial costs at Barnwell in Case 3 approximately equal the increased costs of transportation to Uravan for Case 4. Scrap such as railroad ties must go to Barnwell in any event. It must be emphasized that thes values are dependent upon the volume to be relocated, which at present is unknow A program to delineate the surface areas and depths of contamination is necessary for a realistic estimate.

The deadline for cleanup is July 2, 1982, though I was informed by the state inspector that we can request an extention at that time. A statement of our decontamination plan will be appropriate with such a request.

D. R. Brosnahan
Radiation Safety Officer

DRB:jk

Attach.

UCCNHT0000985

OPTICAL EMISSION SPECTROGRAPHIC ANALYSES OF SAMPLES

FROM SELECTED AREAS SOUTH OF BLDG 166 - %*

	Al	B	Ba	Be	Ca	Cb	Ce	Co	Cr	Cu	Fe	Ga	Hf	La	Mg	Mn	Mo
Area 5, Surface	2.4	.024	.03	.0024	2.4	.6	.9	.03	2.4	.03	3	.03	.024	.24	2.4	.3	.024
Area 6, Surface	.6	.012	.024	.0024	.6	M	1.2	.012	.12	.006	6	-	.03	.24	.12	.24	-
Area 6, 6" Deep	3	.009	.006	.0012	.6	.6	-	.024	.9	.009	3	-	-	-	M	.12	-
Area 8, Surface	2.4	.03	.06	.0024	2.4	2.4	2.4	.06	.24	.03	3	.06	.03	.24	.6	6	.012

	Na	Ni	P	Pb	Sc	Si	Sn	Sr	Ta	Th	Ti	U	V	W	Y	Yb	Zr
Area 5, Surface	.24	.06	.06	.06	-	M	.6	.03	3	.24	.6	-	.06	.9	.06	-	.24
Area 6, Surface	-	.009	-	.3	.24	2.4	.9	.024	M	2.4	M	2.4	.024	.24	3	.24	.06
Area 6, 6" Deep	.12	.024	-	.09	.024	M	.6	-	M	.24	.6	-	.024	-	.6	.06	.03
Area 8, Surface	.3	.06	.24	.024	-	M	.6	.024	3	.3	.6	-	.06	2.4	.06	-	.6

* The following elements were looked for but not detected: - Ag, As, Au, Bi, Cd, Ge, Hg, In, Ir, Li, Os, Pd, Pt, Re, Rh, Ru, Sb, Te, Tl, Zn.

To include probable error, divide by three for lower limit, and multiply lower limit by ten for upper limit.

Dash indicates none detected; M indicates >10%.

UCCNHT0000986

X Pls J.J. Sibley
ew 10/28/81

OC
TJK
RJK
DJH
DRB

Elkem Metals Company
4625 Royal Avenue, PO Box 1344
Niagara Falls, New York 14302
(716) 286-7400

October 27, 1981

Mr. Stephen G. Moorhead
Sullivan & Worcester
200 Park Avenue
New York, NY 10166

Dear Mr. Moorhead:

You requested our comment on the following items mentioned in your letter of October 22, 1981.

Chain Link Fence

The fence has been erected. A small section is down at the moment, to satisfy a Linde maintenance project. Mr. Temple assures me this will be replaced.

Contrary to your parenthetical note, we, at Niagara, assume that the fence belongs to Union Carbide Corporation. Please let us know if we are mistaken.

Frame Garage

It has been demolished.

Building 163 and Surrounding Area

Mr. Brosnahan's letter of October 13 summarizes the current status. Messrs. C. R. Allenbach (Elkem) and D. J. Hansen (UCC) are cooperating on this item. We foresee no problem, but will have to await the final survey.

Building 169 (Asbestos Pilot Plant)

Our Dr. Allenbach sees no problem in this area and we believe it is time to sign off. Mr. Temple's note of July 24, 1981, and attached memo cover the situation.

Very truly yours,

W Chynoweth

W. Chynoweth
Manager - Administration
and Technical Services

WC:cjb
Attachment

CC: E. W. Kantz
J. G. Oxaal
F. T. Temple

cc to C.R.A. - 10-23

OCT 23 1981

SULLIVAN & WORCESTER
200 PARK AVENUE
NEW YORK, NEW YORK 10166
(212) 599-7910
TELECOPIER NO. 212-599-7922
TWX: 710-581-0322

IN BOSTON, MASSACHUSETTS
100 FEDERAL STREET
BOSTON, MASSACHUSETTS 02110
(617) 338-2800
TELECOPIER NO. 617-338-2880
TWX: 710-321-1976

IN WASHINGTON, D. C.
1025 CONNECTICUT AVENUE, N.W.
WASHINGTON, D. C. 20036
(202) 293-6170
TELECOPIER NO. 202-293-2275

October 22, 1981

FEDERAL EXPRESS

Mr. William Chynoweth
Manager, Administration and
Technical Services
Elkem Metals Company Technical Center
4625 Royal Avenue
Niagara Falls, NY 14302

Dear Bill:

As we discussed on the telephone yesterday, I am enclosing a copy of the agreement signed on the closing date, covering Plant Operations at Niagara Falls.

As you can see from the agreement, Union Carbide has agreed that according to item Number 1 on Page 1, within 120 dyas, or October 31, Union Carbide will:

No. - UCC - 7

1) erect a chain link fence (which shall belong to you) along the common boundary between the Technology Center and your Niagara Plant, including any necessary gates for access to Buildings 88 and 99 and we shall both have keys for such gates; and, Done

2) demolish a frame garage which extends from the south-easterly corner of the Technology Center onto your plant property. Done

In addition, according to item Number 2 on Page 2 of the enclosed agreement, Union Carbide has agreed to take such actions, within a reasonable time after June 30, 1981, as may be necessary in order to decontaminate:

1) Building 163 and the area shown on Figure 2 attached to the enclosed letter agreement of such radiation as may be reasonably practicable in order to meet acceptable levels under applicable Federal standards; and, One more survey Some work may be needed

2) Building 169 of asbestos in order to meet current Occupational Safety and Health Administration standards.

Should be no problem

I would appreciate it if you would send me a letter, detailing Union Carbide's progress in fulfilling its obligations.

Sincerely,

Stephen G. Moorhead/ee

Stephen G. Moorhead

SGM/ee
Enclosure

cc: Harry W. Fawcett, Esq. (w/encl.)

UNION CARBIDE CORPORATION
270 PARK AVENUE, NEW YORK, N.Y 10017

June 30, 1981

Elkem Metals Company
19th Floor
270 Park Avenue
New York, New York 10017

Re: Tiger Project - Plant Operations
Niagara Falls, New York

Gentlemen:

In conjunction with the closing of even date herewith as to the sale by Union Carbide Corporation ("Union Carbide") to Elkem Metals Company ("Elkem") of Union Carbide's alloys business and in particular the execution of a Lease Agreement (the "Lease Agreement") for the Niagara Falls Technology Center ("Technology Center"), Union Carbide and Elkem agree as follows:

1. Within 120 days after the date hereof, at its sole cost and expense, Union Carbide shall (i) erect a chain link fence (which shall belong to it) along the common boundary between the Technology Center and Union Carbide's Niagara Plant, including any necessary gates for access to Buildings 88 and 99; and (ii) demolish a frame garage which extends from the southeasterly corner of the Technology Center onto Union Carbide's plant property. Union Carbide and Elkem shall both have keys to such gates, which shall be maintained in a closed and locked position except when they are in active use. In the event that Union Carbide fails to maintain and repair said fence, upon ten (10) days' prior written notice to Union Carbide, Elkem shall have the right to make any necessary repairs thereto at its sole cost and expense, provided that it assumes all risks attendant with such work; except that if the requirement for repair arises solely out of the actions of Union Carbide, then Union Carbide shall reimburse Elkem the reasonable cost of any necessary repairs.

UCCNHT0000990

2. Within a reasonable period after the date hereof, at its sole cost and expense, Union Carbide shall take such actions as may be necessary in order to decontaminate (i) Building 163 and the area shown on Figure 2 attached hereto of such radiation as may be reasonably practicable in order to meet acceptable levels under applicable Federal standards; and (ii) Building 169 of asbestos in order to meet current Occupational Safety and Health Administration standards.

3. Union Carbide hereby grants to Elkem a non-exclusive easement of access to Building 88 over that part of 47th Street located within plant boundaries for as long as the the Lease Agreement of even date herewith shall remain in effect. Such easement shall be for the sole purpose of permitting deliveries and shipments as to nickel boron production and any other ferroalloy products produced in Building 88. Elkem shall indemnify and hold harmless Union Carbide from all claims, damages, loss and liability, including reasonable attorneys' fees, due to any personal injury, death or property damage (including without limitation any damage to the subject land and property of Union Carbide), arising out of Elkem's exercise of such easement rights, except where such claims, damages, loss and liability arise out of the gross negligence of Union Carbide. Elkem shall be liable for the cost of any repairs to Union Carbide's 47th Street roadway and adjoining paved surfaces due to Elkem's exercise of these easement rights. In the event Elkem exercises its option to purchase the Technology Center, simultaneously with the conveyance thereof, Union Carbide shall deliver to Elkem a permanent non-exclusive roadway easement incorporating provisions of this Paragraph 3 and in the same form (to the extent applicable) as Schedule G of the said Lease Agreement.

4. Union Carbide has assigned to Elkem certain sewage rights from the City of Niagara Falls (the "City") applicable to the Technology Center. The City has indicated that it is willing, subject to City Council approval, to increase the total allocation to Union Carbide's Niagara Plant (including the Technology Center) up to 125 pounds per day of suspended solids (SS) and 93 pounds per day of chemical oxygen demand (COD). In the event of any such increased allocation as to SS and COD, if Elkem does not receive 70% of any additional SS or COD rights, Union Carbide shall make a further assignment in order that Elkem will receive 70% of the total SS and COD allocated to the Technology Center and the Niagara Plant. Elkem reserves the right to make any claims or demands against Union Carbide as to the transferred sewage rights due to any infiltration or related problems affecting the Technology Center.

UCCNHT0000991

5. Anything to the contrary contained in the Lease Agreement notwithstanding, (i) if Union Carbide vacates any part of the Licensed Space at the Technology Center in order to accommodate the removal of Elkem personnel from Building 149, Elkem shall accept the surrender of such space and the Lease Agreement shall be modified accordingly; (ii) at the request of Elkem and subject to availability and Union Carbide's prior written consent, which shall not be unreasonably withheld, and consistent with past practices over the last five (5) years, Union Carbide shall deliver to Elkem additional electricity (hydroelectric power only), in excess of the limitations as set forth in Schedule C of the Lease Agreement, for Elkem's use at the Technology Center.

If the foregoing correctly sets forth the understanding and agreement of the parties, kindly execute this letter agreement in the space provided below.

Very truly yours,

UNION CARBIDE CORPORATION

By _____

Title _____

AGREED TO AND ACCEPTED:

ELKEM METALS COMPANY
By ELKEM INVEST, INC.
A General Partner

By _____

Title Vice President.

UCCNHT0000992

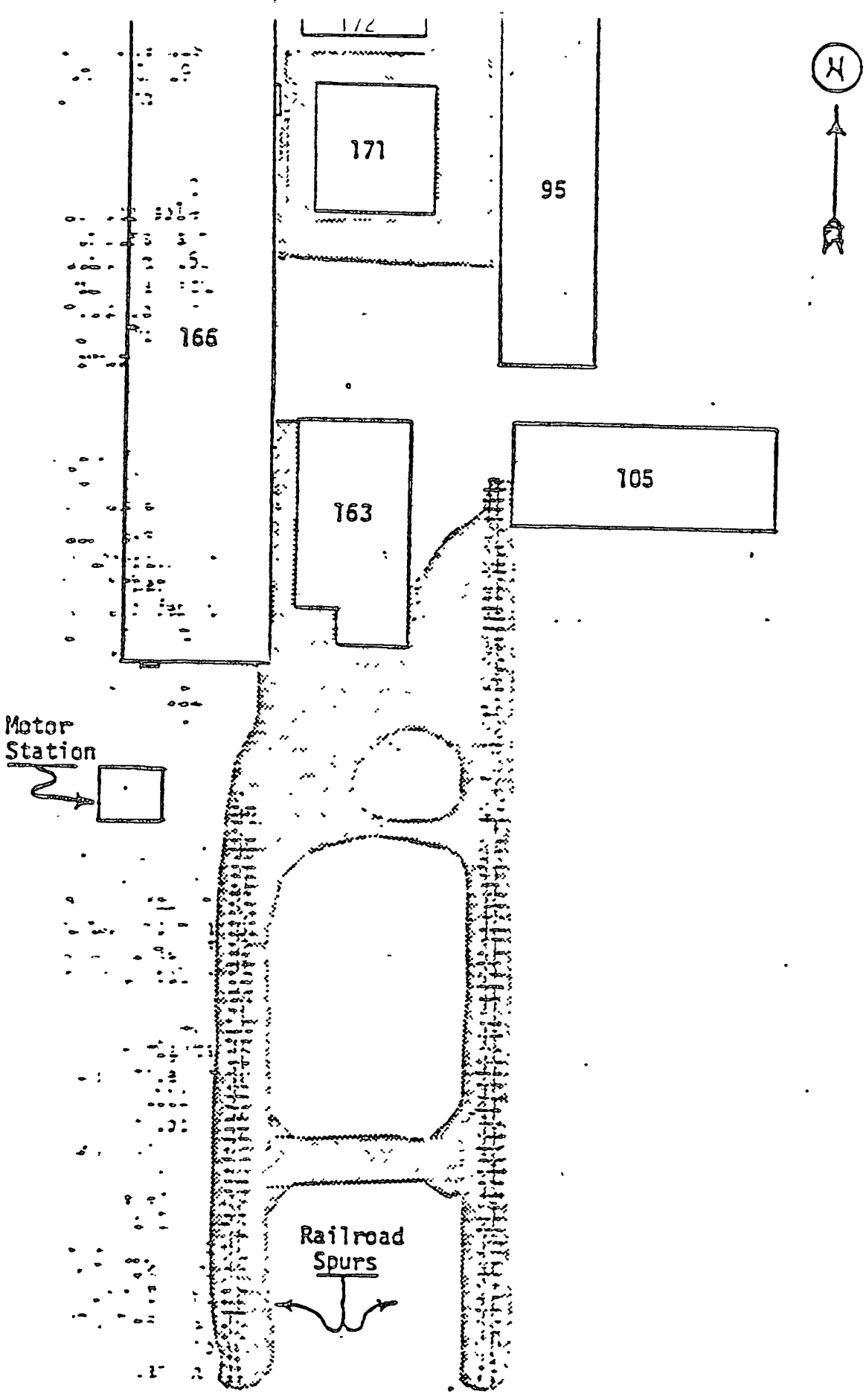


Fig. 2. Location of elevated surface gamma-ray levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY.

UCCNHT0000993

CR Allenbach

RECEIVED

OCT 1 0 1981

UNION CARBIDE INTERNAL CORRESPONDENCE

D. J. HANSEN

FILE

METALS DIVISION

P O BOX 579 - 4625 ROYAL AVE., NIAGARA FALLS, NEW YORK 143(

o (Name) Dr.D. J. Hansen
ivision Building 94
ocation NIAGARA

Date October 13, 1981

Originating Dept Minerals Technology

Answering letter date

opy to Mr. H. J. O'Hear
Mr. R. G. Woolery

Subject Radiation Survey of Technology Area

RECEIVED

OCT 14 1981

SHEA DEPT.

The attached figure shows the results of a radiation survey performed on October 5, 1981 along the east side of Building 166 to 95 building and the "ball field" behind 166. The values were obtained with a Geiger-Müller type survey meter manufactured by Victoreen of Cleveland, Ohio and are estimates of millirems per hour measured at 1" from the surface. It was observed during the survey that the map is not precisely to scale. As a result, the readings along 166 were taken relative to the location of the buildings, though they do approximate 50' centers. The readings within the railroad tracks are spaced ∿30' apart east to west and ∿50' apart north to south. The readings outside the tracks are ∿50' from the nearest reading just inside the tracks.

In general, levels exceeding background occur on all but the western side of Building 171, between Buildings 166 and 163, and along the railroad tracks. Most of these values are only marginally above background, and all those in the regular grid are less than the 0.25 mrem/hr limit for uncontrolled areas applicable to property that remains subject to the jurisdiction of the State Labor Law and Part 38 of the Industrial Code Rule, Ionizing Radiation Protection. (The 0.25 mrem/hr is from Table 5, attached, of Part 38, and is for fixed alpha or beta-gamma emitters. Also given is a value of 0.05%, or 500 ppm, for the limit of concentrations of source material in soil). However, a previously known area yielding higher emissions was reexamined and an estimated 4 mrem/hr was observed. The attached spectrographic analysis indicates that ∿2.4% of uranium and thorium exists at the surface of this area, and ∿.24% Th is detected at a depth of 6".

Based on the above information, the following is recommended:

1. Remove the surface material of >500 ppm U+Th and >.25 mrem/hr in the area of the ∿4 mrem/hr reading.

2. Survey the ball field area thoroughly as the ∿4 mrem/hr would not have been detected by obtaining readings at 30-50' intervals.

3. Analyze the material at the 0.13 mrem/hr areas to check that it does not contain >500 ppm U+Th.

DRB/rmm
Attachments

[signature]

UCCNHT0000994

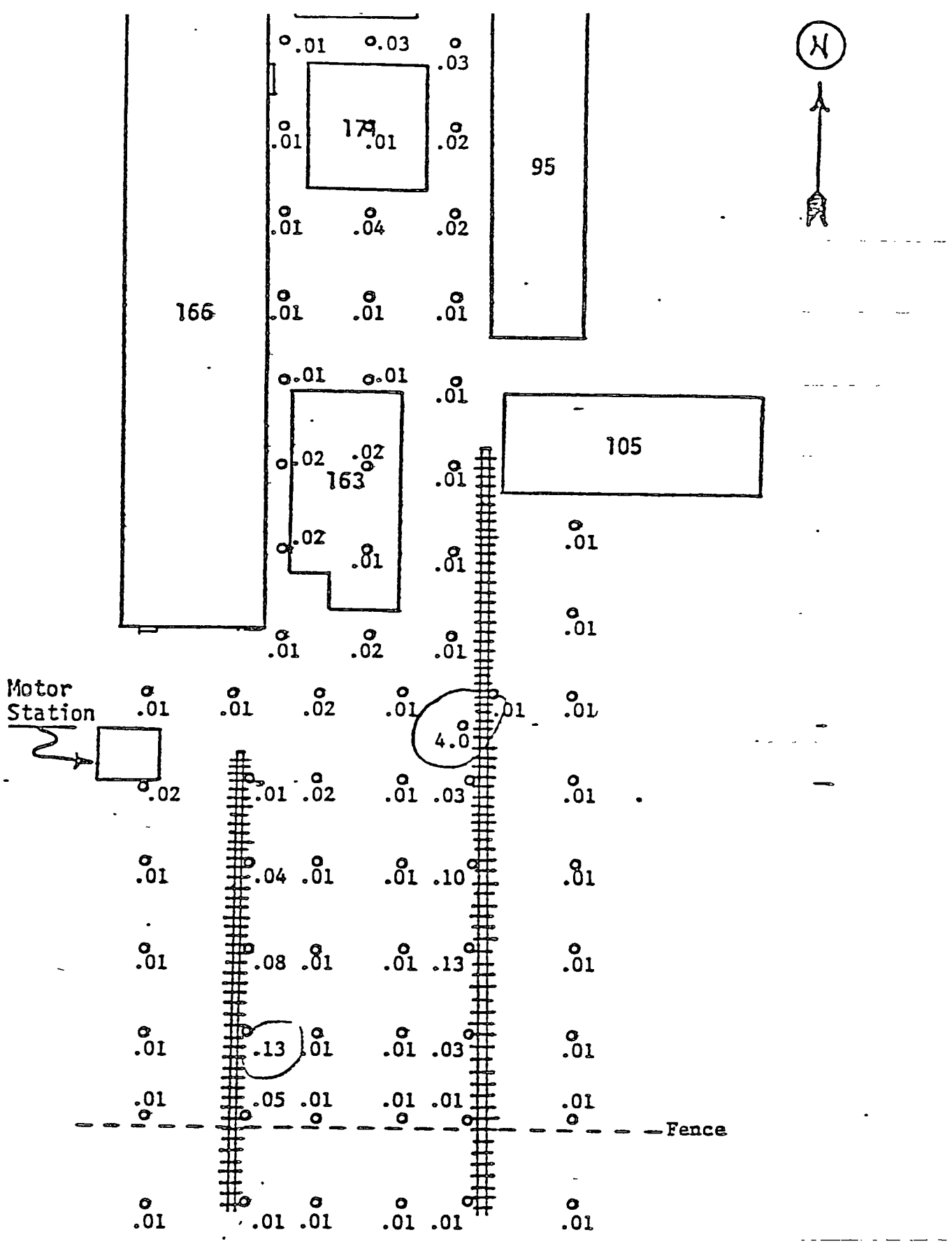


FIGURE 1. Radiation levels in mR/hr at the Technology Department noted during survey of 10/5/81. Natural background was ~.01 mR/hr.

UCCNHT0000995

	Microcuries
.....	100
.....	100
.....	10
.....	10
.....	10
.....	10
.....	10
.....	10
.....	10
.....	100
.....	10
.....	1,000
.....	100
.....	100
.....	100
.....	10
.....	10
.....	10
.....	100
.....	100
.....	10
.....	100
.....	1,000
.....	10
.....	10
.....	10
.....	0.1

...sent more than one ...ollows:

...clide present and the denom... Part (rule). The sum of such

100

...t (rule) where more than one ... shall be derived as follows:

... present and the denominator ...le). The sum of such quotients

1

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits.

(1) Alpha emitters.

(i) Removable:

15 pCi / 100 cm²	=	33 dpm / 100 cm²	average over any one surface
45 pCi / 100 cm²	=	100 dpm / 100 cm²	maximum

(ii) Total (fixed):

450 pCi / 100 cm²	=	1000 dpm / 100 cm²	average over any one surface
2250 pCi / 100 cm²	=	5000 dpm / 100 cm²	maximum

0.25 mrem / hr at 1 cm

(2) Beta-Gamma emitters.

(i) Removable: (all beta-gamma emitters except Hydrogen 3)

100 pCi / 100 cm²	average over any one surface
500 pCi / 100 cm²	maximum

Removable: (Hydrogen 3)

1000 pCi / 100 cm²	average over any one surface
5000 pCi / 100 cm²	maximum

(ii) Total (fixed): 0.25 mrem / hr at 1 cm from surface.

(b) Concentrations in air and water: Table 6, Schedule II.

(c) Concentrations in soil and other materials except water:

(1) Radioactive material except source material: Table 2, Column 2.

(2) Source material: 0.05 per cent by weight.

Note: Jurisdictional limits. The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule).

UCCNHT0000996

UCC METALS DIVISION
R&D DEPT. ANALYTICAL LABORATORY
REPORT OF SPECTROGRAPHIC ANALYSIS

Plate No. 5717
Date 9 Sept 80
By SPec

Submitted by W.R. Pioli Values in %
Gymnometh, C.R. Allenbach
A.R. Brosnahan

537-70

On Sample Basis
SEP 9 1980

Sample No.	009433	009434			
Material	8610 @ #1 surface	8611 @ #2 [illegible]			
Ag	—	—			
Al	.2-2.	1-10			
As	—	—			
Au	—	—			
B	.004-.04	.003-.03			
Ba	.008-.08	.002-.02			
Be	.0008-.008	.0004-.004			
Bi	—	—			
Ca	.2-2.	.2-2.			
Cb	M	.2-2.			
Cd	—	—			
Co	.004-.04	.008-.08			
Cr	.04-.4	.3-3.			
Cu	.002-.02	.003-.03			
Fe	2-20	1-10			
Ga	—	—			
Ge	—	—			
[illegible]	.01-.1	—			
In	—	—			
Ir	—	—			
Mg	.04-.4	M			
Mn	.08-.8	.04-.4			
Mo	—	—			
Na	—	.04-.4			
Ni	.003-.03	.008-.08			
Os	—	—			
P	—	—			
Pb	.1-1.	.03-.3			
Pd	—	—			
Pt	—	—			
Rh	—	—			
Sb	—	—			
Si	.8-8.	M			
Sn	.3-3.	.2-2.			
Sr	.008-.08	—			
Ta	M	M			
Th	.8-8.	.08-.8			
Ti	M	.2-2.			
Tl	—	—			
U	.8-8.	—			
V	.008-.08	.008-.08			
W	.08-.8	—			
Zn	—	—			
Zr	.02-.2	.01-.1			
Yttrium	1-10	.2-2.			
Ytterbium	.08-.8	.02-.2			
Lanthanum	.08-.8	—			
Scandium	[illegible]	[illegible]			

UCCNHT0000997

LGE 4/[illegible]/80

Niagara Cleanup.

1. Prepare Spec for Cleanup.

Option 3 Move to NCC property

Option 5 Remove & ship to a repository

~~2~~ Option 2 -

Need to resolve site w/ Tampa.
Plant property may remain w/ NCC Powerlines
If no pad - plastic liner?

~~3~~. Option 3

How is material shipped (out), bag?

4. Cleanup site

Railroad track - removal/replacement
Backfill Ferrophos vs Clean fill
Black top
- Fence

5 Review Plans w/ Tampa Klotzman
Include Dubay Const on Bid List

TECHNOLOGY DEPARTMENT

REQUEST FOR SPECIAL ORDER

R&D	
Non-R&D	X

COPIES TJK
RJK

Dept. No.		Project Charge No.
520		20319

TITLE. [illegible]

SPECIFIC OBJECTIVE: [illegible]

33000 ENGINEERING

Estimated By: [illegible]

REQUESTED BY: [illegible] Date 4/17/84

APPROVED BY: [signature] Date

Accounting Use Only

BUDGET CLASSIFICATION:

CHECKED BY: [signature] Date 4/17/84

INVOICE TO:

CLEAR TO:
84-615-885-10-150

DATE JOB CLOSED

UCCNHT0000999

Form RHA-P
(10/80)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

SOUTH CAROLINA RADIOACTIVE WASTE TRANSPORT PERMIT

Pursuant to Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act, a Radioactive Waste Transport Permit is hereby issued to the below-named applicant (shipper). This permit shall not, in itself, be construed as authorizing a shipper to dispose of radioactive waste within the State of South Carolina. This permit shall not be transferred, assigned or in any manner disposed of, either voluntarily or involuntarily, directly, or indirectly, through transfer of control to any person, unless the Department shall, after securing full information, find the transfer is in accordance with the provisions of Act No. 429 and shall give written consent.

1. Name and Address of Applicant (Shipper): Union Carbide Corporation Metals Division P.O. Box 97 Niagara Falls, New York 14302 (Marietta, Ohio)	2. Permit Number: 0211-31-84-X 3. Expiration Date: December 31, 1984

1984

For the South Carolina Department of Health and Environmental Control

April 23, 1984
Date of Issuance
DHEC 801 (10/80)

By Heyward G. Shealy
Heyward G. Shealy, Chief
Bureau of Radiological Health

UCCNHT0001000

LSE

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET, P O BOX 97, NIAGARA FALLS N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710-524 1664

TECHNOLOGY DEPARTMENT
– ENGINEERING

April 6, 1984

Chem-Nuclear Systems, Inc.
P.O. Box 726
Barnwell, SC 29813

Attn: Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

This letter authorizes Messrs. Earl Reagan, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space at the Chem-Nuclear site in Barnwell, South Carolina.

If there are any questions regarding this matter, please contact Mr. L. G. Evans at Telephone No. (716) 278-3462 or Mrs. S. C. Zambotti at Telephone No. (716) 278-3232.

Sincerely,

S C Zambotti
Mrs. S. C. Zambotti
Purchasing Agent

SCZ/jl
cc: Earl Reagan
R. J. Klotzbach

UCCNHT0001001

AUTHORIZATION FOR OPERATING ACCOUNT DISBURSEMENT

Attach Original Documents
to be paid here

DATE April 9, 1984

Please Draw a Check in the Amount of $ 500.00

Payable to: S. Carolina Department of Health and Environmental Control, Bureau of Finance

Address: 2600 Bull Street
Columbia, S.C. 29201

In Payment of: Radioactive Waste Transportation Permit

Charge to: TaCb Relocation 740-885-1167-13
Marietta, Ohio

Requested by: L.G. Evans

Approved for Payment: R.J. Klotzbach

[XX] Return CHECK to requisitioner for mailing.

[ ] Mail to above address.

This file to be attached to voucher copy of check.
All individual items attached are to be stamped "PAID".

UCCNHT0001002

AUTHORIZATION FOR OPERATING ACCOUNT DISBURSEMENT

Attach Original Documents
to be paid here

DATE April 9, 1984

Please Draw a Check in the Amount of $ 500.00

Payable to: S. Carolina Department of Health and Environmental Control, Bureau of Finance

Address: 2600 Bull Street
Columbia, S.C. 29201

In Payment of: Radioactive Waste Transportation Permit

Charge to: TaCb Relocation 740-885-1167-13
Marietta, Ohio

Requested by: L.G Evans

Approved for Payment: R J Klotzbach
R J. Klotzbach

/XX/ Return CHECK to requisitioner for mailing.

/ / Mail to above address.

This file to be attached to voucher copy of check.
All individual items attached are to be stamped "PAID".

UCCNHT0001003

UNION CARBIDE CORPORATION PO BOX 66, 137 - 47th STREET
METALS DIVISION NIAGARA FALLS, NEW YORK 14302

July 25, 1983

Chem-Nuclear Systems, Inc.
P.O. Box 726
Barnwell, SC 29813

Attn: Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

This letter authorizes Mssrs. Mike-Anderson, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space a the Chem-Nuclear site in Barnwell, South Carolina.

If there are any questions regarding this matter, please contact Mr. L.G. Evans at Telephone No. (716) 278-3462 or Mr. D.H. McGuire at Telephone No. (716) 278-3232.

Sincerely,

D H McGuire

Mr. D.H. McGuire
Purchasing Agent

DHM:db
cc: Mike-Anderson, NUSPSC

UCCNHT0001004

To: Betty Linville
Grand Junction

From: L.G. Evans

[illegible]

Betty

n.F.
x 3462

AUTHORIZATION FOR OPERATING ACCOUNT DISBURSEMENT

Attach Original Documents
To be paid here

DATE April 9, 1984

Please Draw a Check in the Amount of $ ~~590.00~~ 500.00

Payable to: S. Carolina Dept. of Health & Environmental Control, Bureau of Finance

Address: 2600 Bull Street
Columbia, SC ~~29201~~ 29201

In Payment of: Radioactive Waste Transportation Permit

~~740~~ 02 885-88-0167-13

Charge to: TaCo Relocation 740-885-1167-13
Marietta, OH

Requested by: L. G. Evans

Approved for Payment: * [signature]

☒ Return CHECK to requisitioner for mailing.

☐ Mail to above address.

This file to be attached to voucher copy of check.
All individual items attached are to be stamped "PAID".

rec 4/9 lc 12.50p

UCCNHT0001005

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET, P O BOX 97 NIAGARA FALLS N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710-524 1664

TECHNOLOGY DEPARTMENT
— ENGINEERING

April 6, 1984

Chem-Nuclear Systems, Inc.
P.O. Box 726
Barnwell, SC 29813

Attn: Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

This letter authorizes Messrs. Earl Reagan, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space at the Chem-Nuclear site in Barnwell, South Carolina.

If there are any questions regarding this matter, please contact Mr. L. G. Evans at Telephone No. (716) 278-3462 or Mrs. S. C. Zambotti at Telephone No. (716) 278-3232.

Sincerely,

S C Zambotti
Mrs. S. C. Zambotti
Purchasing Agent

SCZ/jl
cc: Earl Reagan
R. J. Klotzbach

UCCNHT0001006

UMETCO MINERALS CORPORATION

P.O. Box 1029

Grand Junction, Colorado 81502

THE ATTACHED CHECK IS IN PAYMENT OF THE FOLLOWING

P/E ____

____ PER STATEMENT ATTACHED

____ SEMI MONTHLY EXPENSE REPORT

____ FRT BILLS PER ATTACHED

____ TEMPORARY ADVANCE

____ INVOICE NO ____

__X__ OTHER Radioactive Waste Transportation Permit
TaCb Relocation

ACCOUNTS TO BE CHARGED — EMP NO

SOURCE LOCATION CO (2 DIG)	SOURCE LOCATION UNIT (3 DIG)	DEPT (4 DIGITS)	EXP CLASS (3 DIGITS)	MAJOR ACCOUNT (6 DIGITS)	PROJECT NO (6 DIGITS)	AMOUNT
		02885-88-0-0167-13				$ 500 00
					TOTAL	$

No 41318

If you have any questions, please contact Mr. K.W. Papp, Manager of Accounting, at the above telephone number.

0096C

UCCNHT0001007

NUS PROCESS SERVICES

July 15, 1983
PS-53-0464
Proposal No 8307089

Mr Lee Evan
Union Carbide Metal Division
P O Box 97
Niagara Falls, New York 14302

Dear Mr Evan

In regard to our recent phone conversation, NUS Process Services Corporation (NUSPSC) will be pleased to provide waste volume allocation services for Union Carbide

If selected, NUSPSC will provide this service for the fixed fee of $250 per trip On August 1, 1983, Union Carbide will be represented by NUSPSC at the Chem-Nuclear Systems, Inc land burial facility in Barnwell, South Carolina in an attempt to obtain the desired amount of burial space for use in the month of November, 1983 You will receive verbal notification before the close of business that same day of the actual space received

Additional volume allocation services will be performed by NUSPSC for the fixed fee of $250 per trip This price shall remain firm through December, 1983 Please provide seven (7) days advance notice if these services are required

Enclosed you will find an example of a typical letter of authorization In the event you wish NUSPSC to provide this service, please forward a similar letter from Union Carbide Metal Division addressed to Chem-Nuclear Systems, Inc. as shown in the enclosure A copy of your letter to Chem-Nuclear should also be forwarded to my attention at NUS Process Services

If NUSPSC can be of any further assistance in regard to your radioactive waste handling, packaging and transportation needs, please do not hesitate to contact the undersigned

Sincerely,

H Michael Anderson
Manager, Waste Management Services

HMA/ir

Enclosure

cc G P Motl
R E Voit

TECHNOLOGY DEPT - ENGINEERING
Refr'd to_____
For_____

REC'D JUL 22 1983

Noted by_____
File Number
or Subject _____

UCCNHT0001008

C O M P A N Y L E T T E R H E A D

Chem-Nuclear Systems, Inc
P O Box 726
Barnwell, South Carolina 29813

Attn Mr James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis

This letter authorizes Mssrs Mike Anderson, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space at the Chem-Nuclear site in Barnwell, South Carolina

If there are any questions regarding this matter, please contact _____ _____ or _____ _____ at ____Tel #_____

Sincerely,

XX/yy

cc Mike Anderson, NUSPSC

UCCNHT0001009

NUS PROCESS SERVICES

October 18, 1983
PS-53-0578

Mr. L. G. Evans
Union Carbide Metal Division
P.O. Box 97
Niagara Falls, New York 14302

Dear Mr. Evans:

Chem-Nuclear Systems, Inc. has requested that waste volume allocation representatives be identified by name on all letters of authorization. Attached is a sample letter of authorization which should be forwarded to Chem-Nuclear Systems in Barnwell, S.C. with a copy to my attention.

If you have any questions regarding this matter, please do not hesitate to give me a call.

Sincerely,

Regan E. Voit

Regan E. Voit
Director
Waste Management Services

REV/ir

Attachment

UCCNHT0001010

COMPANY LETTERHEAD

Chem-Nuclear Systems, Inc.
Post Office Box 726
Barnwell, South Carolina 29813

Attn. Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

This letter authorizes NUS Process Services Corporation to act as our agent for the purpose of obtaining burial space at the Chem-Nuclear site in Barnwell, South Carolina. Listed below are the NUS Process Services personnel who may be designated to act on our behalf in obtaining burial space

If there are any questions regarding this matter, please contact (Your contact) or (Your contact) at (Tel #)

Sincerely,

ZZ/xx

cc: R. E. Voit, NUSPSC

NUSPSC Personnel

Regan Voit	Anthony Chavis
Doug McLean	Tim Miller
Ray Meyer	Ricky Ray
Bob Chapman	Tim Hallman
Jim Sweatt	Dave McCoy
John Smith	Ricky Davis
Steve Burrell	Roger Betow

UCCNHT0001011

—0	L.G. Evans	278-3462	7/28/83	UCC -

APPROVED BY SIGNATURE: TaCb Residue Removal

APPROVED BY PRINT OR TYPE NAME | DATE: 11247 | See Below

NO E-C-615-244-6749

THIS ORDER NOT BINDING UNLESS UCC VALIDATION APPEARS →

PURCHASE ORDER DATE

JUL 29 1983

UNION CARBIDE 3

UNION CARBIDE CORPORATION
METALS DIVISION
P.O. Box 66, Niagara Falls, NY 14302

HEREINAFTER CALLED 'BUYER'

PAGE 1 OF 2

VENDOR

NUS Process Corporation
1501 Key Road
Columbia, SC 29201

HEREINAFTER CALLED SELLER

MAIL INVOICE IN DUPLICATE TO

UNION CARBIDE CORPORATION
Metals Division
P.O. Box 97
Niagara Falls, NY 14302
ATTN L.G. EVANS

SHIP TO

UNION CARBIDE CORPORATION
Metals Division

PLEASE TO DUPLICATE

BUYER HEREBY ORDERS UPON THE TERMS HEREIN CONTAINED INCLUDING THE ADDITIONAL TERMS ON THE REVERSE SIDE HEREOF

TERMS OF PAYMENT						TRANSPORTATION TERMS			F O B POINT		
SHIP TO ARRIVE BY	NET 30	% DISC	10 DAYS	10TH PROX	OTHER	PREPAID		OTHER	SHIP POINT	DEST	OTHER
See Below	X					ACCT OF BUYER 1	ACCT OF SELLER 2	X 3	1	X 2	3

SUB. TO STATE USE TAX YES	NO	TAX	TEXAS SEE SPECIAL INSTRUCTIONS	TAX EXEMPTION NO	SHIP VIA	PARCEL POST	TRUCK	UPS	RAIL	AIR FRT	OTHER (SPECIFY ROUTING)	BUYER	COM CODE	VENDOR CODE	REC LOC
			☐								DNA		3770F		

ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U/M	DESCRIPTION	UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	MATERIAL CODE SUB	FIRST NO	SECOND NO	SHOP ORDER
1						EA.	Period: Aug. 1, 1983 thru Dec. 31, 1983	$ 250.00		740-885-88-1167-13				
							Cost per meeting to represent Union Carbide							
							Corporation at Chem Nuclear Systems, Barnwell,							
							South Carolina burial site, for the purpose							
							of obtaining burial space on a monthly basis.							
							Union Carbide Corporation representative,							
							L.G. Evans, will notify NUS Process Corporation							
							approximately seven (7) days prior to the first							
							day of each following month as to whether this							
							(Con't.)							

REQUISITIONER'S DESCRIPTION (17) CHARACTER LIMITATION

PURCHASING AGENT'S NAME D.H. McGuire
TYPE OR PRINT NAME

☐ THIS ORDER SUPERSEDES ORAL ORDER OF 7/27/83 DATE WITH Regan Voit VENDOR REPRESENTATIVE DO NOT DUPLICATE

☒ PLEASE RETURN ACKNOWLEDGMENT FORM ATTACHED

RECEIVED
AUG 1 1983
PURCHASING DEPARTMENT

Dennis H. McGuire
PURCHASING AGENT

MM 334 150

UCCNHT0001012

8 PART CONTINUATION ORDER – CENTRAL PURCHASING

R9781A

TO NUS Process Corporation

PAGE NO 2 OF 2 OF ORDER NO EC-~~6XX~~ 244-6749

UNION CARBIDE CORPORATION

IS TO BE CONSIDERED A PART OF SAID ORDER AND TO BE GOVERNED IN ALL RESPECTS BY THE ADDITIONAL TERMS CONTAINED ON THE FIRST PAGE OF THIS ORDER

ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U / M	DESCRIPTION	UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	MATERIAL CODE SUB	FIRST NO	SECOND NO	SHOP ORDER
							this service is required.							
							CONFIRMING ORAL ORDER: DO NOT DUPLICATE							

UCCNHT0001013

Certificate of Insurance

acord

NAME AND ADDRESS OF AGENCY

Marsh & McLennan, Inc.
1221 Avenue of the Americas
New York, NY 10020

COMPANIES AFFORDING COVERAGES

COMPANY LETTER A — American Motorists Insurance Co.
COMPANY LETTER B
COMPANY LETTER C
COMPANY LETTER D
COMPANY LETTER E

NAME AND ADDRESS OF INSURED

Union Carbide Corporation
Old Ridgebury Road
Danbury, CT 06817

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies.

COMPANY LETTER	TYPE OF INSURANCE	POLICY NUMBER	POLICY EXPIRATION DATE	Limits of Liability in Thousands (000)		
					EACH OCCURRENCE	AGGREGATE
A	**GENERAL LIABILITY** [X] COMPREHENSIVE FORM [ ] PREMISES—OPERATIONS [ ] EXPLOSION AND COLLAPSE HAZARD [ ] UNDERGROUND HAZARD [ ] PRODUCTS/COMPLETED OPERATIONS HAZARD [ ] CONTRACTUAL INSURANCE [ ] BROAD FORM PROPERTY DAMAGE [ ] INDEPENDENT CONTRACTORS [ ] PERSONAL INJURY	3ZM 578 450-01	Eff. 1/1/84 until canc.	BODILY INJURY	$ 500	$ 1,000
				PROPERTY DAMAGE	$ 500	$ 1,000
				BODILY INJURY AND PROPERTY DAMAGE COMBINED	$	$
				PERSONAL INJURY		$
A	**AUTOMOBILE LIABILITY** [X] COMPREHENSIVE FORM [ ] OWNED [ ] HIRED [ ] NON-OWNED	3ZM 578 450-01	Eff. 1/1/84 until canc.	BODILY INJURY (EACH PERSON)	$ 500	
				BODILY INJURY (EACH ACCIDENT)	$ 500	
				PROPERTY DAMAGE	$ 500	
				BODILY INJURY AND PROPERTY DAMAGE COMBINED	$	
	EXCESS LIABILITY [ ] UMBRELLA FORM [ ] OTHER THAN UMBRELLA FORM			BODILY INJURY AND PROPERTY DAMAGE COMBINED	$	$
	WORKERS' COMPENSATION and EMPLOYERS' LIABILITY			STATUTORY		
					$	(EACH ACCIDENT)
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES

Anywhere in the U.S.A.

Cancellation Should any of the above described policies be cancelled before the expiration date thereof, the issuing company will endeavor to mail 30 days written notice to the below named certificate holder, but failure to mail such notice shall impose no obligation or liability of any kind upon the company.

NAME AND ADDRESS OF CERTIFICATE HOLDER

Chief Bureau of Radiological Health
South Carolina Dept. of Health &
Environmental Control
2600 Bull St.
Columbia, SC 29201

DATE ISSUED April 6, 1984

C. H. Teves

AUTHORIZED REPRESENTATIVE

ACORD 25 (1 79)

UCCNHT0001014

Form P'A-200P
(10/80)

SOUTH CAROLINA DE[illegible]MENT OF HEALTH AND E[illegible]NMENTAL CONTROL
APPLICATION FOR RADIOACTIVE WASTE TRANSPORT PERMIT

nstructions: Complete Items 1 through 8. Submit original and one copy to Chief, Bureau of Radiological Health, S.C. Dept. of Health and Environmental Control, 2600 Bull Street, Columbia, S.C. 29201. All c[illegible]ies must be signed and dated. Additional sheets may be used if necessary. U[illegible] approval, the Department will return one copy with your transport permit. All permit fees should be made payable to the S.C. Dept. of Health and Environmental Control, Bureau of Finance, 2600 Bull Street, Columbia, S.C. 29201. Please note on remittance, "For Radioactive Waste Transport Permit."

Note: Radioactive Waste Transport Permits may be purchased for more than one facility or location of a company, corporation, etc. However, an application shall be submitted for each facility to include the additional fee and the required certificate of insurance or bond.

1. Name and Address of Applicant (Shipper):

Union Carbide Corporation
Metals Division
P.O. Box 97
Niagara Falls, NY 14302

2. Person responsible for Radioactive Waste shipment:
(a) Name: Lee G. Evans
(b) Title: Project Engineer
(c) Address: P.O. Box 97, Niagara Falls, NY
(d) Telephone: (716) - 278-3462

3. Locations from which waste will be shipped if application is for more than one facility.
(a) Niagara Falls, NY
(b) Marietta, OHIO

4. NRC or Agreement State Radioactive Material License No. for each location.
(a) 950-0139
(b) SMB - 933

5. Estimated Annual Cubic Footage.
6000

6. Amount of permit fee remitted.
$500

Information to be Submitted as Attachment

7. A Certificate of Liability Insurance shall be submitted as evidence of financial ability to protect the State of South Carolina and the public at large from possible radiological injury or damage due to packaging, transportation, disposal, storage, or delivery of radioactive waste. For those applicants not maintaining liability insurance, they must deposit and maintain with the Department a cash or corporate surety bond in the amount of Five Hundred Thousand Dollars ($500,000.00).

CERTIFICATE

8. In compliance with Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act, I hereby certify on behalf of the above-named applicant (shipper) to the South Carolina Department of Health and Environmental Control that: (A) the above-named applicant (shipper) will comply fully with all applicable laws and administrative rules and regulations, both State and Federal, and any disposal facility radioactive material license requirements regarding the packaging, transportation, storage, disposal, and delivery of such wastes; (B) the above-named applicant (shipper) will hold the State of South Carolina harmless for all claims, actions, proceedings in law or equity arising out of radiological injury or damages to persons or property occuring during the transportation of its radioactive waste into or within the State including all costs defending same; provided, however, that nothing contained herein shall be construed as a waiver of the State's sovereign immunity; (C) the above-named applicant (shipper) has current copies of the Regulations for the Transportation of Radioactive Waste into or within the State of South Carolina, DOT Regulations 49 CFR Parts 171-179, and when applicable, the disposal site radioactive material license and the disposal site waste acceptance criteria; (D) the above-named applicant (shipper) has prepared this application to conform with South Carolina Department of Health and Environmental Control Regulation for Transportation of Radioactive Waste Into or Within South Carolina, and that all information contained herein, including any required supplements attached hereto, is true and correct to the best of my knowledge and belief.

Date April 9, 1984

T. J. Kagetsu, Assistant Director- Engineering
Typed Name and Title of Agent of Applicant (Shipper)

T. J. Kagetsu
Signature

DHEC 800
(10/80) Revision

UCCNHT0001015

Form PHA-200P
(10/80)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
APPLICATION FOR RADIOACTIVE WASTE TRANSPORT PERMIT

Instructions: Complete Items 1 through 8. Submit original and one copy to Chief, Bureau of Radiological Health, S.C. Dept. of Health and Environmental Control, 2600 Bull Street, Columbia, S.C. 29201. All copies must be signed and dated. Additional sheets may be used if necessary. Upon approval, the Department will return one copy with your transport permit. All permit fees should be made payable to the S.C. Dept. of Health and Environmental Control, Bureau of Finance, 2600 Bull Street, Columbia, S.C. 29201. Please note on remittance, "For Radioactive Waste Transport Permit."

Note: Radioactive Waste Transport Permits may be purchased for more than one facility or location of a company, corporation, etc. However, an application shall be submitted for each facility to include the additional fee and the required certificate of insurance or bond.

1. Name and Address of Applicant (Shipper):	2. Person responsible for Radioactive Waste shipment: (a) Name: (b) Title: (c) Address: (d) Telephone:
3. Locations from which waste will be shipped if application is for more than one facility. (a) (b)	4. NRC or Agreement State Radioactive Material License No. for each location. (a) (b)
5. Estimated Annual Cubic Footage.	6. Amount of permit fee remitted.

Information to be Submitted as Attachment

7. A Certificate of Liability Insurance shall be submitted as evidence of financial ability to protect the State of South Carolina and the public at large from possible radiological injury or damage due to packaging, transportation, disposal, storage, or delivery of radioactive waste. For those applicants not maintaining liability insurance, they must deposit and maintain with the Department a cash or corporate surety bond in the amount of Five Hundred Thousand Dollars ($500,000.00).

CERTIFICATE

8. In compliance with Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act, I hereby certify on behalf of the above-named applicant (shipper) to the South Carolina Department of Health and Environmental Control that: (A) the above-named applicant (shipper) will comply fully with all applicable laws and administrative rules and regulations, both State and Federal, and any disposal facility radioactive material license requirements regarding the packaging, transportation, storage, disposal, and delivery of such wastes; (B) the above-named applicant (shipper) will hold the State of South Carolina harmless for all claims, actions, proceedings in law or equity arising out of radiological injury or damages to persons or property occuring during the transportation of its radioactive waste into or within the State including all costs defending same; provided, however, that nothing contained herein shall be construed as a waiver of the State's sovereign immunity; (C) the above-named applicant (shipper) has current copies of the Regulations for the Transportation of Radioactive Waste into or within the State of South Carolina, DOT Regulations 49 CFR Parts 171-179, and when applicable, the disposal site radioactive material license and the disposal site waste acceptance criteria; (D) the above-named applicant (shipper) has prepared this application to conform with South Carolina Department of Health and Environmental Control Regulation for Transportation of Radioactive Waste Into or Within South Carolina, and that all information contained herein, including any required supplements attached hereto, is true and correct to the best of my knowledge and belief.

Date _____

_____
Typed Name and Title of Agent of Applicant (Shipper)

_____
Signature

DHEC 800
(10/80) Revision

UCCNHT0001016

UMETCO MINERALS CORPORATION
~~UNION CARBIDE CORPORATION~~

No. 41318

FIRST NATIONAL BANK
Grand Junction, Colorado

Grand Junction, Colorado April 9, 1984

PAY ~~UNION CARBIDE GRAND JUNCTION~~

$500.00

82-39/1021

~~METALS DIVISION~~
Operating Account

TO THE ORDER OF

South Carolina Dept. of Health &
Environmental Control
Bureau of Finance
2600 Ball Street
Columbia, SC 29201

SIGNED

COUNTERSIGNED

CASH PROMPTLY, NOT VALID AFTER 60 DAYS

⑈0004 1318⑈ ⑆102100390⑆ 088 446 2⑈

UCCNHT0001017

To: S.C. ZAMBOTTI - Purchasing Dept.
From: G.E. WALCK - Engineering Dept.
Please Obtain Bids on Items Covered by Subject Specification from Listed Bidders

Subject: Spec. Nos. _____

Plant Location NIAGARA File 11309

1. ATTACHMENTS FOR QUOTATION:
   _____ COPIES, SPECIFICATION
   _____ COPIES, PROPOSAL FORM
   8 COPIES, DRAWINGS
2. BIDS TO BE RECEIVED BY: _____ NO EARLIER THAN ____
3. EQUIPMENT NEEDED BY: JUNE 15, 1984 NO LATER THAN ____
4. APPROVAL/FINAL PRINTS BY _____
5. TECHNICAL CONTACT: NAME G.E. WALCK PHONE (716) 278-3361
6. PLEASE SEND COPIES OF THE R.F.Q. PACKAGE, WITH A COPY OF THIS TRANSMITTAL TO:
   - [X] L.G. EVANS
   - [X] G.E. WALCK
   - [ ] _____
   - [ ] _____
   - [ ] _____
   - [ ] _____
   - [ ] _____
   - [ ] _____
7. PLEASE HAVE BIDDERS SEND COPIES OF THEIR PROPOSALS TO:
   A. L.G. EVANS. ENGR. DEPT.
   B. _____
8. ESTIMATED COST: $ 10,000.00
9. RECOMMENDED BIDDERS: Page 1 of ____
   A. FORGIONE LUMBER CO. INC.
   COLLEGE AVENUE & HYDE PARK BLVD.
   NIAGARA FALLS, N.Y.
   B. WICKER LUMBER CO., INC.
   3411 HIGHLAND AVE.
   NIAGARA FALLS, N.Y.
   C. OLIVERO LUMBER CO.
   4689 MOORE CITY ROAD.
   LEWISTON, N.Y.
   D. PALLET PRODUCERS INC.
   LOCKPORT ROAD.
   NIAGARA FALLS, N.Y.
   E. _____
10. REMARKS:
    WE REQUIRE APPROX. 100 CONTOINERS PER. ORG. SF-7897
    DELIVERED TO THE NIAGARA PLANT PER ATTACHED REQUISITION.

J. E. Walck 5-1-84
(SIGNATURE) (DATE)

To: - PURCHASING DEPT.
From: - ENGINEERING DEPT.
cc: [ ] _____ [ ] _____
[ ] _____ [ ] _____

Please complete, validate and place attached P.O. No. _____

1. ATTACHMENTS FOR PURCHASE
   _____ COPIES, SPECIFICATION
   _____ COPIES, BID ANALYSIS
   _____ COPIES, DRAWINGS
2. RECOMMENDED SUPPLIER:
3. In addition to normal distribution, Purchasing to send validated copy of P.O. and Spec. to:
   [ ] _____ [ ] _____
   [ ] _____ [ ] _____
   [ ] _____ [ ] _____
   [ ] _____ [ ] _____
4. Remarks:

(SIGNATURE) (DATE)

UCCNHT0001018

To Purchasing Department

7 PART PURCHASE REQUISITION/ORDER

PRINTED IN U. S. A.

COM CODE	CPA	SUP	ACCTG UNIT CODE	REQUISITIONED BY	PHONE	BLDG/RM	DATE	NAME	DELIVER TO	LOCATION
			—0	G E WALCK	278-3361		5-9-84	G.E WALCK	BLDG. 166	NIAGARA

NO

APPROVED BY / SIGNATURE	TO BE USED FOR	
	SHIPPING CONTAINERS FOR RESIDUE REMOVAL	
APPROVED BY PRINT OR TYPE NAME	DATE	LAST P O NUMBER	DATE WANTED
L. G EVANS	5/9/84		SEE BELOW

THIS ORDER NOT BINDING UNLESS UCC VALIDATION APPEARS

UNION CARBIDE CORPORATION
METALS DIVISION

HEREINAFTER CALLED "BUYER"

PAGE 1 OF 1

VENDOR

MAIL INVOICE IN DUPLICATE TO

UNION CARBIDE CORPORATION
Metals Division

SHIP TO

UNION CARBIDE CORPORATION
Metals Division
137 - 47TH STREET
NIAGARA FALLS, N.Y. 14302

020889

HEREINAFTER CALLED "SELLER"

BUYER HEREBY ORDERS UPON THE TERMS HEREIN CONTAINED, INCLUDING THE ADDITIONAL TERMS ON THE REVERSE SIDE HEREOF

TERMS OF PAYMENT

TRANSPORTATION TERMS

F O B POINT

SHIP TO ARRIVE BY	NET 30	% DISC	10 DAYS	15TH PROX	OTHER	PREPAID	OTHER	SHIP POINT	DEST	OTHER
SEE BELOW								1	2	3

TAX YES	TAX NO	TAX %	TEXAS SEE SPECIAL INSTRUCTIONS	TAX EXEMPTION NO	SHIP VIA	PARCEL POST	TRUCK	UPS	RAIL	AIR FRT	OTHER (SPECIFY ROUTING)	BUYER	COM CODE	VENDOR CODE	REC LOC

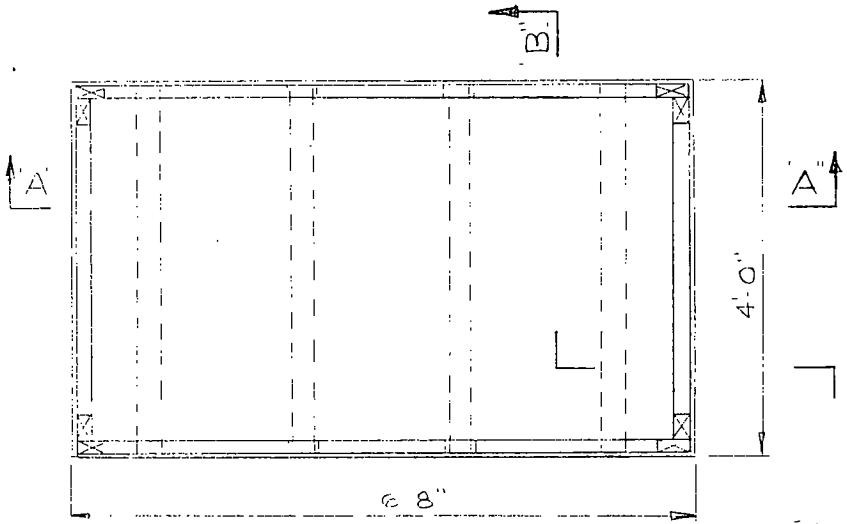
ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U/M	DESCRIPTION	UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	MATERIAL CODE SUB	FIRST NO	SECOND NO	SHOP ORDER
					100	EA.	50 CU.FT. SHIPPING CONTAINERS PER		04	615	085	10	100	1
							UNION CARBIDE CORP. DWG. SF-7897.							
							SHIP 20 TO ARRIVE BY JUNE 15, 1984,							
							THE REMAINDER IN 20 UNIT (TRUCKLOAD) LOTS							
							TO BE RELEASED FOR DELIVERY PER OWNER'S							
							ENGINEER. ALL SHIPMENTS TO BE RELEASED							
							BY JULY 13, 1984.							

HEQUISITIONER'S DESCRIPTION (17) CHARACTER LIMITATION

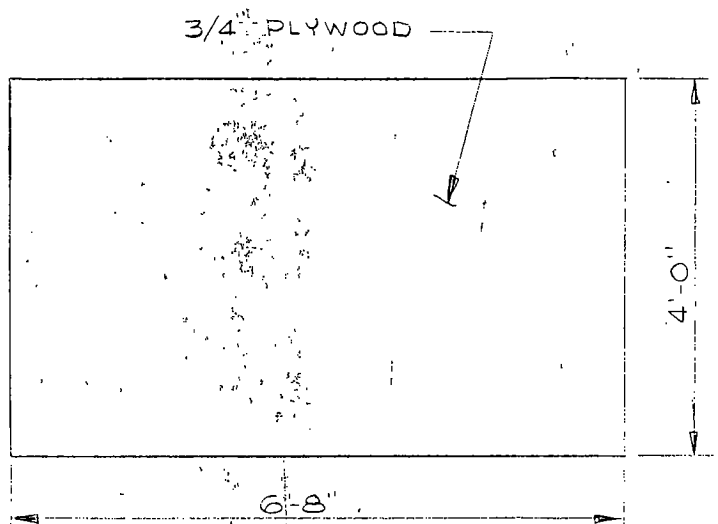
PURCHASING AGENT'S NAME _____ TYPE OR PRINT NAME

] THIS ORDER SUPERSEDES ORAL ORDER OF _____ DATE WITH _____ VENDOR REPRESENTATIVE DO NOT DUPLICATE

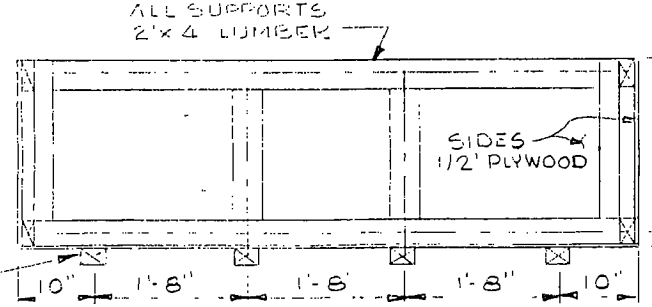
UCCNHT0001019



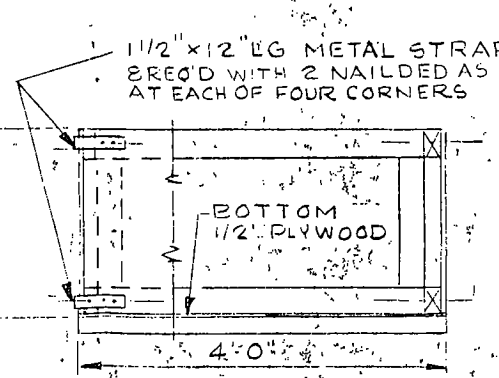
TOP VIEW
COVER REMOVED



COVER OF BOX



SECTION 'A-A'



SECTION 'B-B'

NOTES

1. ALL JOINTS TO BE CAULKED ON INSIDE OF BOX BY Unetco
2. ALL PLYWOOD APA C-D INTERIOR WITH EXTERIOR GLUE
3. FASTENERS TO BE SCREW TYPE NAILS WITH FLAT HEAD

REV	DATE	BY	DESCRIPTION

TITLE: 50 CU. FT. SHIPPING CONTAINER

UNION CARBIDE CORPORATION
METALS DIVISION

FILE NUMBER	930/256	DRAWING SCALE
11309	- - -	3/4" = 1'-0"

PLANT	BLDG NO	DWN BY	CHKD BY	STAFF ENG	ACC ENG	EX	DATE	DRAWING NUMBER
NIAGARA	YARD	DGF			RJE	GEW	5-2-84	SF-7897

UCCNHT0001020

INTERNAL
CORRESPONDENCE

UNION CARBIDE CORPORATION OLD RIDGEBURY ROAD DANBURY CT
Purchasing & Materials Services Department

To (Name)	Mr. W. J. Wysocki	Date	April 20, 1982
Division	Metals Division		
Location	Niagara Falls, NY	Originating Dept	Purchasing & Materials Services
Area			
		Area	C1 219
Copy to	Mr. L. G. Evans - Niagara Falls	Subject	CHEM-NUCLEAR SERVICES, INC.
	Mr. D. H. Mueller - P&MS		National Agreement - Metal
			Division Release No.806-16711

Dear Bill:

Please find attached the subject Release which I executed at a 4/14/82 meeting with Chem-Nuclear. Please furnish an original PASR so I may obtain the necessary approvals for your records.

The approvals granted are conditional upon your attachment of CNSI's completed Form No. CNS-201, the date of such entered in part B.1 of Exhibit A and the entry of the data required in Paragraph G of Exhibit A.

GYMcFadden

GYMcFadden:jh
Attachment

TECHNOLOGY DEPT.- ENGINEERING
Refr'd to
For

REC'D APR 23 1982

Noted by
File Number
or Subject

UCCNHT0001021

EXHIBIT "A"

Radioactive Waste Disposal Contract # 100-27573

Order/Release No. 806-16711

A. 1. DELIVERY LOCATION

2. Company's facility (if other than Delivery Location)

1. Contractor's disposal site located approximately six (6) miles west of Barnwell, South Carolina.
2. Union Carbide Corporation
Metals Division
Marietta, Ohio NIAGARA FALLS, NY

B. MATERIALS

1. Describe materials and any containers in which such materials are to be delivered to Contractor. Specify when and where the containers are to be provided.

The Material shall be as described on Contractor's Form #CNS-201, dated, attached hereto and made a part hereof.

Material: Miscellaneous structural steel, hand rails, piping, concrete & container lumber which is contaminated on surface only with Ta Cb residue as follows

Umax 0.15%
Thmax 0.55%
U&th = 0.0016 is C/gm

The above Material shall be packaged in wooden crates, approximately 100ft 3 each. Said crates shall be constructed of ½" thick plywood reinforced with 2" x 4" lumber All joints shall be caulked, inspected and accepted by Contractor prior to filling at Company Site. Said crates shall be accepted by Contractor as Material hereunder.

2. Additional Information (Specify DOT shipping name and class and EPA description. Specify any special handling instructions.)

The Material shall be as further described in Contractor's Form No. CNS-201, dated , attached hereto and made a part hereof

B.2 Material is a by-product material.

DOT designated as a LSA material.

C. WORK

Describe Work to be performed. (Indicate specific services to be performed, such as package, accept, load, transport, treat, store and dispose. Indicate method of disposal. If Contractor has responsibility for marking and labeling containers in which Materials are to be tendered to Contractor or to perform any other service for Company prior to delivery of Materials, so specify. Indicate any portion of the Work which is to be subcontracted and name of subcontractor.)

C. Contractor shall accept the Material at its facility and shall off-load, store and dispose of Material by burial in its licensed landfill, all in accordance with applicable federal, state and local laws.

Company shall mark, label, package, load and transport Material to Contractor's Barnwell waste management facility.

D. DISPOSAL LOCATION

Indicate nature and specific location of disposal area.

Contractor's disposal site located approximately six (6) miles west of Barnwell, South Carolina.

UCCNHT0001022

EXHIBIT "A" continued

Radioactive Waste Disposal Contract #100-27573
Order/Release No. 1

C. QUANTITY (Specify quantity. If no definite quantity, describe how quantity is determined, such as, such quantity as Company designates for the Work during period between _____ and _____.)	Approximately eight thousand (8000) cubic feet between May 1 and August 31, 1982. 1984 AUG DEC
F. ORDERING PROCEDURE AND SCHEDULES (Specify delivery schedule or procedure for ordering and scheduling deliveries of the Quantity of Materials. Also specify any time limit for a pickup after order is given.)	The following based on the availability of space at Barnwell, South Carolina disposal site. QUANTITY 2000 cubic feet May, 1982 AUG 1984 1146 cubic feet June, 1982 SEPT 1984 3000 cubic feet July, 1982 OCT 1984 1854 cubic feet August, 1982 NOV 1984 1000 CUBIC FT DECT 1984
G. NOTICES 1. For the purpose of providing notice pursuant to Paragraph 22. NOTICES and Paragraph 3. ACCEPTANCE AND TITLE TO MATERIALS of this AGREEMENT, Company designates _____ as its representative with respect to the Work performed under this Release. 2. Contractor hereby designates _____ as Contractor's duly authorized representative.	

reed to this 14 day of April, 1982

(CONTRACTOR) Donald E Burrough

Regional Sales Mgr

(COMPANY)

By [signature]

Title Purchasing Agt

EXHIBIT "B"
Waste Disposal Contract 100-27573
Release No. 806-16711

A. QUANTITY MEASUREMENT (Specify method of measurement and place where it is to be conducted)	Total volume of all containers furnished as determined by the outside dimensions thereof Containers shall be measured at the Barnwell, South Carolina disposal site.
B. CONTRACT PRICE	The fixed unit price amount of twelve dollars ($12.00) per cubic foot of Material container volume delivered to the Barnwell, South Carolina disposal site.
C. INVOICING INSTRUCTIONS	Contract shall submit invoices for the Work performed hereunder to: UNION CARBIDE CORPORATION Metals Division P. O. Box 97 Niagara Falls, NY 14302 ATTENTION: Mr. L. C. Evans

Contractor
Donald E. Burnett
Regional Sales Mgr
4/14/81

Company
[illegible]
Purchasing Agent
4/14/81

UCCNHT0001024

COM CODE	CPA	SUP	ACC G/L CODE		
4 4 1	C		— 0	L.G Evans	3/19/82

APPROVED BY SIGNATURE: 3/19/82 — TO BE USED FOR: TaCb Residue Relocation

APPROVED BY PRINT OR TYPE NAME | DATE | LAST P O NUMBER | DATE WANTED: 4/9/82

NO. E-C-[illegible] 6448

PURCHASE ORDER DATE MAR 22 1982

THIS ORDER NOT BINDING UNLESS UCC VALIDATION APPEARS

UNION CARBIDE 8

UNION CARBIDE CORPORATION
METALS DIVISION
P.O. Box 97, Niagara Falls, NY 14302

HEREINAFTER CALLED 'BUYER'

GEW

PAGE 1 OF 2

VENDOR

AEP Industries Inc.
20 Knickerboker Road
Moonachie, NY 07074
Attn: Ron Esak

HEREINAFTER CALLED 'SELLER'

MAIL INVOICE IN DUPLICATE TO

UNION CARBIDE CORPORATION
Metals Division
P.O. Box 97
Niagara Falls, NY 14302
ATTN: L.G. EVANS

SHIP TO UNLAWFUL TO DUPLICATE

UNION CARBIDE CORPORATION
Metals Division

ITEM #1 *
ITEM #2 **

016144

BUYER HEREBY ORDERS UPON THE TERMS HEREIN CONTAINED, INCLUDING THE ADDITIONAL TERMS ON THE REVERSE SIDE HEREOF

TERMS OF PAYMENT | TRANSPORTATION TERMS | F O B POINT

SHIP TO ARRIVE BY	NET 30	% DISC	10 DAYS	10TH PROX	OTHER	PREPAID	OTHER	SHIP POINT	DEST	OTHER
April 9, 1982		1%				X			X	

SUBJECT TO STATE/LOCAL SALES USE TAX	TAX %	TEXAS SEE SPECIAL INSTRUCTIONS	TAX EXEMPTION NO	SHIP VIA	PARCEL POST	TRUCK	UPS	RAIL	AIR FRT	OTHER (SPECIFY ROUTING)	BUYER	COM CODE	VENDOR CODE	REC LOC
YES / NO X		☐				X						4401 C		

ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U/M	DESCRIPTION	UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	MATERIAL CODE SUB	FIRST NO	SECOND NO	SHOP ORDER
1					5,000	ea.	66" x 108 x .00600 high density bags on rolls	$ 3.62102	740	885	88	1167	1	
							[Printed (Radioactive - LSA) 2" x 1" letters,							
*Ship PRINTED ONLY to:							one side - minimum once per bag] Rubber modi-							
							fied polyethlene resin (Paxon 3205)							
Union Carbide Corp.														
Metals Division							Tube shape bottom seal only.							
c/o Cisler Const. Co.														
Route 7 South														
Marietta, OH 45750														
							National Contract AC 100-05575							
							(Con't)							

REQUISITIONER'S DESCRIPTION (17) CHARACTER LIMITATION

PURCHASING AGENT'S NAME: W.J. Wysocki (TYPE OR PRINT NAME)

☒ THIS ORDER SUPERSEDES ORAL ORDER OF 3/18/82 (DATE) WITH Ron Esak (VENDOR REPRESENTATIVE) DO NOT DUPLICATE

☐ PLEASE RETURN ACKNOWLEDGMENT FORM ATTACHED

W.J. Wysocki
PURCHASING AGENT

MM 334-150

1 PURCHASING DEPT COPY

UCCNHT0001025

LGEVANS

NO. E-C-~~615~~-2

APPROVED BY [signature]

APPROVED BY PRINT OR TYPE NAME: C G RICHARDSON DATE: 4/13/84

DATE WANTED

THIS ORDER NOT BINDING UNLESS UCC VALIDATION APPEARS

UNION CARBIDE CORPORATION
METALS DIVISION

PAGE 1 OF 1

HEREINAFTER CALLED "BUYER"

VENDOR
CHEM NUCLEAR SYSTEMS INC
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA SC 29201

MAIL INVOICE IN DUPLICATE TO
UNION CARBIDE CORPORATION
Metals Division
PO BOX 97
NIAGARA FALLS NY 14302
ATTN LG EVANS

SHIP TO
UNION CARBIDE CORPORATION
Metals Division

015876

HEREINAFTER CALLED "SELLER"

BUYER HEREBY ORDERS UPON THE TERMS HEREIN CONTAINED, INCLUDING THE ADDITIONAL TERMS ON THE REVERSE SIDE HEREOF

TERMS OF PAYMENT | TRANSPORTATION TERMS | F O B POINT

SHIP TO ARRIVE BY | NET 30 | % DISC | 10 DAYS | 10TH PROX | OTHER | PREPAID (ACCT OF BUYER 1, ACCT OF SELLER 2) | OTHER 3 | SHIP POINT 1 | DEST 2 | OTHER 3

SUBJECT TO S.A. BILOCAL ... YES NO | TAX % | TEXAS SEE SPECIAL INSTRUCTIONS ☐ | TAX EXEMPTION NO | SHIP VIA | PARCEL POST | TRUCK | UPS | RAIL | AIR FRT | OTHER (SPECIFY ROUTING) | BUYER | COM CODE | VENDOR CODE | REC LOC

ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U/M	DESCRIPTION	ESTIMATED UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	MATERIAL CODE SUB	FIRST NO	SECOND NO	SHOP ORDER
								50,000	740	885	88	1167	13	
									84-615-885-10-100					
										(SPLIT PER ENGINEER)				

SEE ATTACHED

REQUISITIONER'S DESCRIPTION (17) CHARACTER LIMITATION

PURCHASING AGENT'S NAME _____ TYPE OR PRINT NAME

☐ THIS ORDER SUPERSEDES ORAL ORDER OF _____ DATE WITH _____ VENDOR REPRESENTATIVE DO NOT DUPLICATE

☐ PLEASE RETURN ACKNOWLEDGMENT FORM ATTACHED

_____ PURCHASING AGENT

MM 334 150

UCCNHT0001026

TO P ...rint Department

... / PART PU...CHASE P... ...SITION ORDER

10R0572B

PRINTED IN U. S. A.

TRANS	COM CODE	CFA	SUF	ACCTG UNIT CODE	TRANSMITTAL NO	VENDOR CODE	NAME	LOCATION
				— 0	—			

NO. E-C...-244 6814

VENDOR'S REFERENCE NO	INV REC DATE	INVOICE DATE	T/C	DUE DATE	NET AMOUNT	D/C	DISCOUNT AMOUNT	S/H

*** LATE PROCESS REASON CODE

- ☐ 1 PURCHASE ORDER NEEDED
- ☐ 2 POCN NEEDED
- ☐ 3 RECEIVING REPORT NEEDED
- ☐ 4 AUTHORIZATION NEEDED
- ☐ 5 INVOICE HELD FOR CAUSE
- ☐ 6 INVOICE RECEIVED LATE
- ☐ 7 USED MIT ACCOUNT

UNION CARBIDE CORPORATION
METALS DIVISION

HEREINAFTER CALLED BUYER

* ATTACHMENT NEEDED *

- ☐ 1 UCC DOCUMENT
- ☐ 2 SPECIAL VENDOR DOCMNT
- ☐ 3 CORRECTED VENDOR'S INVOICE

MR 1314

PAGE 1 OF 2

VENDOR

NUS PROCESS CORPORATION
1501 Key Road
Columbia, SC 29201

HEREINAFTER CALLED SELLER

MAIL INVOICE IN DUPLICATE TO

UNION CARBIDE CORPORATION
Metals Division

SHIP TO

UNION CARBIDE CORPORATION
Metals Division

BUYER HEREBY ORDERS UPON THE TERMS HEREIN CONTAINED INCLUDING THE ADDITIONAL TERMS ON THE REVERSE SIDE HEREOF

TERMS OF PAYMENT						TRANSPORTATION TERMS				F O B POINT		
SHIP TO ARRIVE BY	NET 30	% DISC	10 DAYS	10TH PROX	OTHER	PREPAID		OTHER		SHIP POINT	DEST	OTHER
See Below	X					ALLOT OF BUYER 1	ACCT OF SELLER 2 X		3	1	2 X	3

SUB PCT TO S. STATE/LOCAL SALES USE TAX		TAX %	TEXAS SEE SPECIAL INSTRUCTIONS	TAX EXEMPTION NO	SHIP VIA	PARCEL POST	TRUCK	UPS	RAIL	AIR FRT	OTHER (SPECIFY ROUTING)	BUYER	COM CODE	VENDOR CODE	REC LOC
YES	NO X		☐								DNA		3550F		

ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U/M	DESCRIPTION	UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	MATERIAL CODE SUB	FIRST NO	SECOND NO	SHOP ORDER
1					8	EA	Period: May 1, 1984 thru Dec. 31, 1984 Cost per meeting to represent Umetco Minerals Corporation at Chem Nuclear Systems, Barnwell, South Carolina burial site, for the purpose of obtaining burial space on a monthly basis. Umetco representative, L.G. Evans will notify NUS Process Corporation approximately seven (7) days prior to the first day of each following month as to whether this service is required.	$250.00	740-885-88-1167-13					

REQUISITIONER'S DESCRIPTION (17) CHARACTER LIMITATION

PURCHASING AGENT'S NAME S. C. Zambotti
TYPE OR PRINT NAME

LOT RR NO	DATE REC'D	USE	REC'D BY	REC LOC	ORIGIN IN CITY	ORIGIN IN CO	ORIGIN IN STATE	ORIGIN OUT STATE	TRANS PPD	TRANS COL	TRANS CHARGE	CARR	DATE OF PRO	PRO NO	CAR NO	CONTAIN COUNT	PRODUCT WEIGHT	TOTAL WEIGHT	PRODUCT CLASS

UCCNHT0001027

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 51729

BILLING LOCATIONS:

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA, SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING, S C 29812
(803) 259-1781

☐

SOLD-TO

Uxeco Minerals Corporation
137 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	8/30/84		37752	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0384-325-A	

DESCRIPTION	AMOUNT
Services 8/27/84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, SC by Tri State on B/L #655872	
Shipment # 615-3004	
325 cuft of radwaste X 14.50/cuft	4,712.50
(5 containers @ 65 cuft/container)	
S.C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft X 325 cuft	812.50
S.C. Imposed Low Level Radwaste Tax of 4.00/cuft X 325 cuft	1,300.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges (6,825.00)	163.80
	6,988.80

TERMS NET 30 DAYS, INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

DEPT. COPY

UCCNHT0001028

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 51848

BILLING LOCATIONS:

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA, SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING, S C 29812
(803) 259-1781

☐

SOLD TO

Uranco Minerals Corporation
137 - 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	8-31-84		37734	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0384-324-A	

DESCRIPTION	AMOUNT
Services 8-24-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, S. C. by Tri-State on B/L #655821 Shipment #615-3003	
Disposal of 520 cuft of radwaste x 14.50/cuft (8 containers @65 cuft/container)	7,540.00
S. C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft x 520 cuft	1,300.00
S. C. Imposed Low Level Radwaste Tax of 4.00/cuft x 520 cuft	2,080.00
Barnwell County Business License Tax @2.4% of Disposal Charges (10,920.00)	262.08
	11,182.08

TERMS NET 30 DAYS, INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

DEPT. COPY

UCCNHT0001029

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 52063

BILLING LOCATIONS.

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA, SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING, S C 29812
(803) 259-1781

☐

SOLD TO

Unatco Minerals Corp.
137 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	9/14/84		37855	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	E	0984-211-A	

DESCRIPTION	AMOUNT
Services 9/6/84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, SC by Tri State on B/L #657966	
Shipment #615-3005	
520 cuft of radwaste X 14.50/cuft	7,540.00
(8 containers @ 65 cuft/container)	
S.C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft X 520 cuft	1,300.00
S.C. Imposed Low Level Radwaste Tax of 4.00/cuft X 520 cuft	2,080.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges(10,920.00)	262.08
	11,182.08

TERMS NET 30 DAYS INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

R100010 (7 83)

DEPT. COPY

UCCNHT0001030

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 51688

BILLING LOCATIONS:

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA, SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 /-P O BOX 726
SNELLING, S C 29812
(803) 259-1781

☐

SOLD TO

Unatco Mineral Corp.
137 - 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	8-29-84		37682	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0884-322-A	

DESCRIPTION	AMOUNT
Services 8-18-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, SC by Tri-State on B/L#655869	
Shipment#615-3001	
520 cuft of radwaste x $14.50/cuft.	7,540.00
(8 drums @ 65 cuft/drum)	
S.C. Imposed Perpetuity Escrow Fund Charge of $2.50/cuft x 520 cuft.	1,300.00
S.C. Imposed Low Level Radwaste Tax of $4.00/cuft x 520 cuft.	2,080.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges (10,920.00)	262.08
	11,182.08

TERMS NET 30 DAYS, INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

K10018 (7 83)

DEPT. COPY

UCCNHT0001031

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 51696

BILLING LOCATIONS:

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA, SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING, S C 29812
(803) 259-1781

SOLD-TO
Uaetco Minerals Corporation
137 - 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	8-29-84		37699	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0884-323-A	

DESCRIPTION	AMOUNT
Services 8-21-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, S. C. by Tri-State on B/L #655870 Shipment #615-3002	
320 cuft of radwaste x 14.50/cuft (8 drums @65 cuft/drum)	7,340.00
S. C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft x 520 cuft	1,300.00
S. C. Imposed Low Level Radwaste Tax of 4.00/cuft x 520 cuft	2,080.00
Barnwell County Business License Tax @2.4% of Disposal Charges (10,920.00)	262.08
	11,182.08

TERMS NET 30 DAYS. INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

BB

DEPT. COPY

K10018 (7 83)

UCCNHT0001032

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 97 • NIAGARA FALLS NEW YORK 14302

To (Name) Invoice Auditing
Division Umetco Minerals Corporation
P.O. Box 1029
Grand Junction, CO 81502

Date September 18, 1984

Originating Dept TECHNOLOGY DEPARTMENT—ENGINEERING

Attached, please find the following approved invoices.

Vendor	Amount	Invoice Number	Date	P/O No.	Charge To
Western Union	$128.08	---	9/4/84	615-309816	14740-14520-08
NUS	$250.00	0884-59100A	9/7/84	244-6814	84-615-885-10-100
MESCH	$728.00	00000855	9/11/84	615-4679	740-14520-70-12302
"	$168.00	"	"	"	740-14520-70-18362

D. A. Czyzewski

CC L. G. Evans
T. J. Kagetsu

UCCNHT0001033

[illegible]
[illegible] 28[illegible] [illegible] P.O. BOX [illegible]
[illegible] NEW YORK 14091 (716) 434-6276

SOLD TO: UMETCO MINERALS CORP
PO BOX 97
NIA FALLS NY [illegible]
ATTN. LEE EVAN

SHIP TO: UMETCO MINERALS
PO BOX 97
NIA FALLS, NY 14150
ATTN. LEE EVAN

DATE	SALESMAN	ORDER NO	ORDER DATE	SHIPPED VIA	TERMS	INVOICE NO
09/11/84	2	615-4679	01/17/84		NET	00000[illegible]

ORDERED	QUANTITY SHIPPED	BACK ORDERED	ITEM NUMBER	DESCRIPTION	UNIT	UNIT PRICE	AMOUNT
1	1			ON SITE ENGINEERING-FUSE		896.000	896.00

Approved [illegible] 9/17/84

NON TAXABLE	TAXABLE	SALES TAX	FREIGHT	MISCELLANEOUS	INVOICE TOTAL	
896.00	.00	.00	.00	.00		896.00

[illegible]
CONSULTING E[illegible]
[illegible]
[illegible] NY 14091 (716) 434-6276

UMETCO MINERALS C[illegible]
118400

INVOICE DATE	INVOICE NO
09/11/84	00000[illegible]

PLEASE RETURN THIS PORTION OF THE INVOICE WITH YOUR PAYMENT

INVOICE TOTAL
896.00

UCCNHT0001034

1194-27 UMETCO MINERALS CORP.
JOE No. 520-16362

RATE	NAME	HOURS WEEK ENG 9/2/84
$22.00	FOICE DC	6

	6
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	6
ACCUM	6
$ WEEKLY LABOR COST	$168.00
ACCUM.	$168.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$168.00
LABOR & EXP. BILLABLE TO DATE	$168.00

UCCNHT0001035

1184-21	UMETCO MINERALS CORP.	HOURS
	JOB NO. 524-12302	WEEK END
RATE	NAME	9/2/84
$28.00	FOCE DG	28

	28
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	28
ACCUM.	32
$ WEEKLY LABOR COST	$728.00
ACCUM.	$896.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$728.00
LABOR & EXP. BILLABLE TO DATE	$896.00

UCCNHT0001036

NUS PROCESS SERVICES CORPORATION

IN ACCOUNT WITH:
UMETCO Minerals Corporation
P.O. Box 97
Niagara Falls, New York 14302
Attention: Lee Evans

83-INVOICE #: 0884-59100A
INVOICE DATE: 07SEPT1984
RE: P.O.#: E-C-244-6814

Burial Space Allocation Representative Services at the Barnwell, South Carolina Waste Disposal Site

Date of Service: August 17, 1984

Fixed Price Service Charge:	$250.00
TOTAL AMOUNT DUE PER THIS INVOICE	$250.00

"I hereby certify that the amount due is correct and just, that payment therefore has not been received."

PAYEE: NUS Process Services

BY: Gerald P. Motl
Gerald P. Motl, General Manager

PLEASE REMIT TO:

NUS Process Services
910 Clopper Road
Gaithersburg, MD 20878

To insure proper credit, please include the invoice number with the remittance. This invoice is due and payable within thirty (30) days. Overdue balances are subject to an interest charge of one and one-half (1 1/2) percent for each month or portion thereof beyond the due date.

9/14/84

UCCNHT0001037

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 97 • NIAGARA FALLS NEW YORK 14302

To [Name] Invoice Auditing
Division Umetco Minerals Corporation
P.O. Box 1029
Grand Junction, CO 81502

Date September 18, 1984

Originating Dept TECHNOLOGY DEPARTMENT—ENGINEERING

Attached, please find the following approved invoices:

Vendor	Amount	Invoice Number	Date	P/O No.	Charge To:
Chem-Nuclear	$11,182.08	51848	8/31/84	615-306705	84-615-885-10-100
Chem-Nuclear	$11,182 08	51688	8/29/84	"	"
Chem-Nuclear	$11,182 08	51696	8/29/84	"	"
Chem-Nuclear	$6,988.80	51729	8/30/84	"	"

D. A. Czyzewski

CC: L G Evans

UCCNHT0001038

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 51729

BILLING LOCATIONS

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING S C 29812
(803) 259-1781

SOLD TO
Umetco Minerals Corporation
137 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	8/30/84		37752	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0884-325-A	

DESCRIPTION	AMOUNT
Services 8/27/84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, SC by Tri State on B/L #655872	
Shipment # 615-3004	
325 cuft of radwaste X 14.50/cuft	4,712.50
(5 containers @ 65 cuft/container)	
S.C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft X 325 cuft	812.50
S.C. Imposed Low Level Radwaste Tax of 4.00/cuft X 325 cuft	1,300.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges (6,825.00)	163.80
	6,988.80

84-615-885-10-100
Approved J Geon
9/6/84

TERMS NET 30 DAYS INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH
PLEASE MAKE ALL CHECKS PAYABLE TO

MB

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

DUPLICATE COPY

K.0018 (7 83)

UCCNHT0001039

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 51696

BILLING LOCATIONS:

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA, SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING S C 29812
(803) 259-1781

SOLD TO
Umetco Minerals Corporation
137 - 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	8-29-84		37699	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0884-323-A	

DESCRIPTION	AMOUNT
Services 8-21-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, S. C. by Tri-State on B/L #655870 Shipment #615-3002	
520 cuft of radwaste x 14.50/cuft (8 drums @65 cuft/drum)	7,540.00
S. C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft x 520 cuft	1,300.00
S. C. Imposed Low Level Radwaste Tax of 4.00/cuft x 520 cuft	2,080.00
Barnwell County Business License Tax @2.4% of Disposal Charges (10,920.00)	262.08
	11,182.08

approved [illegible] 9/6/84

TERMS NET 30 DAYS, INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

DUPLICATE COPY

K10018 (7 83)

UCCNHT0001040

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 51688

BILLING LOCATIONS.

CORPORATE OFFICE
0 STONERIDGE DRIVE
SUITE 100
COLUMBIA SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING, S C 29812
(803) 259-1781

SOLD TO

Umetco Mineral Corp.
137 - 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	8-29-84		37682	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0884-322-A	

DESCRIPTION	AMOUNT
Services 8-18-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, SC by Tri-State on B/L#655869	
Shipment#615-3001	
520 cuft of radwaste x $14.50/cuft.	7,540.00
(8 drums @ 65 cuft/drum)	
S.C. Imposed Perpetuity Escrow Fund Charge of $2.50/cuft x 520 cuft.	1,300.00
S.C. Imposed Low Level Radwaste Tax of $4.00/cuft x 520 cuft.	2,080.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges (10,920.00)	262.08
	11,182.08

Approved 9/6/84

TERMS NET 30 DAYS INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH JB
PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

DUPLICATE COPY

F 10018 (7 83)

UCCNHT0001041

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 51848

BILLING LOCATIONS:

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA, SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING, S C 29812
(803) 259-1781

☐

SOLD TO

Umetco Minerals Corporation
137 - 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	8-31-84		37734	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0884-324-A	

DESCRIPTION	AMOUNT
Services 8-24-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, S. C. by Tri-State on B/L #655821 Shipment #615-3003	
Disposal of 520 cuft of radwaste x 14.50/cuft (8 containers @65 cuft/container)	7,540.00
S. C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft x 520 cuft	1,300.00
S. C. Imposed Low Level Radwaste Tax of 4.00/cuft x 520 cuft	2,080.00
Barnwell County Business License Tax @2.4% of Disposal Charges (10,920.00)	262.08
	11,182.08

9/11/84

TERMS NET 30 DAYS INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH
PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

K10015 (7 83)

DUPLICATE COPY

UCCNHT0001042

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 97 • NIAGARA FALLS NEW YORK 14302

To (Name) Invoice Auditing
Umetco Minerals Corporation
Division P.O. Box 1029
Grand Junction, CO 81502

Date September 19, 1984

Originating Dept TECHNOLOGY DEPARTMENT—ENGINEERING

Attached, please find the following approved invoices:

Vendor	Amount	Invoice Number	Date	P/O No.	Charge To
APPLIED HEALTH	$300.00	3-009-10048	9/13/84	615-244-6820	84-615-885-10-100

Dorothy Czyzewski

D. A. Czyzewski

CC: L. G. Evans

UCCNHT0001043

SERVICES
- Radiation and Industrial Safety Surveys
- Repair & calibration of instruments & equipment
- Decontamination & waste disposal
- Radiation monitoring film badges
- Rent-A Techs

Applied HEALTH PHYSICS inc

PRODUCTS
- Air Sampling Equipment
- Anti-C clothing & accessories
- Strippable coatings
- Warning signs & devices
- Radiation shielding

2986 Industrial Blvd • Box 197 • Bethel Park, Pa 15102 • *Phone 412* • 563-2242

INVOICE

SOLD TO

ATTN. Accounts Payable
UNION CARBIDE CORPORATION
P.O. Box 97
Niagara Falls, NY 14302

SAME AS SOLD TO UNLESS SPECIFIED

SHIP TO

Umetco Minerals Corporation
47th & A Street
Niagara Falls, NY 14302
ATTN: Gil Walck

DATE SHIPPED	F O B	SHIPPED VIA	SALESMAN	INVOICE DATE	INVOICE NUMBER
9/5/84	Bethel Park Pa	Federal Express	J. Douglas	9/13/34	3-009-10043

CUSTOMER ORDER NO	QUANTITY ORDERED	QUANTITY SHIPPED	DESCRIPTION	UNIT PRICE	UNIT	AMOUNT
C-C-615-244-6620	60	60	AIP Smears	$5.00/ea	60	$300.00

Approved JDE
- 9/17/84

HEREBY REPRESENTS THAT WITH RESPECT TO THE PRODUCTION OF THE ARTICLES AND OR THE PERFORMANCE OF THE SERVICES COVERED BY THIS INVOICE IT HAS FULLY COMPLIED WITH SECTION 12 OF THE FAIR LABOR STANDARDS ACT OF 1938 AS AMENDED

TERMS NET 30 DAYS Monthly service charge of 1 1/2% per month or 18% per annum added to past due accounts

TOTAL $300.00

UCCNHT0001044

UC 149 2

INTERNAL
CORRESPONDENCE

UNION CARBIDE CORPORATION 137-47th Street PO BOX 97 NIAGARA FALLS NY 14302
METALS DIVISION

To **Invoice Auditing**
UCC - Metals Div.
PO Box 1029
Grand Junction, Colo., 81502

Date September 10, 1984

Originating Dept TECHNOLOGY DEPARTMENT — ENGINEERING

Attached, please find the following approved invoices:

Vendor	Amount	Invoice Number	Invoice Date	P/O No.	Charge to:
TRI-STATE	$1298.76	-- (Pro #655871)	8/31/84	---	84-615-885-10-100
TRI-STATE	$1298.76	-- (Pro #655872)	9/5/84	---	84-615-885-10-100

D. A. Czyzewski

Copy to: L. G. Evans

UCCNHT0001045

D-U-N-S
00-987-0965

tsmt®
General Commodities Between All Points in U S

80S/054

REMIT TO: TRI STATE MOTOR TRANSIT CO.
P.O. BOX 263-116
KANSAS CITY, MO. 64193

PRO NUMBER 655872
SHIPPING DATE 8/22/84
INVOICE DATE 9/05/84

BILL TO
UMETCO MINERAL
ATTN: L.G. EVANS
PO BOX 97
NIAGARA FALLS NY 14302

SHIPPER	ORIGIN		TARIFF	TOTAL MILES
UMETCO MINERALS CO	NIAGARA FA	NY	4007A 3000	822
CONSIGNEE	**DESTINATION**		**SHIPPER NUMBER**	
CHEM NUC	BARNWELL	SC	6153004	

LENGTH	WIDTH	HEIGHT	SEAL NO (S)	PLACARDS APPLIED	UNIT NUMBER	ICC CODE
					8218 448132TS	28190

ROUTING | INTERLINE POINT | C/L REFERENCE

DESCRIPTION OF ARTICLES OR COMMODITY	WEIGHT	RATE	CHARGES
RAM 822 MI	26218	X 1.58	1298.76

Received
9/10/84

ICC REGULATIONS REQUIRE PAYMENT OF ALL FREIGHT CHARGES WITHIN 7 DAYS OF PRESENTATION

PLEASE REMIT THIS AMOUNT → 1,298.76

DUPLICATE FREIGHT BILL

UCCNHT0001046

D-U-N-S
00-987-0965

tsmt®
General Commodities Between All Points in U S

BUS/054

PRO NUMBER 655871

SHIPPING DATE 8/21/84

INVOICE DATE 8/31/84

REMIT TO TRI STATE MOTOR TRANSIT CO.
P.O. BOX 263-116
KANSAS CITY, MO. 64193

BILL TO
UMETCO MINERAL
ATTN: L.G. EVANS
PO BOX 97
NIAGARA FALLS NY 14302

SHIPPER	ORIGIN		TARIFF	TOTAL MILES
UMETCO MINERALS CO	NIAGARA FA	NY	4007A 3000	822
CONSIGNEE	DESTINATION		SHIPPER NUMBER	
CHEM NUC	BARNWELL	SC	6153003	

LENGTH	WIDTH	HEIGHT	SEAL NO (S)	PLACARDS APPLIED	UNIT NUMBER	ICC CODE
					3216 44510615	28190

ROUTING | INTERLINE POINT | C/L REFERENCE

* DESCRIPTION OF ARTICLES OR COMMODITY	WEIGHT	RATE	CHARGES
KAM 822 MI	42500	X 1.58	1298.76

9/10/84

ICC REGULATIONS REQUIRE PAYMENT OF ALL FREIGHT CHARGES WITHIN 7 DAYS OF PRESENTATION

PLEASE REMIT THIS AMOUNT → 1,298.76

DUPLICATE FREIGHT BILL

UCCNHT0001047

UC 149 2

INTERNAL
CORRESPONDENCE

UNION CARBIDE CORPORATION 137-47th Street PO BOX 97 NIAGARA FALLS NY 14302
METALS DIVISION

To **Invoice Auditing**
UCC - Metals Div.
PO Box 1029
Grand Junction, Colo., 81502

Date August 29, 1984

Originating Dept TECHNOLOGY DEPARTMENT — ENGINEERING

Attached, please find the following approved invoices:

Vendor	Amount	Invoice Number	Invoice Date	P/O No.	Charge to:
Dube	$23,652.30	--	7/31/84	615-309773	84-615-885-10-100
Mesch	$784.00	00000793	8/24/84	615-4679	740-14520-70-20301
"	$336.00	"	"	"	740-14520-70-18325

D. A. Czyzewski

Copy to: L. G. Evans

UCCNHT0001048

MESCH ENGINEERING P.C.
CONSULTING ENGINEERS
285 MARKET STREET P.O. BOX 451
LOCKPORT, NEW YORK 14094 (716) 434-6276

SOLD TO
UMETCO MINERALS CORP
PO BOX 97
NIA FALLS, NY 14130
ATTN. LEE EVAN

SHIP TO
UMETCO MINERALS CORP
PO BOX 97
NIA FALLS, NY 14130
ATTN. LEE EVAN

DATE	SALESMAN	ORDER NO	ORDER DATE	SHIPPED VIA	TERMS	INVOICE NO
8/24/84		[illegible]	8/17/84		NET	00000793

ORDERED	QUANTITY SHIPPED	BACK ORDERED	ITEM NUMBER	DESCRIPTION	UNIT	UNIT PRICE	AMOUNT
1	1			ON-SITE ENGINEERING-FOSE		1120.000	1120.00

Approved
8/28/84

NON TAXABLE	TAXABLE	SALES TAX	FREIGHT	MISCELLANEOUS	INVOICE TOTAL	1120.00
[illegible].20	[illegible]	.00	.00	.00		

MESCH ENGINEERING P.C.
CONSULTING ENGINEERS
285 MARKET ST. P.O. BOX 451
LOCKPORT, NY 14094 (716) 434-6276

UMETCO MINERALS C
[illegible]1040

INVOICE DATE	INVOICE NO
8/24/84	000079[illegible]

PLEASE RETURN THIS PORTION OF THE INVOICE WITH YOUR PAYMENT

INVOICE TOTAL [illegible]

UCCNHT0001049

1194-2 . UMETCO MINERALS CORP. HOUR.
JOB NO. 520-[illegible] WEE END
RATE NAME 9 [illegible]/84

$25. FOCE DG 28

	28
PREMIUM LABOR COST	$[illegible].00
HRS RECAP WKLY	28
ACCUM.	150
$ WEEKLY LABOR COST	$784.00
ACCUM.	$4200.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$784.00
LABOR & EXP. BILLABLE TO DATE	$4200.00

[illegible] UMETCO MINERALS CORP. HOURS
JOB NO. 520-18.25 WEEK END
RATE NAME 8/19/84

$[illegible] [illegible] 12

	12
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	12
ACCUM.	4[illegible]
$ WEEKLY LABOR COST	$[illegible]6.00
ACCUM.	$1288.00
EXPENSES WKLY	$[illegible].00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$[illegible].00
LABOR & EXP. BILLABLE TO DATE	$1288.00

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731 3635

July 31,1984

885-10-100

84-615-

Union CARBIDE Corp.
Metals Division
P.O. BOX 66
Niagara Falls N.Y. 14302

Approved
8/27/84

Job location:
R.R. tracks behind Elkem Metals:

Removed debris, packed radio active ready for shipment:

Labor & Equipment:

7/9/84 Ticket #4913

Truck 8 hrs. @ $15.00 perhr.	$ 120.00
Pick up truck @ $20.00 perday.	$ 20.00
Gas for pick up 2 tanks per week @ $25.00 per tank.	$ 50.00
Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
5 ton fork lift @ $100.00 per day.	$ 100.00
Torch set @ $15.00 per day.	$ 15.00
2 labors 8 hrs. each @ $11.00 per hr. each.	$ 176.00
Dube 8 hrs. @ $17.00 per hr.	$ 136.00
Scraper & grass cutter @ $40.00 perday.	$ 40.00

7/10/84 Ticket #5584

Pick up truck @ $20.00 per day.	$ 20.00
3 labors 7½ hrs. each @ $11.00 per hr, each.	$ 247.50
Backhoe w/operator 7½ hrs @ $30.00 per hr.	$ 225.00
5 ton fork @ $100.00 per day.	$ 100.00
Dube 10 hrs. @ $17.00 per hr pickde up material in buffalo.	$ 170.00
Scraper & grass cutter @ $40.00 per day.	$ 40.00
Torch set @ $15.00 per day.	$ 15.00
Flat tire on fork lift R.R. spike, had to	

UCCNHT0001052

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731 3635

continued from page #1

7/11/84	Ticket #5585	
	Pick up truck @ $20.00 per day	$ 20.00
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	5 ton fork lift @ $100.00 per day	$ 100.00
	Dube 8 hrs. @ $17.00 per hr.	$ 136.00
	3 labors 8 hrs. each @ $11.00 per hr. each	$ 264.00
	Scraper & grass cutter @ $40.00 per day	$ 40.00
	Torch set @ $15.00 per day	$ 15.00
7/12/84	Ticket #5072	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	5 ton fork lift @ $100.00 per day	$ 100.00
	955 Hylift w/operator 8 hrs. @ $32.00 per hr.	$ 256.00
	Pick up truck @ $20.00 per day	$ 20.00
	Power brush cutter @ $40.00 per day	$ 40.00
	2 labors 8 hrs. each @ $11.00 per hr each	$ 176.00
	Dube 8 hrs. @ $17.00 per hr.	$ 136.00
7/13/84	" #5073	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	5 ton fork lift @ $100.00 per day	$ 100.00
	955 Hylift w/operator 8 hrs. @ $32.00 per hr.	$ 256.00
	Pick up truck @ $20.00 per day	$ 20.00
	2 labors 8 hrs. each @ $11.00 per hr.each	$ 176.00
	Dube 8 hrs. @ $17.00 per hr.	$ 136.00
7/14/84	" #5074	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	955 Hylfit w/operator 8 hrs. @ $32.00 per hr.	$ 256.00
	10 ton fork lift @ $125.00 per day	$ 125.00
	2 ton fork lift@ $250.00 per week	$ 250.00
	Pick up truck @ $20.00 per day	$ 20.00
	Gas for pick up 2 tanks per week @ $25.00 per tank	$ 50.00

UCCNHT0001053

Dube Construction Co.
GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731 3635

continued from page #2

	Dube 8 hrs & 2 hrs. to pick up material	
	in Buffalo 10 Hrs. # $17.00 per hr.	$ 170.00
	4 labors 8 hrs. each @ $11.00 per hr.each.	$ 352.00
7/17/84	Ticket #5075	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	955 Hylift w/operator 8 hrs. @ $32.00 per hr.	$ 256.00
	10 ton fork lift @ $125.00 per day.	$ 125.00
	2 ton fork lift 8 hrs.	
	Pick up truck @ $20.00 per day.	$ 20.00
	Dube 8 hrs. @ $17.00 per hr.	$ 136.00
	4 labors 8 hrs. each @ $11.00 per hr. each.	$ 352.00
7/18/84	" #5076	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	955 Hylift w/operator 8 hrs. @ $32.00 per hr.	$ 256.00
	10 ton fork lift @ $125.00 perday.	$ 125.00
	2 ton fork lift * hrs.	
	Pick up truck @ $20.00 per day.	$ 20.00
	Dube 8 hrs. @ $17.00 per hr.	$ 136.00
	4 labors 8 hrs. each @ $11.00 per hr.	$ 352.00
7/19/84	" #5077	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	955 Hylift w/operator 8 hrs. @ $32.00 per hr.	$ 256.00
	10 ton fork lift @ $125.00 per day.	$ 125.00
	2 ton fork lift 8 hrs.	
	Pick up truck @ $20.00 per day.	$ 20.00
	Dube 8 hrs. @ $17,oo per hr.	$ 136.00
	4 labors 8 hrs. each @ $11.00 per hr.each.	$ 352.00
7/20/84	" #5078	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	955 Hylift w/operator 8 hrs. @ $32.00 per hr.	$ 256.00

UCCNHT0001054

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731-3635

continued from page #3

	10 ton fork lift @ $125.00 per day.....	$ 125.00
	2 ton fork lift 8 hrs.	
	PIck up truck @ $20.00 per day.....	$ 20.00
	DUbe 8 hrs. @ $17.00 per hr.....	$ 136.00
	4 labors 8 hrs. each @ $11.00 per hr.each.....	$ 352.00
7/23/84	TIcket #6633	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.....	$ 240.00
	955 Hylift w/operator 8 hrs. @ $32.00 per hr.....	$ 256.00
	10 ton fork lift @ $125.00 perday.....	$ 125.00
	2 ton fork lift 8 hrs. @ $250.00 per week...../	$ 250.00
	Pickup truck @ $20.00 per day.....	$ 20.00
	Gas for pick up 2 tanks per week @ $25.00 per tank.....	$ 50.00
	Dube 8 hrs. @ $17.00 per hr.....	$ 136.00
	3 labors 8 hrs. each @ $11.00 per hr. each.....	$ 264.00
	1 labor 5½ hrs. @ $11.00 per hr.....	$ 60.50
7/24/84	" #6634	
	BACkhoe w/operator 8 hrs. @ $30.00 per hr.....	$ 240.00
	Dozer w/operator 8 hrs. @ $30.00 per hr.....	$ 240.00
	10 ton fork lift @ $125.00 per day.....	$ 125.00
	2 ton fork lift 8 hrs.	
	Pick up truck @ $20.00 per day.....	$ 20.00
	Dube 8 hrs. @ $17.00 per hr.....	$ 136.00
	4 labors 8 hrs.each @ $11.00 per hr. each.....	$ 352.00
7/25/84	" #5079	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.....	$ 240.00
	Dozer w/operator 8 hrs. @ [illegible]ER HR	$ 240.00
	10 ton fork lift @ $125.00 per day.....	$ 125.00
	2 ton fork lift 8 hrs.	
	PICk up truak @ $20.00 per day.....	$ 20.00

UCCNHT0001055

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731-3635

continued from page #4

	Tandum truck & driver 8 hrs,@ $25.00 per hr....$	200.00
	Dube 8 hrs. @ $17.00 per hr.....$	136.00
	4 labors 8 hrs.each @ $11.00 per hr. each.....$	352.00
7/26/84	Ticket #5080	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.....$	240.00
	Dozer w/operator 8 hrs. " " ".....$	240.00
	10 ton fork lift @ $125.00 per day.....$	125.00
	2 ton fork lift 8 hrs.	
	Pick up truck @ $20.00 per day.....$	20.00
	Tandum truck & driver 8 hrs @ $25.00 per hr....$	200.00
	Pick up truck @ $20.00 per day.....$	20.00
	Dube 8 hrs. @ $17.00 per hr.....$	136.00
	3 labors 8 hrs. each @ $11.00 per hr. each.....$	264.00
7/27/84	" #5081	
	Backhoe w/operator 8 hrs. @ $30.00 perhr.....$	240.00
	Dozer w/opertaor 8 hrs. " " " " .....$	240.00
	10 ton fork lift @ $125.00 per day.....$	12 5.00
	2 ton fork lift 8hrs.	
	Tandum truck & driver 4 hrs. @ $25.00 per hr..$	100.00
	Pick up truck @ $20.00 per day.....$	20.00
	Dube 8 hrs. @ $17.00 perhr.....$	136.00
	3 labors 8 hrs. each @ $11.00 per hr.each.....$	264.00
	Total due on labor & equipment.....	$16,644.54

Material on job:

Broom & bromm handles.....$	17.98
5 street brooms .....$	52.97
Caulk & caulking guns.....$	42.69
Maleo #M15 snips & Nail cloth.....$	22.68
4 #867 spray paint.....$	14.51

UCCNHT0001056

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132
SANBORN 731-3635

continued from page #5

30 tubes relin caulking,.....	$ 30.50
Clear tape & masking tape.....	$ 10.11
2 rolls of tape.....	$ 9.95
Shovels & handles.....	$ 32.53
20-cases of rely cauking.....	$ 186.66
10-32x200 mill black	$ 702.33
12-32x100 " ".....	$ 834.60
3-32x100 " ".....	$ 240.71
40-2x4.....	$ 63.77
#50 sinkers.....	$ 20.28
30-2x4's.....	$ 47.83
30-2x4's & nails.....	$ 88.38
30-2x4's studs.....	$ 47.83
4 nozzles.....	$ 10.55
#7 4202 nozzles.....	$ 10.55
Yard line.....	$ 16.05
Dumped debris @ Modern Landfill	
2 loads @ $70.00 per load.....	$ 140.00
TOTAL MATERIALS.....	$2,643.46

Labor & equipment.....	$ 16,664.54
Matrials.....	$ 2,643.46
	$ 19,308.00
10% overhead.....	$ 1,930.80
	$ 21,238.80
5% profit.....	$ 1,061.94
	$ 22,300.74
State tax.....	$ 1,351.56
TOTAL DUE.....	$ 23,652.30

UCCNHT0001057

UC 149 2

INTERNAL
CORRESPONDENCE

UNION CARBIDE CORPORATION 137-47th Street PO BOX 97 NIAGARA FALLS NY 14302
METALS DIVISION

To **Invoice Auditing**
UCC - Metals Div.
PO Box 1029
Grand Junction, Colo., 81502

Date September 13, 1984

Originating Dept TECHNOLOGY DEPARTMENT — ENGINEERING

Attached, please find the following approved invoices:

Vendor	Amount	Invoice Number	Invoice Date	P/O No.	Charge to:
Dube	$26,805.82	----	7/30-8/27/84	615-309773	84-615-885-10-100

D. A. Czyzewski

Copy to: L G. Evans

UCCNHT0001058

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132
SANBORN 731-3635

Union Carbide Corp.
Metals Division
P. O. Box 66
Niagara Falls N. Y. 14302
Attn: Mr. G.E. Walck

R.R N tracks behind Elkems
Remove debris, pack radio active in boxes for shipping
Labor &Equipemnt

7/30/84	Ticket #5083		
	Backhoe w/operator 8 hrs. @ $30.00 per hr		$ 240.00
	Dozer w/operator 8 " " " "		$ 240 00
	10 ton fork lift 8 hrs. @ $125.00 per day		$ 125.00
	2 ton " " " @ $250.00 per week		$ 250.00
	Pick up truck @ $20.00 per day		$ 20.00
	Dube 8 hrs. @ $17.00 per hr		$ 136 00
	4 labors 8 hrs. each @ $11.00 per hr each		$ 352.00
	Gas for pick up 2 tanks per week @ $25.00 per tank		$ 50.00
7/31/84	" #5034		
	Backhoe w/operator 8 hrs. @ $30.00 per hr		$ 240.00
	10 ton fork lift 8 hrs. @ $125.00 per day		$ 125.00
	2 " " " 8 "		
	Pick up truck @ $20.00 per day		$ 20.00
	Dube 8 hrs. @ $17.00 per hr		$ 136.00
	4 labors 8 hrs. each @ $11.00 per hr each		$ 352.00
8/1/84	" #5085		
	Backhoe w/operator 8 hrs. @ $30.00 per hr		$ 240.00
	Dozer w/operator 8 hrs. @ $30.00 per hr		$ 240.00
	10 ton fork lift 8 hrs. @ $125.00 per day		$ 125.00
	2 ton fork lift		
	3 labors 8 hrs. each @ $11.00 per hr. each		$ 264.00
	Dube 8 hrs. @ $17.00 per hr		$ 136.00
	Pick up teuck @ $20.00 per day		$ 20.00
	8-12 yds of clay @ $65.00 per load		$ 520.00
	1 labor 4 hrs. @ $11.00 per hr		$ 44.00
8/2/84	" #5086		
	Backhoe w/operator 8 hrs. @ $30.00 per hr		$ 240.00
	2 ton fork lift		
	1 labor 8 hrs. @ $11.00 per hr		$ 88.00
	Dube 8 hrs. @ $17.00 per hr		$ 136.00

UCCNHT0001059

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731-3635

	continued from page #1	
	Pick up truck @ $20.00 per day	$ 20.00
	Compressor & buster @ $40.00 per day	$ 40.00
8/3/84	Ticket #5087	
	Backhoe w/operator 8 hrs. @ $30.00 per hr	$ 240.00
	Compressor & buster @ $40.00 per day	$ 40.00
	10 ton fork lift @ $125.00 per day	$ 125.00
	2 ton fork lift	
	Pick up truck @ $20.00 per day]	$ 20.00
	Dube 8 hrs. @ $17.00 per hr	$ 136.00
	2 labors 8 hrs. each @ $11.00 per hr each	$ 176.00
	1 labor 6 hrs. @ $11.00 per hr	$ 66.00
8/6/84	Ticket #6638	
	Backhoe w/operator 8 hrs. @ $30.00 per hr	$ 240.00
	Dozer 8 hrs. @ $152.00 per day	$ 152.00
	10 ton fork lift @ $125.00 per day	$ 125.00
	2 ton fork lift @ $250.00 ,per week	$ 250.00
	Dube 8 hrs. @ $17.00 per hr	$ 136/00
	Pick up truck @ $20.00 per day	$ 20/00
	2 labors 8 hrs. each @ $11.00 per hr. each	$ 176.00
	Gas for pick up truck 2 tanks per week @ 25.00 each	$ 50.00
8/7/84	Ticket #6640	
	Backhoe w/operator 8 hrs. @ $30.00 per hr.	$ 240.00
	10 mton fork lift @ $125.00 per day	$ 125.00
	2 " "	
	Pick up truck @ $20.00 per day	$ 20.00
	Dozer 8 hrs. @ $152.00 per day	$ 152.00
	Buster & compressor @ $40.00 per day	$ 40.00
	Dube 8 hrs. @ $17.00 per hr	$ 136.00
	3 labors 8 hrs. each @ $11.00 per hr each	$ 264.00
8/8/84	Ticket #5088	
	Backhoe w/operator 8 hrs. @ $30.00 per hr	$ 240.00
	10 ton fork lift @ $125.00 perday	$ 125.00
	2 " " "	
	Dozer 8 hrs. @ $152.00 per day	$ 152.00
	Pick up truck @ $20.00 per day	$ 20.00
	3 labors 8 hrs. each @ $11.00 per hr each	$ 264.00
	Dube 8 hrs. @ $17.00 per hr	$ 136.00

UCCNHT0001060

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731 3635

continued from page #2

8/9/84	Ticket #5089	
	Backhoe w/operator 8 hrs. @ $30.00 per hr	$ 240.00
	10 ton fork lift @ $125.00 per day	$ 125.00
	2 ton fork lift	
	Pick up truck @ $20.00 per day	$ 20.00
	2 labors 8 hrs. each @ $11.00 per hreach	$ 176.00
	Dube 8 hrs. @ $17.00 per hr	$ 136.00
	1 labor 4 hrs @ $11.00 per hr	$ 44.00
	Flatbed to transport Compactor	$ 150.00
8/10/84	Ticket #5090	
	Backhoe w/operator 8 hrs. @ $30.00 per hr	$ 240.00
	10 ton fork lift @ $125.00 per day	$ 125.00
	2 "	
	Dozer 8 hrs. @ $152.00 per day	$ 152.00
	Pick up truck @ $20.00 per day	$ 20.00
	Dube 8 hrs. @ $17.00 per hr	$ 136.00
	3 labors 8 hrs. each @ $11.00 per hr each	$ 264.00
	Compactor roller @ $550.00 per week	$ 550.00
	Tandum truck to haul 6 loads of clay @ $65.00 per load	$ 390.00
8/11/84	Ticket #5092	
	Dozer w/operator 8 hrs. @ $30.00 per hr	$ 240.00
	Roller compactor	
	truck & driver to haul 16 loads of clay	
	@ $65.00 per load	$ 1,040.00
	Truck & driver to haul 4 loads of clay @ $65.00 per lds	$ 260.00
	Pick up truck @ $20.00 per day	$ 20.00
	Dube 8 hrs. @ $17.00 per hr	$ 136.00
8/13/84	Ticket #5091	
	Backhoe w/operator 8 hrs. @ $30.00 per hr	$ 240.00
	10 ton fork lift @ $125.00 per day	$ 125.00
	2 " " "	
	Dube 8 hrs. @ $17.00 per hr	$ 136 00
	Pick up truck @ $20.00 per day	$ 20.00
	1 labor 6 hrs. @ $11.00 per hr	$ 66.00
	Gas for pick up truck 1 tank per week @ $25.00	$ 25.00
8/14/84	Ticket #5093	
	Backhoe w/operator 8 hrs. @ $30.00 per hr	$ 240.00
	Dozer 8 hrs. @ $152.00 per day	$ 152.00
	Roller compactor	$ 275.00

UCCNHT0001061

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731 3635

continued from page #3

		2 ton fork lift	
		10 ton fork lift @ $125.00 per day	$ 125.00
		1 labor 8 hrs. @ $11.00 per hr	$ 88.00
		Dube 8 hrs. @ $17.00 per hr	$ 136.00
		Pick up truck @ $20.00 per day	$ 20.00
8/15/84	Ticket	#5465	
		Backhoe w/operator 8 hrs. @ $30.00 perhr	$ 240.00
		Dozer 8 hrs. @ $152.00 per day	$ 152.00
		Roller compactor	
		10 ton fork lift @ $125.00 per day	$ 125.00
		Dube 8 hrs. @ $17.00 per hr	$ 136.00
		Pick up truck @ $20.00 per day	$ 20.00
		1 labor 8 hrs. @ $11.00 per hr	$ 88.00
		Hauled 5 loads of clay @ $65.00 per load	$ 325.00
8/16/84	Ticket	#5094	
		Backhoe w/operator 8 hrs. @ $30.00 per hr	$ 240.00
		Dozer 8 hrs. @ $152.00 per day	$ 152.00
		10 ton fork lift @ $125.00 per day	$ 125.00
		Dube 8 hrs. @ $17.00 per hr	$ 136.00
		Pick up truck @ $20.00 per day	$ 20.00
		1 labor 8 hrs. @ $11.00 per hr	$ 88.00
		Roller Compactor 8 hrs.	
8/17/84	Ticket	#5095	
		Backhoe w/operator 8 hrs. @ $30,00 per hr	$ 240.00
		Dozer 8 hrs. @ $152.00 per day	$ 152.00
		Roller compactor 8 hrs.	
		Pick up truck @ $20.00 per day	$ 20.00
		1 labor 8 hrs. @ M$11.00 per hr.	$ 88.00
		Dube 8 hrs. @ $17.00 per hr	$ 136.00
		10 ton fork lift @ $125.00 per day	$ 125.00
8/20/84	Ticket	#6642	
		Dozer w/operator 8 hrs. @ $30.00 per hr	$ 240.00
		10 ton fork lift @ $125.00 per day	$ 125.00
		1 labor 8 hrs. @ $11.00 per hr	$ 88.00
		Dube 8 hrs. @ $17.00 per hr	$ 136.00
		Pick up truck @ $20.00 per day	$ 20.00
		Gas for pick up 1 tank per week @ $25.00 per tank	$ 25.00

UCCNHT0001062

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N.Y. 14132
SANBORN 731 3635

continued from page #4

8/21/84	Ticket #6643		
	10 ton fork lift @ $125.00 per day		$ 125.00
	2 labors 8 hrs. each @ $11.00 per hr each		$ 176.00
	Dube 8 hrs. @ $17.00 per hr		$ 136.00
	Pick up truck @ $20.00 per day		$ 20.00
8/22/84	" #6644		
	10 ton fork lift @ $125.00 per day		$ 125.00
	2 labors 8 hrs. each @ $11.00 per hr each		$ 176.00
	Dube 8 hrs. @ $17.00 per hr		$ 136.00
	Pick up truck @ $20.00 per day		$ 20.00
8/23/84	" #6646		
	10 ton fork lift @ $125.00 per day		$ 125.00
	2 labors 8 hrs. each @ $11.00 per hr each		$ 176.00
	Dube 8 hrs. @ $17.00 per hr		$ 136.00
	Trailer to transport dozer & roller compacter		$ 75.00
8/24/84	" #6647		
	10 ton fork lift @ $125.00 per day		$ 125.00
	Pick up truck @ $20.00 per day		$ 20.00
	2 labors 8 hrs. each @ $11.00 per hr each		$ 176.00
	Dube 8 hrs. @ $17.00 per hr		$ 136.00
8/27/84	" #6102		
	10 ton fork lift left on job site 1 week @ $75.00 per day		$ 375.00
	TOTAL DUE LABOR & EQUIPMENT		$ 19,877.00

TERMS - 1% discount 10th, 30 days net, 2% per month on unpaid balance

UCCNHT0001063

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Remodeling - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132
SANBORN 731-3635

continued form page #5

Materials:

2 #50 sinkers	$ 37.90
10 R 1x2x8 spruce furring	$ N/C
2 rolls of black poly plastic	$ 119.90
30 pieces 2x4 spruce	$ 44.70
2 caulking guns	$ 5.98
20 2x4's	$ 29,80
1 2x8x10	$ 3.95
50 pounds nails	$ 18 95
1 4x4	$ 4.99
6 rolls 32x100 plastic poly	$ 390.00
Rental of gas post holes	$ 33.85
10 cases of caulking dap	$ 95.00
Derust spray blue	$ 6.80
" " black	$ 6.80
2 rigdig shovel	$ 34.66
10 cases dab gray oil caulk	$ 190.00
3 yds of concrete w/wire mesh	$ 194.66
Acetteline & oxigen	$ 151.16
5 loads to Modern Disposal	$ 625.00
4 cans derust spray paint @$2.80(last bill)	$ 11.20
	$ 2,005.30

Total labor & equipment	$ 19,877.00
" materials	$ 2,005.30
	$ 21,882.30
10% overhead	$ 2,188.23
	$ 24,070.53
5% profit	$ 1,203.53
	$ 25,274.06
State tax 7%	$ 1,531,76
TOTAL DUE THIS BILL	$ 26,805.82

Approved
9/12/84

UCCNHT0001064

UC 149 2

UNION CARBIDE

INTERNAL
CORRESPONDENCE

UNION CARBIDE CORPORATION 137-47th Street PO BOX 97 NIAGARA FALLS NY 14302
METALS DIVISION

To **Invoice Auditing**
UCC - Metals Div.
PO Box 1029
Grand Junction, Colo., 81502

Date August 16, 1984

Originating Dept TECHNOLOGY DEPARTMENT — ENGINEERING

Attached, please find the following approved invoices:

Vendor	Amount	Invoice Number	Date	P/O No.	Charge to:
Western Union	$128.08	--	8/1/84	615-309816	14740-14520-08
Leupold & Stevens	$7.50	9859	8/6/84	--	14740-14520-40
MESCH	$280.00	00000718	8/3/84	615-4679	740-14520-70-18331
"	$168.00	"	"	"	740-14520-70-20301
"	$448.00	"	"	"	740-14520-70-92825
"	$224.00	"	"	"	740-14520-70-18325
NUS	$250.00	0784-0163A	8/2/84	244-6814	84-615-885-10-100

D. A. Czyzewski

Copy to: L. G. Evans

UCCNHT0001065

NUS PROCESS SERVICES

IN ACCOUNT WITH:
UMETCO Minerals Corporation
P.O. Box 97
Niagara Falls, New York 14302
Attention: Lee Evans

83-INVOICE #: 0784-0163A
INVOICE DATE: 02AUG1984
RE: P.O.#: E-C-244-6814

Burial Space Allocation Representative Services at the Barnwell, South Carolina Waste Disposal Site

Date of Service: August 1, 1984

Fixed Price Service Charge:	$250.00
TOTAL AMOUNT DUE PER THIS INVOICE	$250.00

"I hereby certify that the amount due is correct and just, that payment therefore has not been received."

PAYEE: NUS Process Services

BY: Glynn E. Voit
Gerald P. Motl, General Manager

PLEASE REMIT TO:

NUS Process Services
910 Clopper Road
Gaithersburg, MD 20878

To insure proper credit, please include the invoice number with the remittance. This invoice is due and payable within thirty (30) days. Overdue balances are subject to an interest charge of one and one-half (1 1/2) percent for each month or portion thereof beyond the due date.

Approved 8/13/84

UCCNHT0001066

MESCH ENGINEERING P.C.
CONSULTING ENGINEERS
285 MARKET STREET P.O. BOX 451
LOCKPORT, NEW YORK 14094 (716) 434-6276

SOLD TO
UMETCO MINERALS CORP
PO BOX 97
NIA FALLS, NY
ATTN. LEE EVAN

SHIP TO
UMETCO MINERALS CORP
PO BOX 97
NIA FALLS, NY 14150
ATTN. LEE EVAN

DATE	SALESMAN	ORDER NO	ORDER DATE	SHIPPED VIA	TERMS	INVOICE NO
08/03/84		515-1677	07/17/84		NET	00000718

ORDERED	QUANTITY SHIPPED	BACK ORDERED	ITEM NUMBER	DESCRIPTION	UNIT	UNIT PRICE	AMOUNT
1	1			ON-SITE ENGINEERING-FOO		1120.000	1120.00

8/13/84

NON TAXABLE	TAXABLE	SALES TAX	FREIGHT	MISCELLANEOUS	INVOICE TOTAL	
1120.00	.00	.00	.00		INVOICE TOTAL	1120.00

MESCH ENGINEERING P.C.
CONSULTING ENGINEERS
285 MARKET ST. P.O. BOX 451
LOCKPORT, NY 14094 (716) 434-6276

UMETCO MINERAL
118400

INVOICE DATE	INVOICE NO
08/03/84	00000718

PLEASE RETURN THIS PORTION OF THE INVOICE WITH YOUR PAYMENT

INVOICE TOTAL 1120.00

UCCNHT0001067

11-4-12	UMETCO MINERALS CORP.	HOURS
	JOB NO. 520-18001	WEEK END
RATE	NAME	7/29/84
$20	PIEDIS	10

	10
PREMIUM LABOR COST	$0.0
HRS RECAP WKLY	10
ACCUM.	20
$ WEEKLY LABOR COST	$280.00
ACCUM.	$560.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$280.00
LABOR & EXP. BILLABLE TO DATE	$560.00

[illegible]	[illegible]	HOURS
	JOB NO. [illegible]	WEEK END
RATE	NAME	7/29/84
$[illegible]	[illegible]	6

	6
PREMIUM LABOR COST	$0.0[illegible]
HRD REDAR WKLY	6
ACCUM.	91
$ WEEKLY LABOR COST	$16[illegible].00
ACCUM.	$[illegible]
EXPENSES WKLY	$0.00
ACCUM.	$0.0[illegible]
WEEKLY BILLABLE TOTAL	$16[illegible].00
LABOR & EXP. BILLABLE TO DATE	$254[illegible].00

1194-22 JMETCO MINERALS CORP. HOURS
JOB NO. 520-92025 WEEK END
RATE NAME 7/29/84

$25.00 FUSE DC 16

	16
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	16
ACCUM.	16
$ WEEKLY LABOR COST	$448.00
ACCUM.	$448.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$448.00
LABOR & EXP. BILLABLE TO DATE	$448.00

04-20	UMETCO MINERALS CORP	HOUR
	JOB NO. 52 -18025	WEEK END
RATE	NAME	7/2-/84
$20	FOSE,DC	

	2
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	2
ACCUM.	2
$ WEEKLY LABOR COST	$224.00
ACCUM.	$224.00
EXPENSES WKLY	$0.00
ACCUM	$0.00
WEEKLY BILLABLE TOTAL	$224.00
LABOR & EXP. BILLABLE TO DATE	$224.00

UC 149 2

INTERNAL
CORRESPONDENCE

UNION CARBIDE CORPORATION 137-47th Street, P O BOX 97 NIAGARA FALLS NY 14302
METALS DIVISION

To Invoice Auditing
UCC - Metals Div.
PO Box 1029
Grand Junction, Colo., 81502

Date June 5, 1984

Originating Dept TECHNOLOGY DEPARTMENT — ENGINEERING

Attached, please find the following approved invoices:

Vendor	Amount	Invoice Number	Invoice Date	P/O No.	Charge to:
NUS Process Services	$250.00	0584-0163A	5/24/84	EC244-6814	84-615-885-10-100

D. A. Czyzewski

Copy to: L. G. Evans

UCCNHT0001072

NUS PROCESS SERVICES

IN ACCOUNT WITH:
UMETCO Minerals Corporation
P.O. Box 97
Niagara Fallas, New York 14302
Attention: Accounts Payable

83-INVOICE #: 0584-0163A
INVOICE DATE: 24MAY1984
RE: P.O.#: E-C-244-6814

Burial Space Allocation Representative Services at the Barnwell, South Carolina Waste Disposal Site

Date of Service: May 1, 1984

Fixed Price Service Charge:	$250.00
TOTAL AMOUNT DUE PER THIS INVOICE	$250.00

"I hereby certify that the amount due is correct and just, that payment therefore has not been received."

PAYEE: NUS Process Services

BY: Gerald P. Motl
Gerald P. Motl, General Manager

PLEASE REMIT TO:

NUS Process Services
910 Clopper Road
Gaithersburg, MD 20878

To insure proper credit, please include the invoice number with the remittance. This invoice is due and payable within thirty (30) days. Overdue balances are subject to an interest charge of one and one-half (1 1/2) percent for each month or portion thereof beyond the due date.

Approved 6/4/84
84-615-885-10-100

UCCNHT0001073

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 97 • NIAGARA FALLS NEW YORK 14302

To [Name] Invoice Auditing
Umetco Minerals Corporation
Division P.O. Box 1029
Grand Junction, CO 81502

Date October 2, 1984

Originating Dept TECHNOLOGY DEPARTMENT—ENGINEERING

Attached, please find the following approved invoices:

Vendor	Amount	Invoice Number	Date	P/O No.	Charge To:
APPLIED HEALTH	$400.00	3-009-10072	9/20/84	244-6820	740-885-1167-15
APPLIED HEALTH	$300.00	3-008-1008	8/27/84	244-6820	740-885-1167-15
MESCH	$420.00	00000892	9/20/84	615-4679	740-14520-70-14355
"	$196.00	"	"	"	740-14520-70-12302
"	$504.00	"	"	"	740-14520-70-18325
"	$ 28.00	"	"	"	740-14520-70-18362
MESCH	$ 56.00	00000876	9/14/84	615-4679	740-14520-70-14355
"	$616.00	"	"	"	740-14520-70-12302
"	$140.00	"	"	"	740-14520-70-18325
"	$84.00	"	"	"	740-14520-70-18362

Dorothy Czyzewski

D. A. Czyzewski

CC: L. G. Evans

UCCNHT0001074

SERVICES
- Radiation and Industrial Safety Surveys
- Repair & calibration of instruments & equipment
- Decontamination & waste disposal
- Radiation monitoring film badges
- [illegible] A-Techs

Applied HEALTH PHYSICS inc

PRODUCTS
- Air Sampling Equipment
- Anti-C clothing-disposables
- Strippable coatings
- Warning signs & devices
- Radiation shielding

2986 Industrial Blvd • Box 197 • Bethel Park, Pa 15102 • *Phone 412* • 563-2242

INVOICE

SAME AS SOLD TO UNLESS SPECIFIED

SOLD TO:
ATTN: Accounts Payable
UNITCO MINERALS CORPORATION
P.O. Box 66
Niagara Falls, NY 14302

SHIP TO:

DATE SHIPPED	F O B	SHIPPED VIA	SALESMAN	INVOICE DATE	INVOICE NUMBER
3/21/84	Bethel Park Pa	Federal Express	J. Douglas	3/27/84	3-008-10008

CUSTOMER ORDER NO	QUANTITY ORDERED	QUANTITY SHIPPED	DESCRIPTION	UNIT PRICE	UNIT	AMOUNT
C-244-6320	60	60	AHP Smears	$5.00/ea	60	$300.00

Approved JSD 9/4/84

RECEIVED
SEP 10 1984

SELLER REPRESENTS THAT WITH RESPECT TO THE PRODUCTION OF THE ARTICLES AND OR THE PERFORMANCE OF THE SERVICES COVERED BY THIS INVOICE IT HAS FULLY COMPLIED WITH SECTION 12(a) OF THE FAIR LABOR STANDARDS ACT OF 1938 AS AMENDED

TERMS NET 30 DAYS Monthly service charge of 1 1/2% per month or 18% per annum added to past due accounts

TOTAL $300.00

UCCNHT0001075

SERVICES
- Radiation and Industrial Safety Surveys
- Repair & calibration of instruments & equipment
- Decontamination & waste disposal
- [illegible]diation monitoring film badges
- [illegible] A-Techs

Applied HEALTH PHYSICS inc

2986 Industrial Blvd Box 197 • Bethel Park, Pa 15102 • *Phone 412* • 563-2242

PRODUCTS
- Air Sampling Equipment
- Anti C clothing dis usables
- Strippable coatings
- Warning signs & devices
- Radiation shielding

INVOICE

SOLD TO

ATTN: Accounts Payable
UNION CARBIDE CORPORATION
P.O. Box 97
Niagara Falls, NY 14302

SHIP TO (SAME AS SOLD TO UNLESS SPECIFIED)

Umetco Minerals Corporation
47th & A Street
Niagara Falls, NY 14302

DATE SHIPPED	F O B	SHIPPED VIA	SALESMAN	INVOICE DATE	INVOICE NUMBER
9/11/84	Bethel Park Pa	Federal Express	J. Douglas	9/20/84	3-009-10072

CUSTOMER ORDER NO	QUANTITY ORDERED	QUANTITY SHIPPED	DESCRIPTION	UNIT PRICE	UNIT	AMOUNT
[illegible]-C-244-C820	80	80	AHP Smears	$5.00/ea	80	$400.00

Approved for payment
9/25/84

[illegible] RESPECT TO THE PRODUCTION OF THE ARTICLES AND OR [illegible] COVERED BY THIS INVOICE IT HAS FULLY COMPLIED [illegible] ABOR STANDARDS ACT OF 1938 AS AMENDED

TERMS NET 30 DAYS Monthly service charge of 1 1/2% per month or 18% per annum added to past due accounts

TOTAL $400.00

UCCNHT0001076

[illegible]
[illegible]
285 MARKET STREET P.O. BOX 451
LOCKPORT, NEW YORK 14094 (716) 434-6278

SOLD TO
UMETCO MINERALS CORP
PO BOX 97
NIA FALLS, NY 14150
ATTN. LEE EVAN

SHIP TO
UMETCO MINERALS
PO BOX 97
NIA FALLS, NY 14150
ATTN. LEE EVAN

DATE	SALESMAN	ORDER NO	ORDER DATE	SHIPPED VIA	TERMS	INVOICE NO
09/14/84		[illegible]	09/14/84		NET	00000876

ORDERED	QUANTITY SHIPPED	BACK ORDERED	ITEM NUMBER	DESCRIPTION	UNIT	UNIT PRICE	AMOUNT
1	1			ON-SITE ENGINEERING-LEE		896.000	896.00

Approved 9/14/84

NON TAXABLE	TAXABLE	SALES TAX	FREIGHT	MISCELLANEOUS	INVOICE TOTAL	
						[illegible]

[illegible]
CONSULTING ENGINEERS
[illegible] P.O. Box [illegible]
Lockport, NY 14094 (716) 434-6278

UMETCO MINERALS
18400

INVOICE DATE	INVOICE NO
09/14/84	00000876

PLEASE RETURN THIS PORTION OF THE INVOICE WITH YOUR PAYMENT

INVOICE TOTAL

UCCNHT0001077

1164-16 UMETCO MINERALS CORP.
JOB NO. 520-14355

RATE	NAME	HOURS WEEK END 9/9/84
$23.00	FOSE, DG	2

	2
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	2
ACCUM.	22
$ WEEKLY LABOR COST	$56.00
ACCUM.	$616.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$56.00
LABOR & EXP. BILLABLE TO DATE	$616.00

UCCNHT0001078

1194-21 UMETCO MINERALS CORP.
JOB NO. 520-12302

RATE	NAME	HOURS WEEK END 9/9/84
$28.00	FOSE,DG	22

		22
PREMIUM LABOR COST		$0.00
HRS RECAP	WKLY	22
	ACCUM.	54
$ WEEKLY LABOR COST		$616.00
	ACCUM.	$1512.00
EXPENSES	WKLY	$0.00
	ACCUM.	$0.00
WEEKLY BILLABLE TOTAL		$616.00
LABOR & EXP. BILLABLE TO DATE		$1512.00

UCCNHT0001079

1134-23	UMETCO MINERALS CORP.	HOURS
	JOB NO. 520-18325	WEEK END
RATE	NAME	9/9/84
$26.00	FOSE,DG	5

	5
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	5
ACCUM.	53
$ WEEKLY LABOR COST	$140.00
ACCUM.	$1484.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$140.00
LABOR & EXP. BILLABLE TO DATE	$1484.00

UCCNHT0001080

1184-27 UMETCO MINERALS CORP.
JOB NO. 520-18362

RATE	NAME	HOURS WEEK END 9/9/84
$28 00	FOSE, DG	3

		3
PREMIUM LABOR COST		$0.00
HRS RECAP	WKLY	3
	ACCUM.	9
$ WEEKLY LABOR COST		$84.00
	ACCUM.	$252.00
EXPENSES	WKLY	$0.00
	ACCUM.	$0.00
WEEKLY BILLABLE TOTAL		$84.00
LABOR & EXP BILLABLE TO DATE		$252.00

UCCNHT0001081

MESH [illegible] INC.
[illegible]
285 MARKET STREET, P.O. BOX 45,
[illegible] NEW YORK 14051 (716) 434-6276

SOLD TO
UMETCO MINERALS CORP
P.O. BOX 97
NIAGARA FALLS, NY 14170
ATTN: LEE EVAN

SHIP TO
UMETCO MINERALS
P.O. BOX 97
NIAGARA FALLS, NY 14170
ATTN: LEE EVAN

DATE	SALESMAN	ORDER NO.	ORDER DATE	SHIPPED VIA	TERMS	INVOICE NO
8/20/84		[illegible]	[illegible]		NET	[illegible]

ORDERED	QUANTITY SHIPPED	BACK ORDERED	ITEM NUMBER	DESCRIPTION	UNIT	UNIT PRICE	AMOUNT
1	1			ON SITE ENGINEERING FEE		1148.000	1148.00

NON TAXABLE	TAXABLE	SALES TAX	FREIGHT	MISCELLANEOUS	INVOICE TOTAL	[illegible]

9/4/84

PLEASE RETURN THIS PORTION OF THE INVOICE WITH YOUR PAYMENT

MESH [illegible] INC.
CONSULTING ENGINEERS
285 MARKET [illegible] P.O. BOX 45
[illegible] NEW YORK 14051 (716) 434-6276

UMETCO MINERALS C
18400

INVOICE DATE	INVOICE NO.
8/20/84	[illegible]

INVOICE TOTAL

UCCNHT0001082

1184-16 UMETCO MINERALS CORP.
JOB NO. 520-14355

RATE	NAME	HOURS WEEK END 9/16/84
$28.00	FOSE, DG	15

	15
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	15
ACCUM.	37
$ WEEKLY LABOR COST	$420.00
ACCUM.	$1036.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$420.00
LABOR & EXP. BILLABLE TO DATE	$1036.00

UCCNHT0001083

1184-21	UMETCO MINERALS CORP.	HOURS
	JOB NO. 520-12302	WEEK END
RATE	NAME	9/16/84
$28.00	FOSE, DG	7

	7
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	7
ACCUM.	61
$ WEEKLY LABOR COST	$196.00
ACCUM.	$1708.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$196.00
LABOR & EXP. BILLABLE TO DATE	$1708.00

UCCNHT0001084

1184-23 UMETCO MINERALS CORP.
JOB NO. 520-18325

RATE	NAME	HOURS WEEK END 9/16/84
$28.00	FOSE, DG	18

	18
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	18
ACCUM.	71
$ WEEKLY LABOR COST	$504.00
ACCUM.	$1988.00
EXPENSES WKLY	$0.00
ACCUM.	$0.00
WEEKLY BILLABLE TOTAL	$504.00
LABOR & EXP. BILLABLE TO DATE	$1988.00

UCCNHT0001085

1184-27 UMETCO MINERALS CORP
JOB NO. 520-18362

RATE	NAME	HOURS WEEK END 9/16/84
$28.00	FOSE,DG	1

	1
PREMIUM LABOR COST	$0.00
HRS RECAP WKLY	1
ACCUM.	10
$ WEEKLY LABOR COST	$28.00
ACCUM.	$280.00
EXPENSES WKLY	$0.00
ACCUM.	$0 00
WEEKLY BILLABLE TOTAL	$28.00
LABOR & EXP BILLABLE TO DATE	$280.00

UCCNHT0001086

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 97 • NIAGARA FALLS NEW YORK 14302

To (Name) Invoice Auditing
Umetco Minerals Corporation
Division P.O. Box 1029
Grand Junction, CO 81502

Date October 2, 1984

Originating Dept TECHNOLOGY DEPARTMENT—ENGINEERING

Attached, please find the following approved invoices

Vendor	Amount	Invoice Number	Date	P/O No.	Charge To
TRI STATE	$1298 76	-- (Pro #657967)	9/18/84	---	84-615-885-10-100
TRI STATE	$1298 76	-- (Pro #657966)	9/17/84	---	84-615-885-10-100
TRI STATE	$4,077.54	--	9/18/84	---	84-615-885-10-100
CHEM-NUCLEAR	$11,182 08	52063	9/14/84	615-306705	84-615-885-10-100
CHEM-NUCLEAR	$11,182 08	52098	9/19/84	"	84-615-885-10-100
CHEM-NUCLEAR	$11,182 08	52126	9/21/84	"	84-615-885-10-100
CHEM-NUCLEAR	$8,386 56	52131	9/21/84	"	84-615-885-10-100

D. A. Czyzewski

CC L. G Evans

D-U-N-S
00-987-0965

tsmt®
General Commodities Between All Points in U S

BDS/054

PRO NUMBER 657971

SHIPPING DATE 9/07/84

INVOICE DATE 9/18/84

REMIT TO TRI STATE MOTOR TRANSIT CO.
P.O. BOX 263-116
KANSAS CITY, MO. 64193

B O
I T
L O
L E

UMETCO MINERAL
ATTN: L.G. EVANS
PO BOX 97
NIAGARA FALLS NY 14302

SHIPPER	ORIGIN	TARIFF	TOTAL MI
UMETCO MINERALS CO	NIAGARA FA NY	4007A 2000	185
CONSIGNEE	DESTINATION	SHIPPER NUMBER	
UMETCO MINERAL	URAVAN COL	615-4002	

LENGTH	WIDTH	HEIGHT	SEAL NO (S)	PLACARDS APPLIED	UNIT NUMBER	ICC COD
					3995 440814TS	281

ROUTING INTERLINE POINT C/L REFERENCE

DESCRIPTION OF ARTICLES OR COMMODITY	WEIGHT	RATE	CHARGES
	41844 AS 41844	X 9.08	3799.
RAM			
EXTRA DRIVER 1854 MI X .15			278.

Approved 9/24/84

ICC REGULATIONS REQUIRE PAYMENT OF ALL FREIGHT CHARGES WITHIN 7 DAYS OF PRESENTATION

PLEASE REMIT THIS AMOUNT 4077

DUPLICATE FREIGHT BILL

UCCNHT0001088

0965

tsmt®

General Commodities Between All Points in U S

BDS/054

REMIT TO

TRI STATE MOTOR TRANSIT CO.
P.O. BOX 203-110
KANSAS CITY, MO. 64193

BILL NO. 657906

SHIP DATE 9/04/84

INVOICE DATE 9/17/84

UMETCO MINERAL
ATTN: L.G. EVANS
PO BOX 97
NIAGARA FALLS NY 14302

SHIPPER	ORIGIN		TARIFF	TOTAL MILES
UMETCO MINERALS CO	NIAGARA FA	NY	4007A 3000	822
CONSIGNEE	DESTINATION		SHIPPER NUMBER	
CHEM NUC	BARNWELL	SC	6153005	

LENGTH	WIDTH	HEIGHT	SEAL NO (S)	PLACARDS APPLIED	UNIT NUMBER	ICC CODE
					3992 445102TS	28190

ROUTING | INTERLINE POINT | C/L REFERENCE

DESCRIPTION OF ARTICLES OR COMMODITY	WEIGHT	RATE	CHARGES
RAM 822 MI	39300	X 1.58	1298.76

Copy sent 9/24/84

ICC REGULATIONS REQUIRE PAYMENT OF ALL FREIGHT CHARGES WITHIN 7 DAYS OF PRESENTATION

PLEASE REMIT THIS AMOUNT → 1,298.76

UCCNHT0001089

D U N-S
00 987-0965

tsmt®
General Commodities Between All Points in U S

BDS/054

PRO NUMBER
657907

SHIPPING DATE
9/05/84

INVOICE DATE
9/18/84

REMIT TO
TRI STATE MOTOR TRANSIT CO.
P.O. BOX 263-116
KANSAS CITY, MO. 64193

UMETCO MINERAL
ATTN: L.G. EVANS
PO BOX 97
NIAGARA FALLS NY 14302

ER	ORIGIN		TARIFF	TOTAL MILES
TCO MINERALS CO	NIAGARA FA	NY	4007A 3000	822
GNEE	DESTINATION		SHIPPER NUMBER	
EM NUC	BARNWELL	SC	615-3006	

LENGTH	WIDTH	HEIGHT	SEAL NO (S)	PLACARDS APPLIED	UNIT NUMBER	ICC CODE
					6163 448122TS	28190

TING	INTERLINE POINT	C/L REFERENCE

DESCRIPTION OF ARTICLES OR COMMODITY	WEIGHT	RATE	CHARGES
AM 822 MI	41380	X 1.58	1298.76

ICC REGULATIONS REQUIRE PAYMENT OF ALL FREIGHT CHARGES WITHIN 7 DAYS OF PRESENTATION

PLEASE REMIT THIS AMOUNT → 1,298.76

UCCNHT0001090

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 52063

BILLING LOCATIONS

CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING S C 29812
(803) 259-1781

☐

SOLD TO
Umetco Minerals Corp.
137 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	9/14/84		37855	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0984-211-A	

DESCRIPTION	AMOUNT
Services 9/6/84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, SC by Tri State on B/L #657966	
Shipment #615-3005	
520 cuft of radwaste X 14.50/cuft	7,540.00
(8 containers @ 65 cuft/container)	
S.C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft X 520 cuft	1,300.00
S.C. Imposed Low Level Radwaste Tax of 4.00/cuft X 520 cuft	2,080.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges(10,920.00)	262.08
	11,182.08

Approved
9/24/84

TERMS NET 30 DAYS INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH

PLEASE MAKE ALL CHECKS PAYABLE TO

MB

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

DUPLICATE COPY

UCCNHT0001091

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 52098

BILLING LOCATIONS

CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS ☐
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING S C 29812
(803) 259-1781

SOLD TO

Umetco Mineral Corp.
137 - 47th Street
Niagara Falls, NY 14302

ATTN

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	9-19-84		37873	480

F O B	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0984-212-A	

DESCRIPTION	AMOUNT
Services 9-7-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, S.C. by Tri-State on B/L # 657967. Shipment # 615-3006	
520 cuft of radwaste x 14.50/cuft (8 containers @ 65 cuft/container)	7,540.00
S. C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft x 520 cuft.	1,300.00
S. C. Imposed Low Level Radwaste Tax of 4.00/cuft x 520 cuft.	2,080.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges (10,920.00)	262.08
	11,182.08

9/24/84

TERMS NET 30 DAYS INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH SF

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

K10018 (7 83)

DUPLICATE COPY

UCCNHT0001092

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 52126

BILLING LOCATIONS

☐ CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING S C 29812
(803) 259-1781

☐

SOLD TO

Umetco Mineral Corp.
P. O. Box 97
Niagara Falls, NY 14302

ATTN Mr. L. C. Evans

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	9-21-84		37901	480

F O B	PROJECT #	MARKETING DIST	AF #	SHIP VIA
BARNWELL	48000	N	0984-213-A	

DESCRIPTION	AMOUNT
Services 9-13-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, S.C. by Tri-State on B/L # 657968. Shipment # 615-3007	
520 cuft of radwaste x 14.50/cuft	7,540.00
(8 containers @ 65 cuft/container)	
S. C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft x 520 cuft.	1,300.00
S. C. Imposed Low Level Radwaste Tax of 4.00/cuft x 520 cuft.	2,080.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges (10,920.00)	262.08
	11,182.08

9/24/84

TERMS NET 30 DAYS INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH SF

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

K10016 (7 83)

DUPLICATE COPY

UCCNHT0001093

CHEM-NUCLEAR SYSTEMS, INC.

INVOICE NO. 52131

BILLING LOCATIONS

CORPORATE OFFICE
240 STONERIDGE DRIVE
SUITE 100
COLUMBIA SC 29210
(803) 256-0450

☒ BARNWELL OPERATIONS
OSBORN ROAD
HIWAY 64 / P O BOX 726
SNELLING, S C 29812
(803) 259-1781

#52131

SOLD TO
Umetco Minerals Corp.
P. O. Box 97
Niagara Falls, NY 14302
ATTN L. C. Evans

CUSTOMER #	DATE	P O #/CONTRACT #	AS #	DIVISION
80-100343	9-21-84		37915	480

JOB	PROJECT #	MARKETING DIST	AN #	SHIP VIA
BARNWELL	48000	N	0984-214-A	

DESCRIPTION	AMOUNT
Services 9-13-84 for the receipt and disposal of radioactive waste materials delivered to Barnwell, S.C. by Tri-State on B/L # 657969. Shipment # 615-3008	
390 cuft of radwaste x 14.50/cuft (6 boxes @ 65 cuft/box)	5,655.00
S. C. Imposed Perpetuity Escrow Fund Charge of 2.50/cuft x 390 cuft.	975.00
S. C. Imposed Low Level Radwaste Tax of 4.00/cuft x 390 cuft.	1,560.00
Barnwell County Business License Tax @ 2.4% of Disposal Charges (8,190.00)	196.56
	8,386.56

9/24/84

NET 30 DAYS INVOICES NOT PAID WITHIN 30 DAYS ARE SUBJECT TO CHARGE OF 1½% PER MONTH

PLEASE MAKE ALL CHECKS PAYABLE TO

CHEM-NUCLEAR SYSTEMS, INC
P O BOX 1478
COLUMBIA, SC 29202

SF

83)

COPY

UCCNHT0001094

ACCT NO	SERIES	EXPOSURE PERIOD	BADGE DATE
30807		1 MONTH 7	6/25/84

UNION CARBIDE CRB-LINDS
METALS DIVISION
ATTN JOHN A PAGANO
137-47TH ST
NIAGARA FALLS NY 14302

615-309984

R S Landauer, Jr & Co
Division of Tech/Ops Inc

Glenwood Science Park
Glenwood Illinois 60425
Telephone (312) 755 7000

ACCT NO	SERIES	EXPOSURE PERIOD	BADGE DATE
30807		1 MONTH 7	6/25/84

UNION CARBIDE CRB-LINDS
METALS DIVISION
ATTN JOHN A PAGANO
137-47TH ST
NIAGARA FALLS NY 14302

615-309984

USE THIS SIDE FOR DELETIONS
PLACE D IN DELETE COLUMN

USE REVERSE SIDE FOR ADDITIONS AND OTHER CHANGES

SERVICE CHANGE ORDER

PARTICIPANT NUMBER	BADGE TYPE	NAME	DELETE (D)	CHANGE SERIES FROM	CHANGE SERIES TO	PARTICIPANT NUMBER	BADGE TYPE	NAME	LIMIT D 16 CHARACTERS OR SPACES	SOCIAL SECURITY NO	SEX	BIRTH DATE MO	DA	YEAR
00000	G1	CONTROL				00000	G1	CONTROL						
00005	G1	LUCIEN DUBE				00005	G1			081-30-7550	M	11	6	27
00006	G1	MARTIN SAUVEGEAULT				00006	G1			0F6-54-3541	M	6	30	58
00007	G1	VINEVARSKI, JOSEPH				00007	G1			123-54-3529	M	12	21	59
00008	G1	KEVIN BRANCHAUD				00008	G1			132-42-1074	M	7	16	53
00009	G1	GENE WOLEK				00009	G1			098-22-9548	M	5	13	28
00010	G1	PAUL JASEK				00010	G1			094-50-7778	M	F	10	65
00011	G1	MARK MALOON				00011	G1			122-50-7335	M			
00012	G1	RICHARD KELLY				00012	G1							
00013	G1	MICHAEL AIDUK				00013	G1			057-44-6742	M	9	19	50
00014	G1	MARK GOLABEK				00014	G1							
00015	G1					00015	G1							
00016	G1					00016	G1							

PACKING LIST

R S LANDAUER JR & CO DIVISION OF TECH/OPS INC
GLENWOOD OFFICE PARK GLENWOOD ILLINOIS 60425

IMPORTANT WHEN REQUESTING ANY CHANGES ADDITIONS OR DELETIONS PLEASE MAKE THEM ON THIS FORM
CHANGES TO BE EFFECTIVE FOR YOUR NEXT WEAR DATE
MUST REACH THE GLENWOOD OFFICE NO LATER THAN
PLEASE DO NOT DUPLICATE CHANGES REQUESTED DURING PRECEDING 20 DAYS
DO NOT RETURN CHANGE REQUESTS WITH YOUR DOSIMETERS SINCE THIS DELAYS HANDLING SEND ALL CHANGES UNDER SEPARATE COVER BY

ONE HOLDER IS LOANED AT NO CHARGE FOR EACH FILM IN SERVICE AND MUST BE RETURNED AT TERMINATION OF CONTRACT EXTRA HOLDERS MAY BE PURCHASED ON REQUEST WITH THIS SHIPMENT OUR RECORDS INDICATE THE FOLLOWING LOANED FILM HOLDERS IN YOUR POSSESSION

G (REGULAR)	H (THERMAL)	I (NEUTRON)	OTHER
3			

FOR ADDRESS CHANGES ONLY

PLEASE TYPE OR PRINT

SHIPPING ADDRESS (MAXIMUM 5 LINES OF 23 CHARACTERS)

1
2
3
4 CITY | STATE | ZIP CODE
5

BILLING ADDRESS (MAXIMUM 5 LINES OF 23 CHARACTERS)

1
2
3
4 CITY | STATE | ZIP CODE
5

REPORTING ADDRESS (MAXIMUM 5 LINES OF 23 CHARACTERS)

1
2
3
4 CITY | STATE | ZIP CODE
5

FIRST CLASS MAIL ATTENTION ORDER DEPARTMENT A BADGE NUMBER IS ASSIGNED PERMANENTLY AND CANNOT BE ASSIGNED TO A NEW PERSON NAME CHANGES MAY BE MADE ONLY TO CORRECT SPELLING OR DUE TO MARRIAGE DOSIMETERS MAY BE RETURNED IN ORIGINAL SHIPPING CONTAINER BUT OLD LABELS AND POSTMARKS MUST BE COVERED AND PROPER POSTAGE AFFIXED

UCCNHT0001095

ACCT NO	SERIES	EXPOSURE PERIOD	BADGE DATE
30857		1 MONTH Z	62594

UNION CARBIDE CRP-LINDE
METALS DIVISION
ATTN JOHN A PAGANO
137-47TH ST
NIAGARA FALLS NY 14302

615-309994

R S Landauer, Jr & Co

Division of Tech/Ops Inc

Glenwood Science Park
Glenwood Illinois 60425
Telephone (312) 755 7000

USE THIS SIDE FOR DELETIONS PLACE D IN DELETE COLUMN

USE REVERSE SIDE FOR ADDITIONS AND OTHER CHANGES

ACCT NO	SERIES	EXPOSURE PERIOD	BADGE DATE
30857		1 MONTH 7	[illegible]

UNION CARBIDE CRP-LINDE
METALS DIVISION
ATTN JOHN A PAGANO
137-47TH ST
NIAGARA FALLS NY 14302

615-30[illegible]

Tech/Ops

Landauer

PACKING LIST

R S LANDAUER JR & CO DIVISION OF TECH/OPS INC
GLENWOOD SCIENCE PARK GLENWOOD ILLINOIS 60425

PARTICIPANT NUMBER	BADGE TYPE	NAME
00000	G1	CONTROL
00005	G1	
00006	G1	
00007	G1	
00008	G1	
00009	G1	
00010	G1	
00011	G1	
00012	G1	
00013	G1	
00014	G1	
00015	G1	
00016	G1	

SERVICE CHANGE ORDER

DELETE (D)	CHANGE SERIES FROM	CHANGE SERIES TO	PARTICIPANT NUMBER	BADGE TYPE	NAME	NAME OF 16 CHARACTERS OR SPACES	SOCIAL SECURITY NO	SEX	BIRTH DATE MO	BIRTH DATE DAY YEAR
			00000	G1	CONTROL					
			00005	G1						
			00006	G1						
			00007	G1						
			00008	G1						
			00009	G1						
			00010	G1						
			00011	G1						
			00012	G1						
			00013	G1						
			00014	G1						
			00015	G1						
			00016	G1						

IMPORTANT: WHEN REQUESTING ANY CHANGES ADDITIONS OR DELETIONS PLEASE MAKE THEM ON THIS FORM. CHANGES TO BE EFFECTIVE FOR YOUR NEXT WEAR DATE MUST REACH THE GLENWOOD OFFICE NO LATER THAN

PLEASE DO NOT DUPLICATE CHANGES REQUESTED DURING PRECEDING 20 DAYS

DO NOT RETURN CHANGE REQUESTS WITH YOUR DOSIMETERS SINCE THIS DELAYS HANDLING. SEND ALL CHANGES UNDER SEPARATE COVER BY

ONE HOLDER IS LOANED AT NO CHARGE FOR EACH FILM IN SERVICE AND MUST BE RETURNED AT TERMINATION OF CONTRACT. EXTRA HOLDERS MAY BE PURCHASED ON REQUEST. WITH THE SHIPMENT OUR RECORDS INDICATE THE FOLLOWING LOANED FILM HOLDERS IN YOUR POSSESSION

G (REGULAR)	H (THERMAL)	E (NEUTRAL)	OTHER
3			

FOR ADDRESS CHANGES ONLY

PLEASE TYPE OR PRINT

SHIPPING ADDRESS (MAXIMUM 5 LINES OF 23 CHARACTERS)

1
2
3
4 CITY STATE ZIP CODE
5

BILLING ADDRESS (MAXIMUM 5 LINES OF 23 CHARACTERS)

1
2
3
4 CITY STATE ZIP CODE
5

REPORTING ADDRESS (MAXIMUM 5 LINES OF 23 CHARACTERS)

1
2
3
4 CITY STATE ZIP CODE
5

FIRST CLASS MAIL ATTENTION ORDER DEPARTMENT. A BADGE NUMBER IS ASSIGNED PERMANENTLY AND CANNOT BE ASSIGNED TO A NEW PERSON. NAME CHANGES MAY BE MADE ONLY TO CORRECT SPELLING OR DUE TO MARRIAGE. DOSIMETERS MAY BE RETURNED IN ORIGINAL SHIPPING CONTAINER, BUT OLD LABELS AND POSTMARKS MUST BE COVERED AND PROPER POSTAGE AFFIXED

UCCNHT0001096

UNION CARBIDE CRP-LINDE
METALS DIVISION
ATTN JOHN A PAGANC
137-47TH ST
NIAGARA FALLS NY 14302

ACCOUNT NO	SERIES CODE
30897	

EXPOSURE NO	PROCESS NO	PREPARATION DATE	DOSIMETER RECEIVED	REPORTING TIME	SP	COPIES	NOTIFICATION LEV	PAGE NO
1 MONTH Z	N5133	81584	80684	7 WORK DAYS	2	1	400	1

RADIATION DOSIMETRY REPORT

Landauer
a TechOps company

R S Landauer Jr & Co
Glenwood Science Park
Glenwood Illinois 60425
Telephone (312)755-7000

QUALITY CONTROL RELEASE: JDW

PR 2916 - 28431

PARTICIPANT ID NUMBER	NAME	SOCIAL SECURITY NUMBER	NOTE (SEE REVERSE SIDE)	DOSIMETER TYPE	USE	RADIATION QUALITY	EXPOSURE TO BADGE (MILLIREMS) FOR PERIOD(S) INDICATED BELOW: DEEP	SHALLOW	CUMULATIVE TOTALS (MILLIREMS): CALENDAR QUARTER: DEEP	SHALLOW	YEAR TO DATE: DEEP	SHALLOW	PERMANENT: DEEP	SHALLOW	ADJUSTMENTS	UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE (MILLIREMS)	SEX	BIRTH DATE: MO	DA	YR	NUMBER BADGE REPORTS: TO DATE	QTR.	INCEPTION DATE OF PERMANENT TOTAL: MO	YR
	FOR EXPOSURE PERIOD 06/25/84					TO	07/24/84		SECOND		1984													
00000	CONTROL			G1			M	M	M	M	M	M	10	10							63	3	3	79
00005				G1			M	M	M	M	M	M	M	M							1	1	6	84
00006				G1			M	M	M	M	M	M	M	M							1	1	6	84
00007				G1			M	M	M	M	M	M	M	M							1	1	6	84
00008				G1			M	M	M	M	M	M	M	M							1	1	6	84
00009				G1			M	M	M	M	M	M	M	M							1	1	6	84
00010				G1			M	M	M	M	M	M	M	M							1	1	6	84
00011				G1			M	M	M	M	M	M	M	M							1	1	6	84
00012				G1			M	M	M	M	M	M	M	M							1	1	6	84
00013				G1			M	M	M	M	M	M	M	M							1	1	6	84
00014				G1			M	M	M	M	M	M	M	M							1	1	6	84
00015				G1			M	M	M	M	M	M	M	M							1	1	6	84
00016				G1			M	M	M	M	M	M	M	M							1	1	6	84

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

USE CODE (COLUMN 6): 1-WHOLE BODY 2-RIGHT FINGER 3-LEFT FINGER 4-RIGHT WRIST 5-LEFT WRIST 6-OTHER EXTREM 7-OTHER WHOLE BODY 8-MONITOR

AN INCREASE IN THE HIGH ENERGY DESIGNATION WHEN ONLY LOW ENERGY EXPOSURE IS POSSIBLE MAY INDICATE THAT THE FILM PACKET WAS EXPOSED OUT OF THE FILTERED HOLDER

IMPORTANT: USE OF DESIGNATION FOR ABSTRACT DISPLACEMENT

UCCNHT0001097

Soil Decontamination - South of Bldg 166 - Niagara

Soil Samples To Be Analyzed.

File 11309

1.) Samples 7-19-84

Material from West Area Before Excavation (Surface).

Sample	Location
S-1	South End.
S-2	Center
S-3	Center.
S-4	North End Center.
S-5	North End - Edge Conc. Pad.

2.) Samples - After Excavation - Before Backfilling

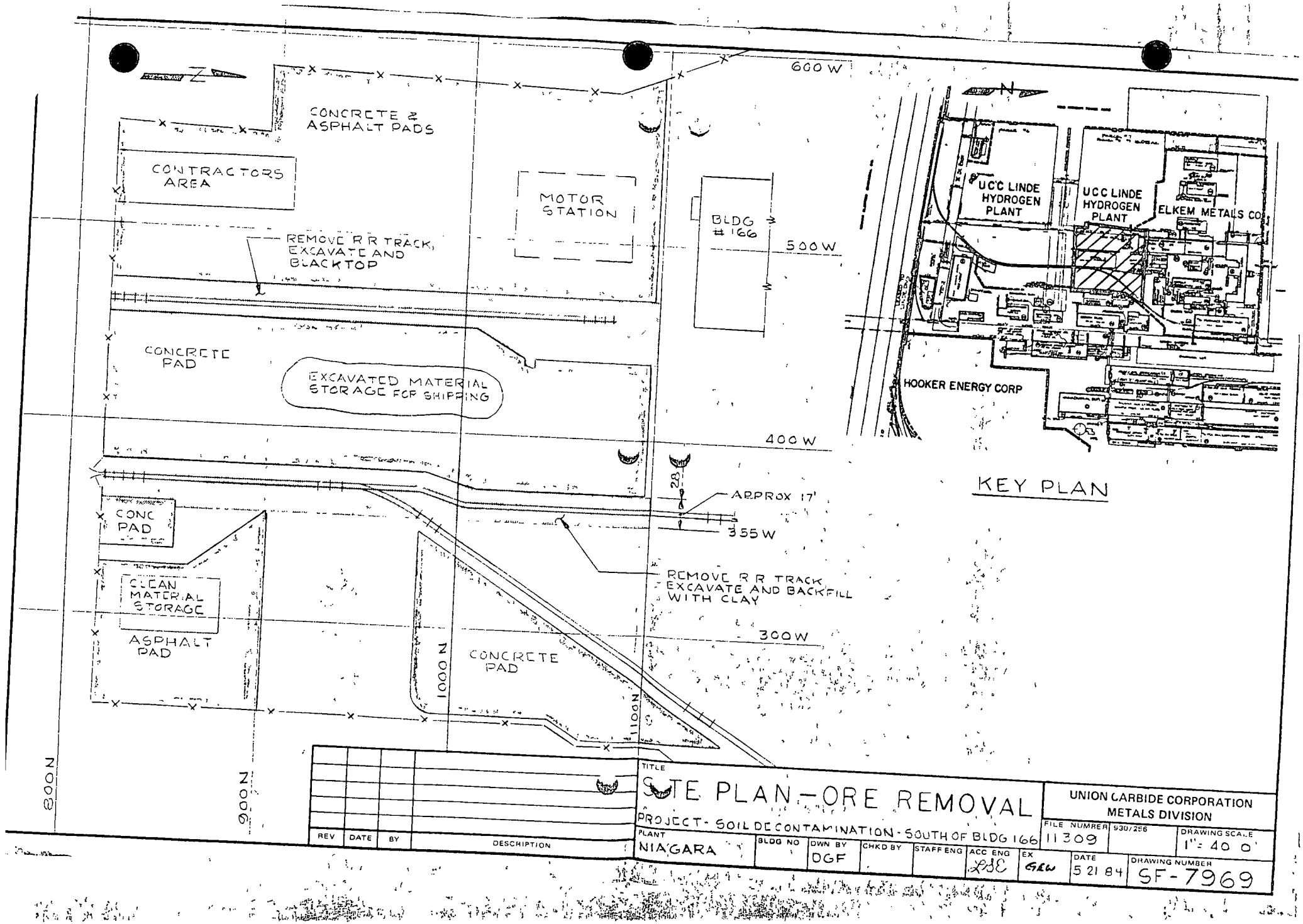
Sample	Location
WA-1-S	West Area Surface - Hole #1
WA-1-6	West Area @ 6" - " #1
WA-1-12	West Area @ 12" - " #1
WA-2-S	" " @ Surface - " #2
WA-2-6	" " @ 6" - " #2
WA-2-12	" " @ 12" - #2
WA-3-S	" " @ Surface - Hole #3
WA-3-6	" " @ 6" - " #3
WA-3-12	" " @ 12" - " #3.
WA-4-S	" " @ Surface - Hole #4
WA-4-6	" " @ 6" " " 4
WA-4-12	" " @ 12 - " " 4
EA-1-S	East Area @ Surface - Hole 1
EA-1-6	" " @ 6" - " " 1
EA-1-12	" " @ 12 - " " 1
EA-2-S	" " @ Surface - " " 2
EA-2-6	" " @ 6" - " " 2
EA-2-12	" " @ 12" - " " 2
EA-3-S	" " @ Surface - " " 3
EA-3-6	" " @ 6" - " " 3
EA-3-12	" " @ 12" - " " 3
EA-4-S	" " @ Surface - " " 4
EA-4-6	" " @ 6" - " " 4
EA-4-12	" " @ 12 - " " 4.
WL-1	Excavated Area over Water Lines - West Area.

UCCNHT0001098

3. SAMPLES AFTER BACKFILLING WITH CLAY - 10-16 84.

SAMPLE			LOCATION
101 -	A	(SURFACE)	WEST AREA - SOUTH
	B	(@ 6")	
	C	(@ 12")	
	D	(@ 18")	
	E	(@ 24").	
102 -	A		WEST AREA - CENTER
	B		
	C		
	D		
	E		
103 -	A		WEST AREA - NORTH.
	B		
	C		
	D		
	E		
104 -	A		EAST AREA - SOUTH
	B		
	C		
	D		
	E		
105 -	A		EAST AREA - CENTER
	B		
	C		
	D		
	E		
106 -	A		EAST AREA - NORTH CENTER.
	B		
	C		
	D		
	E		
107 -	A		EAST AREA - NORTH
	B		
	C		
	D		
	E		

UCCNHT0001099



UCCNHT0001100

To. S.C ZAMBOTTI - Purchasing Dept.
From: G.K. WALCK - Engineering Dept.
Please Obtain Bids on Items Covered by Subject Specification from Listed Bidders

Subject: Spec. Nos. 615-11309-1
REMOVAL OF ORE FROM UMC NIAGARA SITE

Plant Location NIAGARA File 11309

1. ATTACHMENTS FOR QUOTATION:
   - 6 COPIES, SPECIFICATION
   - _____ COPIES, PROPOSAL FORM
   - 6 COPIES, DRAWINGS
2. BIDS TO BE RECEIVED BY: JUNE 22, 1984
3. CONSTRUCTION EQUIPMENT NEEDED BY: NO EARLIER THAN _____ July 9, 1984. NO LATER THAN _____
4. APPROVAL/FINAL PRINTS BY _____
5. TECHNICAL CONTACT: NAME L.G EVANS PHONE 716-278-3462
6. PLEASE SEND COPIES OF THE R.F.Q. PACKAGE, WITH A COPY OF THIS TRANSMITTAL TO:
   - [X] L.G EVANS. [ ] _____
   - [X] G.K. WALCK [ ] _____
   - [ ] _____ [ ] _____
   - [ ] _____ [ ] _____
7. PLEASE HAVE BIDDERS SEND COPIES OF THEIR PROPOSALS TO:
   A. L. G. EVANS ENGR. DEPT.
   B. _____
8. ESTIMATED COST: $ 30,000

9. RECOMMENDED BIDDERS: Page 1 of _____
   A. DUBE CONSTRUCTION CO.
   8267 LOCKPORT ROAD
   SANBORN, N.Y.
   B. _____
   C. _____
   D. _____
   E. _____

10. REMARKS: _____

J. E. Walck (SIGNATURE) 5-22-84. (DATE)

To: - PURCHASING DEPT.
From: - ENGINEERING DEPT.
cc. [ ] _____ [ ] _____
[ ] _____ [ ] _____

Please complete, validate and place attached P.O. No. _____

1. ATTACHMENTS FOR PURCHASE
   - _____ COPIES, SPECIFICATION
   - _____ COPIES, BID ANALYSIS
   - _____ COPIES, DRAWINGS
2. RECOMMENDED SUPPLIER:

3. In addition to normal distribution, Purchasing to send validated copy of P.O. and Spec. to:
   [ ] _____ [ ] _____
   [ ] _____ [ ] _____
   [ ] _____ [ ] _____
   [ ] _____ [ ] _____

4. Remarks: _____

(SIGNATURE) (DATE)

UCCNHT0001101

Niagara Falls, New York
SPECIFICATION NO. 615-11309-1
May 16, 1984

SPECIFICATION FOR THE REMOVAL

OF

ORE FROM UMC

Niagara Site

For

Umetco MINERALS CORPORATION
NIAGARA FALLS, NY

Prepared by

Umetco Minerals Corporation
Technology Department - Engineering
Niagara Falls, New York

Prepared by [signature] Approved by [signature]

DATE OF ISSUE	PURPOSE	REVISION NO.	ISSUE AUTHORIZED BY
5/22/84	Preliminary	0	[signature]

INDEX

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	2.0 Items of Work by Contractor	6
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	4.0 Material and Equipment by Contractor	7
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4	Container Filling Operation	10
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UCCNHT0001103

SECTION 1 - SPECIAL CONDITIONS

1.0 USE OF OWNER'S PROPERTY

1.1 The plant and all facilities in the immediate area (see Dwg. SF-7969) are leased by Elkem Metals Company. Umetco Minerals Corp. will be considered the "Owner" until completion of this Project.

1.2 All Contractor's personnel shall enter and leave the plant through the gate designated by the Engineer. Parking facilities will be available in the area designated by the Engineer.

1.3 Space on the Owner's property will be allotted to the Contractor for a storage of equipment and material and erection of any temporary structures adjacent to the work site.

2.0 CONSTRUCTION SCHEDULE

The Contractor shall consult with the Owner's Engineer before proceeding with the work and effect a schedule which will cause a minimum of interference between the performance of the work and Elkem's operations. The Contractor shall have a full-time superintendent on the job site at all times when work is being performed. Work will be permitted after the normal working hours and on Saturdays and/or Sundays and/or holidays provided that the Owner's Engineer is notified in advance and grants his approval.

3.0 MATERIAL AND EQIUPMENT HANDLING AND STORAGE

Any materials and/or equipment belonging to the Owner and not part of this specification which are presently stored in the work area will be removed by Owner prior to start of work by Contractor.

The Owner's Engineer will determine, and indicate to the Contractor, the route that the Contractor shall follow in transporting any equipment and materials to and from the site or storage.

4.0 TEMPORARY STRUCTURES

The Contractor shall provide all temporary structures required by him in connection with this work. All such structures shall be removed by the Contractor upon completion of his work.

5.0 UTILITIES

The Owner may not provide any utilities for this project. The Contractor may need to provide or make arrangements as required for the following:

UCCNHT0001104

5.1 Water: A tank truck or other water storage.

5.2 Compressed Air: The Contractor shall furnish all compressed air required in the execution of the work.

5.3 Fuel (Gasoline/Diesel): The Contractor shall provide storage and pumping equipment as required and fuel.

5.4 Steam. A steam generator may be required for decontamination of equipment.

5.5 No utility lines which may serve adjacent areas are to be cut or removed. In the event such lines interfere with the removal work, the Contractor and Owner's Engineer shall work out a plan to reinstall the utility via a route that will permit satisfactory service to the affected areas. Cost of such rerouting shall be considered an extra to the contract.

6.0 FIRE PROTECTION

An adequate amount of extinguishers or fire protection equipment shall be kept on hand at all times during construction - subject to Owner's approval.

7.0 SAFETY RULES

7.1 The Contractor and all his employees shall abide by all special safety rules in force in the Owner's plant and comply in general with all provisions of the American Standard Safety Code for Building Construction as sponsored by the American Institute of Architects, the National Safety Council, the Mine Safety and Health Administration Regulations, and the Associated General Contractors of America, Inc. The Contractor must comply with all applicable rules and regulations of the latest edition of the Federal Occupational Safety and Health Act.

7.2 Fiber hard hats, safety glasses and safety shoes shall be worn at all times inside the plant fence. The Contractor shall furnish all hard hats and safety glasses and any other special equipment which may be needed.

7.3 The Contractor shall install and maintain from the beginning to the completion of all Contractor's work all necessary protective barriers, lights and warning signs and shall take all necessary precautions required to avoid injury or damage to any and all persons and property.

8.0 DRAWINGS AND SPECIFICATIONS

8.1 The Contractor shall keep one up-to-date copy of all drawings and specifications on the job site, in good order, available to the Owner, the Engineer and their representatives.

UCCNHT0001105

8.2 The Contractor shall consult with the Owner's Engineer before proceeding with any work, if he finds an error or inconsistency between the drawings, specifications or vendor information. The Owner's Engineer will interpret the problem and his decision shall be final and binding upon the Contractor and the Owner.

9.0 DAMAGED WORK OR EQUIPMENT

Any and all work or equipment damaged or soiled in the execution of the Work shall be thoroughly cleaned, repaired or replaced in a manner satisfactory to the Owner's Engineer.

10.0 SANITARY FACILITIES

The Contractor shall furnish all sanitary facilities required for his employees and maintain same in a clean and orderly condition. Contractor's employees shall not make use of the Owner's employees' facilities.

11.0 CLEAN-UP

The Contractor shall maintain at all times the site of his operations in a clean manner, including all obstructions, tools, equipment, refuse and material of any kind deposited on the Owner's property by the Contractor or incidental to his work.

12.0 ELKEM FACILITIES

The area surrounding the work site is off limits. Workers shall be instructed not to leave the authorized areas. When work is required in an unauthorized area, the Contractor shall consult with the Owner's Engineer for plant safety procedures and permission from Elkem.

13.0 FIRE FIGHTING AND PERSONNEL SAFETY

Prior to commencing work, the Contractor and all of his employees shall be required to attend a briefing by the Umetco Engineer. This briefing will cover proper action in the event of fire and proper use of respirators as well as other safety rules and regulations. Employees hired subsequent to this meeting will also be required to attend similar instructions.

14.0 RADIOACTIVE MATERIALS

Prior to commencing work, the Contractor and all of his employees shall be required to attend a briefing given by the Umetco Safety Officer. This briefing will cover proper use of film badges and proper use of respirators as well as other safety rules and regulations. Employees hired subsequent to this meeting will also be required to attend similar instructions.

UCCNHT0001106

SECTION 2 - SCOPE OF WORK

1.0 GENERAL

1.1 This specification covers the labor, material, tools and equipment to excavate approximately 170 cubic yards of contaminated soil and materials from a plot of ground owned by Umetco Minerals corporation and Leased by Elkem, located in Niagara Falls, NY and backfill with clay and/or blacktop as shown on the Drawings. The soil and/or materials are to be loaded into containers for shipment to another location.

2.0 ITEMS OF WORK BY CONTRACTOR

2.1 Major items of Work and Sequence of the operation are listed below. Items not listed but shown or called out on the drawing and/or specification shall be provided by the contractor.

2.2 Sequence of Work

1. Remove approximtely 550 feet of railroad track including rail's, ties, switches etc.

2. Clean rails and ties as they are removed (check by radiologist) and store both contaminated and uncontaminated on concrete pads, as directed.

3. Excavate approximately 170 cu yds of soil from designated areas to an approximate depth of 8" and store on adjacent concrete pad. Excavated material to be covered with plastic until ready for loading into containers.

4. Use fork lift truck to bring container to loading station & remove cover.

5. Fill container with material by means of a front end loader at loading station and cover box.

6. Transport loaded box to storage area.

7. Prepare box for shipping.

    a. Caulk cover
    b. Nail cover in place
    c. Band box with steel strapping
    d. Stencil with "Radioactive-LSA"
    e. Weigh and mark box and record weights

8. Transport completed boxes to Niagara Plant for storage until shipping schedule begins.

UCCNHT0001107

9. Radiological survey of excavated areas.

10. Backfill with clay - approximately 4000 sq. ft.

11. Blacktop area - approximately 6300 sq. ft.

12. Radiological survey after backfilling.

3.0 MATERIAL & EQUIPMENT BY OWNER

3.1 Container loading hopper

3.2 Shipping containers

3.3 Scales

3.4 Caulking, strapping & stenciling materials.

4.0 MATERIAL AND EQUIPMENT BY CONTRACTOR

The contractor shall provide all tools and equipment necessary for completion of the work. This must include fuel and water and storage facilities for both, as well as sanitary and decontamination facilities for his employees.

5.0 WORK AND MATERIALS NOT INCLUDED

5.1 Radiation testing and survey instruments.

5.2 Preparation of shipping papers.

5.3 Site radiological survey before, during and after completion of project.

5.4 Loading trucks for shipment.

UCCNHT0001108

SECTION 3 - REMOVAL OF CONTAMINATED SOIL AND MATERIAL

1.0 SITE DESCRIPTION

Drawing No. SF-7969 defines the location of the UMC land parcel containing the contaminated soil and material.

2.0 MATERIAL DESCRIPTION

2.1 Contaminated Soil

This material is soil fill which has been contaminated with a tin slag spillage from railroad cars and contains oxides of uranium and thorium.

2.2 Contaminated Material

This generally includes debris and scrap from the plant which was dumped in the area. It also includes the rails and ties of the railroad track that is required to be removed. The volume of this material will be determined by the radiological survey performed by others.

3.0 DESCRIPTION OF REMOVAL PROCEDURE

3.1 Contamination

3.1.1 The Contractor shall make every effort to minimize contamination of areas outside the work area.

3.2 Classification

3.2.1 General - The material is classified into three categories contaminated soil, contaminated materials and clean material. The separation will be defined by radiological survey which will be determined by Umetco's radiologist.

3.2.2 Contaminated soil - All of the contaminated soil shall be removed and packaged for shipping.

3.2.3 Contaminated Materials

This includes primarily railroad ties, rails, wood, stones, pieces of metal etc. Although the amount of this material is believed to constitute a small percentage of the total job (1-2%), it too will have to be handled, classified and decontaminated or packaged for shipment.

UCCNHT0001109

3.2.4 Clean Materials

Materials that have been identified by the radiologist as clean or have been decontaminated and checked to be clean are to be moved to a designated storage area for disposition determined by Elkem.

3.4 Removal of Materials

3.4.1 Remove approximately 550 ft. of railroad track from two areas of the property. This includes steel rails, tires, switches etc. The rails may be cut into suitable lengths for handling purposes.
All this material must be cleaned in place as it is removed and checked by the radiologist.
The radiologist will determine material to be packaged for shipment and material to put in a designated storage area for future disposition.

3.4.2 Excavate ore as determined by the radiologist - approximately to a depth of 8". This material is to be stored on the concrete pad between the two areas to be excavated.
The excavated material is to be covered to protect from inclement weather.

UCCNHT0001110

SECTION 4 - CONTAINER FILLING OPERATION

1.0 MATERIAL HANDLING SYSTEM

The Equipment consists of a loading hopper Drawing SF-7968 to facilitate filling containers with a front end loader.

2.0 SHIPPING CONTAINERS

The container is made of framed plywood construction approximately 4'-0" wide 2'-0" high x 6'-8" long. Complete with a 3/4" thick plywood cover. All joints exposed to the exterior are caulked. The container must be kept dry at all times and therefore needs to be securely covered in outside storage.
A 6 mil polyethylene liner is fitted inside the container prior to filling.

3.0 LOADING PROCEDURE

3.1 Set loading hopper in a suitable position in relation to the material to be loaded. Place shipping container, with cover removed, under loading hopper on wood timbers.

3.2 Load material from storage pile into container with a front end loader.

3.3 Remove filled container to designated storage area and preparation for shipping.

4.0 PREPARATION FOR SHIPMENT

4.1 Caulk all around top of container, position and nail cover in place.

4.2 Stencil container on front and back with the words "Radioactive - LSA".

4.3 Caulk exterior joints.

4.4 Band container with steel strapping, three straps vertically and two straps horizontally.

4.5 Transport completed containers to the Niagara Plant for storage prior to shipping.

5.0 SHIPPING

5.1 All work for shipping containers will be performed by the Niagara Plant.

UCCNHT0001111

SECTION 5 - HEALTH AND SAFETY

1.0 GENERAL

The Owner shall have a radiation health safety officer on the site during the soil removal and packaging period.

2.0 RADIATION

The potential radiation hazard of the Ta-Cb ore residue is minimal because the radioactivity is very low (approximately 0.2 mrem/hr as measured at the surface. Title 29 - Labor, Chapter XVII - Occupational Safety and Health Administration, Section 1910.96 - Ionizing Radiation, paragraph (b) 1, Table G-18, gives permissible employee dose of 1250 mrem per calendar quarter.

We can expect that the maximum dose to any employee during the 1984 loading period to be 30 mrem. This assumes continuous contact 10 hours per day, 6 days per week, for 2 weeks. The loading and packaging operation will not constitute continuous contact, but rather exposure at some distance, i.e., 3-4 feet, which reduces radiation to less than 0.1 mrem per hour. Therefore, we can expect the average exposure level to be 180 mrem per calendar quarter.

3.0 SAFETY MATERIALS AND EQUIPMENT

Film Badges - Film badges will be issued to each employee and a record will be maintained of exposure levels.

Rubber Boots and Gloves - Will be used where it is necessary to walk on

or handle contaminated materials. To be provided by Contractor. These will not leave the site unless decontaminated and approved by the Owner's Engineer. The Contractor shall provide a safe/secure storage area for equipment left at the site.

Respirators - Will be provided (by Contractor) where there is exposure to dust. Since the material (residue) is damp, dusting is not expected to become a problem.

Hard Hats, Safety Glasses, Safety Shoes - See Section 1, paragraph 7.2.

Protective Barriers, Lights and Warning Signs - See Section 1, paragraph 7.3.

4.0 DECONTAMINATION

The Contractor shall provide facilities and equipment for personnel decontamination. Brushes for removal of loose dust and dirt from clothing should be adequate. Washing facilities for hands and face will be required. Full showers are not necessary.

UCCNHT0001112

SECTION 6 - DRAWING LIST

1.0 CONSTRUCTION

No.	Rev.	Title
SF-7968	-	Container loading hopper
SF-7969	-	Site Plan - Ore Removal

UCCNHT0001113

1M 12 76
EM 174 9A

UNION CARBIDE CORPORATION METALS DIVISION

DRAWING NUMBER SF-7968

930 256

TILE NO 11309

TITLE CONTAINER LOADING HOPPER

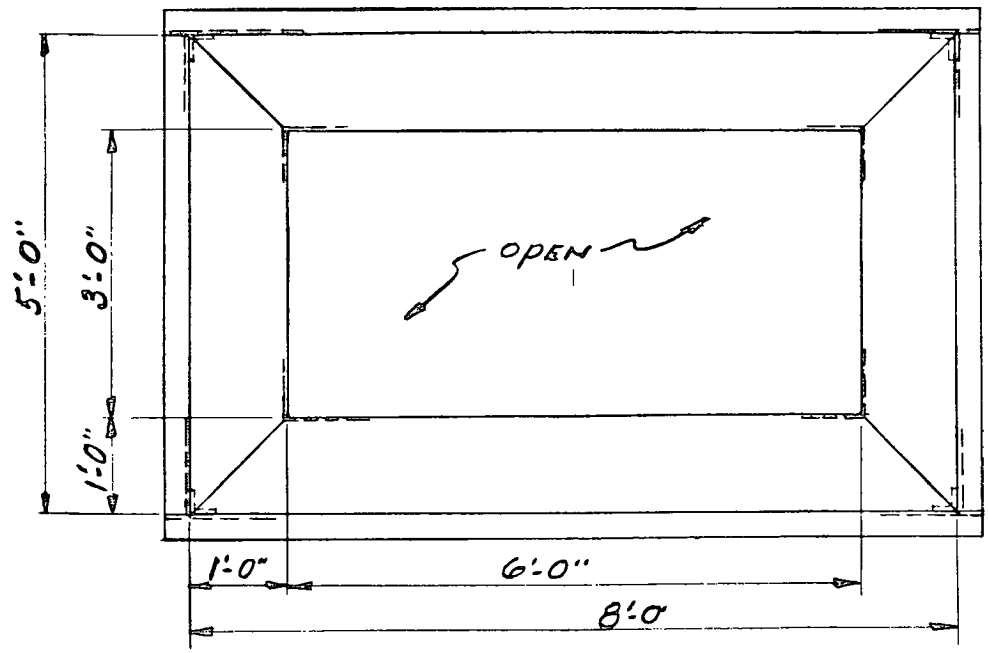
PLANT	DEPARTMENT	BLDG NO	DRAWN BY	CHECKED BY	APPROVED	EX	ACC ENG	DATE	DRAWING SCALE
NIAGARA	YARD	—	GEW				DSE	5-22-84	1/2" = 1'-0"

REV

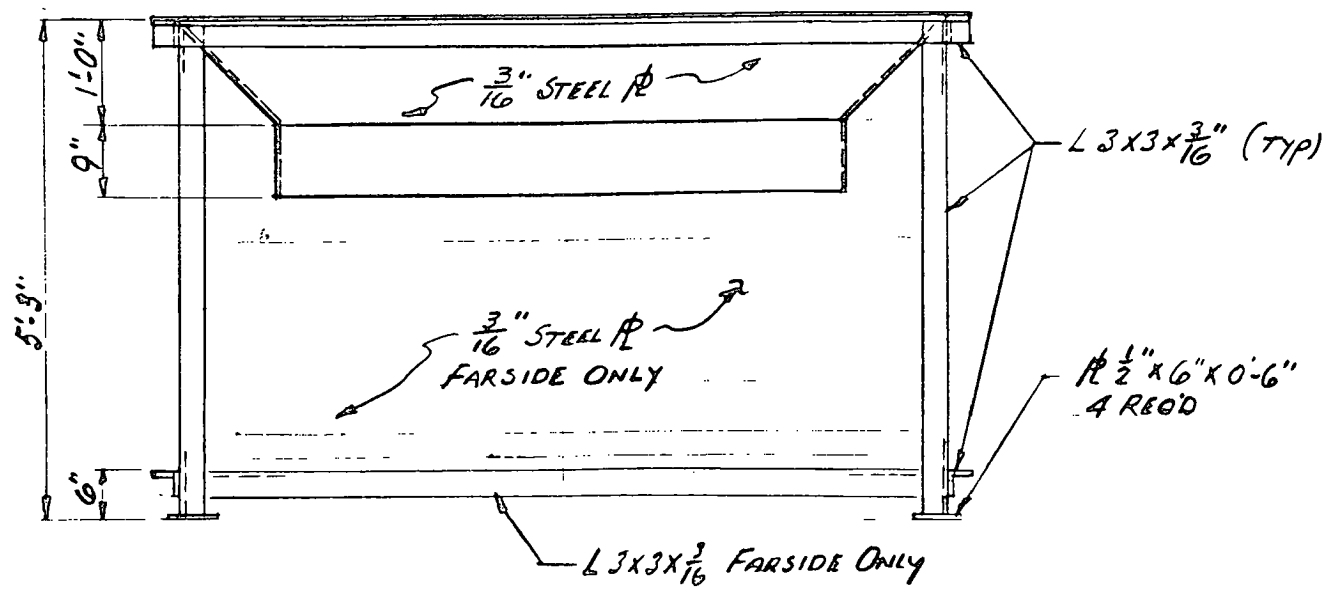
REV

REV

REV



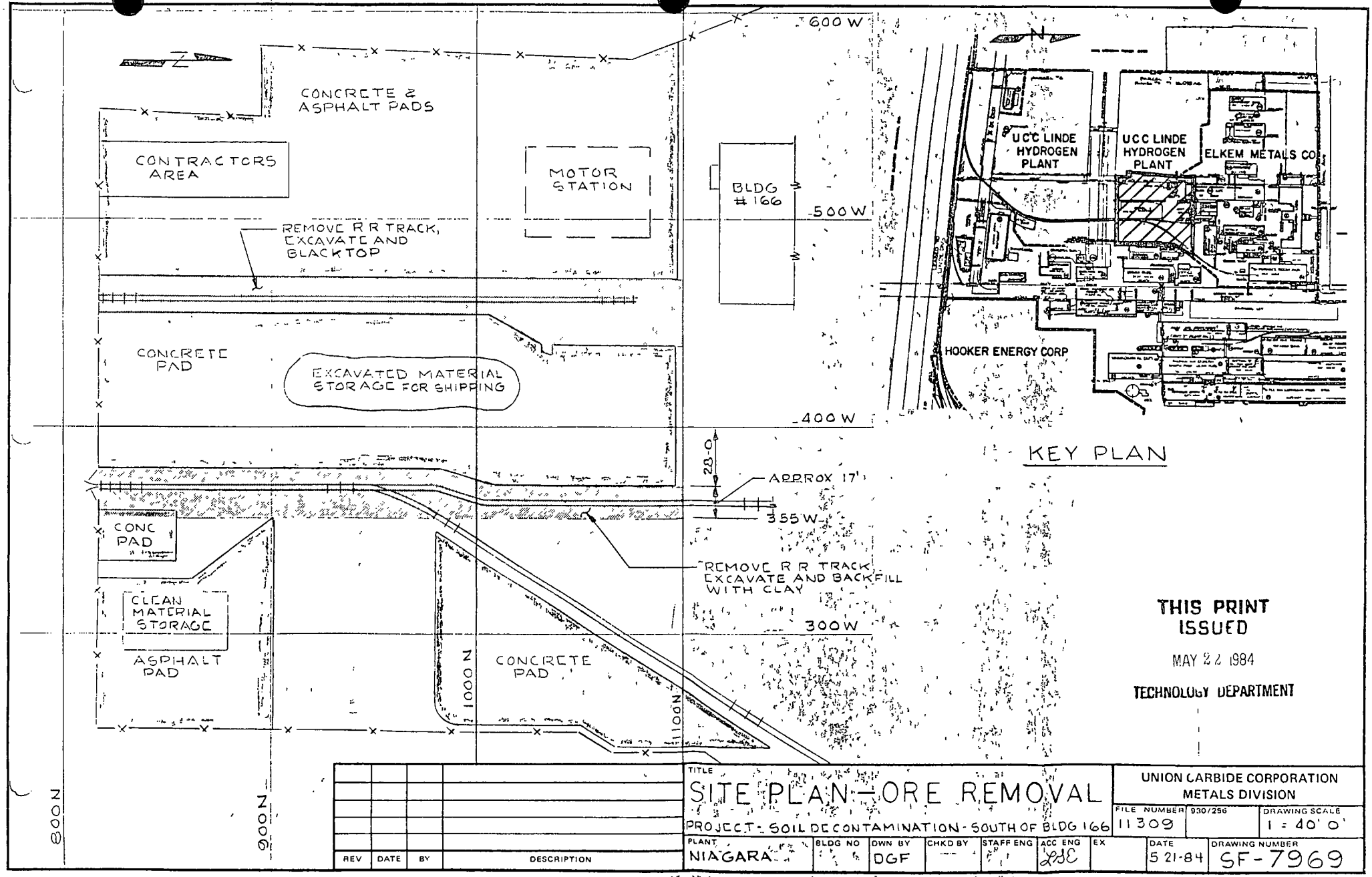
PLAN



ELEVATION

BRUNING 44 132 92

UCCNHT0001114



REV	DATE	BY	DESCRIPTION

TITLE
SITE PLAN — ORE REMOVAL
PROJECT - SOIL DECONTAMINATION - SOUTH OF BLDG 166

UNION CARBIDE CORPORATION
METALS DIVISION

PLANT	BLDG NO	DWN BY	CHKD BY	STAFF ENG	ACC ENG	EX	DATE	DRAWING NUMBER
NIAGARA		DGF	—				5 21-84	SF-7969

FILE NUMBER 930/256 11309 | DRAWING SCALE 1 = 40' 0"

UCCNHT0001115

CONTRACT SYNOPSIS

48

NAME AND ADDRESS (INCLUDING ORDERING ADDRESS IF DIFFERENT)	CONTRACT NO
CHEM-NUCLEAR SYSTEMS, INC. 240 Stoneridge Drive Columbia, SC 29210 (803)256-0450	100-27573 SUPERSEDED CONTRACT NO

4/25/84 per [illegible] Being extended

CONTRACT	DURATION		TOTAL ESTIMATED VALUE
[illegible]/82	4/1/82	TO 3/31/84	$300,000.

TO [illegible] (INCLUDING SPECIFICATION REFERENCE IF NECESSARY)

Radioactive Waste Disposal Services (Using the Barnwell, South Carolina burial site which is [illegible]ged for the State of SC by CNSI).

COMMODITY CODE C

F.O.B.	TERMS OF PAYMENT	TRANSPORTATION TERMS
Per Release Instructions	Net 30 days.	

TYPE OF UCC COMMITMENT (INCLUDING ANY NECESSARY EXPLANATION OF OUR OBLIGATION, AND ANY OTHER CONTRACTS OR PRICE AGREEMENTS COVERING SAME COMMODITY OR ITEM)

☐ F[illegible]IREMENT ☐ FIXED MINIMUM (DEFINED BELOW) ☐ PARTIAL REQUIREMENTS (DEFINED BELOW) ☒ PRICE AGREEMENT

This [illegible]ional Agreement sets forth the terms under which CNSI will perform radioactive waste disposal services. This Agreement does not constitute an endorsement by P&MS or HS&EA of CNSI's qualifications. Each division must pre-qualify CNSI, the Barnwell, SC disposal site and procedures for its specific requirements. UPON EXECUTION OF A SIMILAR AGREEMENT WITH U.S. ECOLOGY, INC. COMPETITIVE BIDS MUST BE OBTAINED IN ACCORDANCE WITH APPLICABLE PROVISIONS OF THE PURCHASING MANUAL.

I. Pre-Release Requirements

The following must be completed prior to the issuance of a "Release" against this Agreement:

A. Determine whether the Material will comply with all applicable provisions of Title 10 and Title 49 of the Code of Federal Regulations, Federal Nuclear Regulatory Commission and State Radioactive Material Licenses, as well as the Barnwell Site Disposal Criteria, and any amendments thereto.

1. The above condition is warranted by UCC in the Agreement (see Paragraph 1).

2. Failure to comply could place UCC in default of the Agreement.

B. In the event the location issuing the Release elects to use the services of a DOT [illegible]d/licensed carrier, a radioactive waste transport permit must be obtained from the South Carolina Department of Health and Environmental Control Regulations (No 61-[illegible]), copy attached. In addition, certain states and municipalities through which the Material is transported may also require permits.

C. Obtain burial space at the Barnwell, SC disposal site by contacting the Manager of Site Allocation at that location. This individual may be reached at (803)[illegible]

PLANTS COVERED

CC

ADDRESS ANY QUESTIONS TO G. [illegible]. McFADDEN

PURCHASING AGENT

☐ CHECK [illegible] CONTRACT COPY SENT TO PLANT

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1. UCC does not participate in the Space Allocation Program at the site.
2. Space granted to participants under this Agreement is on a first-come, first-served basis.
3. Since burial space in excess of that required by generators under allocation is usually made available after the fifteenth of a month, it is recommended that request for space be made at that time.

II. Release Procedures

A. The "Release" under this Agreement is the combination of Exhibits A and B as well as Contractor's "Radioactive Shipment Record Form", which is made a part of Exhibit "A" by reference. Instructions for completing the above form, also known as CNS-201, are found on the reverse side thereof.

B. Each Release must be sequentially numbered for identification and control purposes. A pro-forma P. O. number, identified as a "Release No." in the upper right hand corner of the Exhibits, will satisfy the requirement.

C. As with all National Agreements for hazardous waste disposal services, UCC represents to the Contractor that the description of the Materials contained in the Exhibits is complete and accurate.

D. The scope of Work, as described in Paragraph C of Exhibit A, must indicate the specific tasks which are to be performed by both parties.

E. THE EXHIBIT FORMS MUST BE IDENTICAL TO THOSE ATTACHED TO THE NATIONAL AGREEMENT.

III. Acceptance and Title to Materials

A. Contractor has the right to reject all Materials which do not conform to the representations made in the Release.

B. When transportation and disposal services are provided by Contractor, Contractor will take "Contractual Title" to the Material when it exits UCC's facility. Full title shall pass upon Contractor's receipt of the Materials at the Barnwell Site unless rejected for the following reasons:

1. Non-conforming
2. Force-majuere occurrence, including arbitrary actions by government officials and/or "good faith" safety concerns of Contractor.

C. Contractor may return non-conforming Materials to UCC provided Contractor:

1. Contractor notifies UCC of a non-conformity within seventy-two (72) hours after the arrival of Material at the Barnwell Site.

2. Said notice must be sent by Contractor via registered or certified mail.

D. Contractor may also reject Material due to the force majeure occurrences set forth in Paragraph 21, which include:

1. Arbitrary actions by federal, state, or local government officials, or
2. Contractor's good faith safety concerns.

Under such conditions Contractor will notify UCC of such occurrence within (72) hours and acceptance or rejection will be within a reasonable time thereafter.

E. Contractor is required to handle non-conforming Materials in a lawful manner using due care.

F. Contractor shall not commingle the Materials if the Materials are rejected, or prior to the expiration of the (72) hour rejection period.

G. UCC shall reimburse Contractor for the cost of return transportation of rejected Materials.

H. In the event the terms of the Release can be re-negotiated to cause Contractor to accept a non-conforming or otherwise rejected Material, an amendment to the Release indicating the change should be prepared and executed by both parties prior to the commencement of the Work.

IV. Compensation

A. As set forth in Paragraph 4. the "CONTRACT PRICE" is the total price paid for the services performed under a Release. This amount is the sum of the removal and transportation charges as determined under Schedule A and the disposal charges found in Schedule B.

B. It is important to note the various cost build-up factors found in Schedule B. Said amount includes a basic disposal charge to which various scheduled surcharges are added based on radiation levels, type of container, weight, etc.

C. Each participating location is given an option under this Agreement to either obtain transportation from CNSI or obtain third party services.

V. Demurrage, Delay and Overtime Charges

See Paragraph 5 of the Agreement for specific demurrage and delay charges.

VI. Waste disposal services may be obtained under this Agreement through any of the following offices of CNSI:

Corporate and Western Operations
P. O. Box 1866
Bellevue, WA 98009
(206)827-0711

Northeast/Midwest Operations
The Exchange Ste. 203
270 Farmington Avenue
Farmington, CT 06032
(203)677-0455

Eastern Office
1 Greystone West Bldg.
240 Stoneridge Drive
Columbia, SC 29210
(803)798-9042

Southeast/Southwest Operations
P. O. Box 726
Barnwell, SC 29812
(803)259-1781

VII. Guidance of Disposal of Low-Level Radioactive Waste at Barnwell Waste Management Facility

Attached are the subject guidelines prepared by Ms. C. L. Dudnick of the Law Department, dated April 1, 1982.

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EXHIBIT "A"

Radioactive Waste Disposal Contract # 100-27573

Order/Release No.

A. 1 DELIVERY LOCATION 2. Company's Facility (if other than Delivery Location)	
B. MATERIALS 1. Describe materials and any containers in which such materials are to be delivered to Contractor. Specify when and where the containers are to be provided. The Material shall be as described on Contractor's Form #CNS-201, dated, attached hereto and made a part hereof.	
2. Additional Information (Specify DOT shipping name and class and EPA description. Specify any special handling instructions.)	
WORK Describe Work to be performed. (Indicate specific services to be performed, such as package, accept, load, transport, treat, store and dispose. Indicate method of disposal. If Contractor has responsibility for marking and labeling containers in which Materials are to be tendered to Contractor or to perform any other service for Company prior to delivery of Materials, so specify. Indicate any portion of the Work which is to be subcontracted and name of subcontractor.)	
D. DISPOSAL LOCATION Indicate nature and specific location of disposal area.	Contractor's disposal site located approximately six (6) miles west of Barnwell, South Carolina.

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EXHIBIT "A" continued

Radioactive Waste Disposal Contract #100-27573
Order/Release No.

E. QUANTITY

(Specify quantity. If no definite quantity, describe how quantity is determined, such as, such quantity as Company designates for the Work during period between _____ and _____.)

F. ORDERING PROCEDURE AND SCHEDULES

(Specify delivery schedule or procedure for ordering and scheduling deliveries of the Quantity of Materials. Also specify any time limit for a pickup after order is given.)

G. NOTICES

For the purpose of providing notice pursuant to Paragraph 22. NOTICES and Paragraph 3. ACCEPTANCE AND TITLE TO MATERIALS of this AGREEMENT, Company designates _____ as its representative with respect to the Work performed under this Release.

2. Contractor hereby designates _____ as Contractor's duly authorized representative.

greed to this _____ day of _____,19___

ONTRACTOR)

_____

tle_____

(COMPANY)

By_____

Title_____

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EXHIBIT "B"

Radioactive Waste Disposal Contract #100-27573
Order/Release No.

A. QUANTITY MEASUREMENT (Specify method of measurement and place where it is to be conducted.)	
B. CONTRACT PRICE Transportation (if provided by Contractor hereunder) Per trip rate in accordance with Schedule "A". Disposal Services The following rates in accordance with Schedule "B", latest revision.	
C. INVOICING INSTRUCTIONS	

Agreed to this _____ day of _____, 19____

(CONTRACTOR)

By_____

Title_____

(COMPANY)

By_____

Title_____

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Guidance on Disposal of Low-Level Radioactive Waste at the Barnwell Waste Management Facility

Under a national contract being negotiated with Chem-Nuclear Services, Inc. ("CNSI"), Union Carbide will "warrant and represent" that each shipment of radioactive waste submitted to CNSI for disposal at the Barnwell site complies with all applicable provisions of Title 10 (NRC regulations) and Title 49 (DOT regulations) of the Code of Federal Regulations, all applicable provisions of South Carolina laws and regulations, CNSI's licenses to operate and provide disposal services at Barnwell, the Barnwell Site Disposal Criteria, and any amendments to any of these laws, regulations, permits and disposal criteria. Once the contract with CNSI is executed and a need for services under the contract is indicated, the environmental manager at each facility responsible for activities pertaining to the packaging, transportation, and disposal of the waste will have to familiarize himself or herself with the appropriate regulatory requirements, CNSI licenses, and Barnwell site disposal criteria. Assuming the facility has obtained an allocation to dispose of waste at Barnwell, the following is a general guide to the items to be considered in order to use that allocation:

1. Review the radioactive materials license for the UCC facility to ensure that it authorizes transfer of the particular waste for disposal at Barnwell and that CNSI's licenses, current copies of which CNSI is to provide, authorize the receipt of the type, form and quantity of material to be transferred.

2. Review packaging and labeling requirements contained in DOT and NRC regulations, CNSI permits and the site disposal criteria cited in the first paragraph of this memorandum. CNSI is certainly an appropriate resource in determining what these requirements are. In fact, South Carolina regulations require CNSI, as operator of the Barnwell facility, to notify each shipper of special requirements, if any, regarding the packaging, transportation, storage, disposal or delivery of wastes at Barnwell. However, remember that even if CNSI is requested to do packaging and labeling and improperly performs these tasks, Union Carbide will be held responsible under South Carolina law and any penalty assessed will be assessed against Union Carbide.

To assure that this legal responsibility for proper packaging and labeling is clearly placed on the shipper of the waste, the State of South Carolina requires the shipper to provide it with a certification that the materials are properly classified, described, packaged, marked and labeled and in proper condition for transportation. (See paragraph 5.1 of the South Carolina Department of Health and Environmental Control Regulation No. 61-83, a copy of which is attached, hereinafter referred to as "the South Carolina Regulations.") CNSI also requires the shipper to provide this same certification on its Radioactive Shipment Record Form for use of the

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Barnwell Waste Management Facility. It is therefore important that the environmental manager at the facility who is responsible for these activities assure that qualified personnel perform these tasks.

3. If CNSI does not provide transportation services, choose a transporter whom you find qualified for the transportation of low-level radioactive waste. The transporter must, of course, be franchised by the ICC as authorized to transport in interstate commerce, or Union Carbide may provide its own transportation. Even if you request CNSI to package and transport waste to Barnwell, the South Carolina Regulations only require CNSI, as the carrier, to certify that the shipment is properly placarded, shipping papers are properly executed, the vehicle has been inspected and complies with Federal and South Carolina requirements, and it has copies of the Radioactive Waste Prior Notification and Manifest Form and the Radioactive Waste Shipment Certification Form (see paragraphs 5 and 7 below).

4. In reviewing the route to be followed by the transporter of waste to Barnwell, assure that all notices to be supplied by the shipper to states and local governments along the route are timely provided. The transporter and/or CNSI should have sufficient information on notification requirements and I suggest you consult with them. Nonetheless, an independent review should be made of the notice requirements imposed by law on the shipper. I suggest requesting HAMTRAC personnel to provide assistance.

Despite statements by the NRC to the contrary, many state and local governments have determined and will probably continue to determine that all radioactive material transported into and through their borders poses a potential health threat and will require prenotification and/or postnotification, prohibit the use of certain routes, etc. While it has been the fate of many of these laws eventually to be declared unconstitutional, I recommend compliance with them or use of alternative routes.

5. Before disposing of radioactive waste at Barnwell, the shipper must have a valid radioactive waste transport permit issued by the South Carolina Department of Health and Environmental Control in accordance with its Regulation No. 61-83, a copy of which is attached. This permit must be renewed each year. Under the South Carolina Regulations, Union Carbide could obtain one permit to cover all facilities, each division could obtain a permit to cover all of its facilities, or each facility or several facilities could obtain a separate permit. I strongly recommend that each facility shipping waste to Barnwell obtain a separate permit because, should South Carolina suspend a permit, Barnwell would be prohibited from accepting radioactive waste from all the facilities covered by that permit. Further, I understand that South Carolina is very conscientious in its enforcement of its radioactive material regulations. This fact, too, militates against assuming the risk of including more than one facility on a permit. (Several Union Carbide facilities have already purchased individual permits.)

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Attached to the copy of Regulation No. 61-83, you will see a copy of the application for a permit. I suggest telephoning Mr. Virgil R. Autry, Director, Division of Radioactive Material Licensing and Compliance, South Carolina Department of Health and Environmental Control, at 803-758-7951, to find out what the appropriate fee is. In addition, the person responsible for obtaining this permit should speak with Robert M. Thode in our Insurance Department (presently in New York City at 8-427-4209) in order to obtain the certificate of liability insurance required to be submitted with the application.

6. The shipper must give written notice to the South Carolina Department of Health and Environmental Control no more than 30 days and not less than 72 hours before each shipment of radioactive waste is expected to arrive in the State or leave the shipper's licensed facility within the State, unless the shipment consists of 75 cubic feet or less containing one curie of radioactive material or less which may be consigned as non-exclusive use shipments under DOT regulations. A copy of the form, Radioactive Waste Shipment Prior Notification and Manifest Form, and instructions are also attached to the copy of Regulation No. 61-83. Note that any cancellation or changes in date of arrival, carrier, route, waste description, curie content, volume or waste classification which occur before the waste leaves the Union Carbide facility must also be immediately reported to the Department by telephoning 803-758-7806. I suggest maintaining a record of the Department person contacted.

South Carolina has a telecopier machine for transmitting the advance notice forms. A copy of the form must be given to the carrier and all drivers and accompany the shipment to Barnwell. CNSI will complete the "Consignee Acknowledgement" part of this form when it is accepted at Barnwell.

7. Under the South Carolina Regulations, the Union Carbide facility is required to inspect the low-level radioactive waste shipment within 48 hours before shipment and certify that the inspection was made and that no items of non-compliance were found. There is a certification block on CNSI's Radioactive Shipment Record Form that the UCC facility must complete that confirms the inspection was made.

8. In addition to the accurate prior notification form and other required shipping documents, including the DOT-required shipping document (bill of lading) and CNSI's Radioactive Shipment Record Form, South Carolina also requires that a Radioactive Waste Shipment Certification Form be completed by the shipper and carrier. (A copy of this form is also included with Regulation No. 61-83.) Once a shipment is accepted at Barnwell, it is the shipper's responsibility to assure that the duly executed notification form and certification form are provided to the South Carolina Department of Health and Environmental Control.

9. If the Union Carbide facility has an NRC-issued license, records of the transfer and disposal of source or byproduct material must be maintained by that facility until the Commission authorizes their disposition. After five years, I would recommend requesting the Commission to authorize their disposition, or at the least, removal from the site to Union Carbide's Vermont depository. Agreement state licensees will also have to maintain records. The length of time will depend upon the particular agreement state statute or regulations.

It is an understatement to say that the transfer of radioactive material is highly regulated. As the generator of radioactive waste, Union Carbide will be held responsible for complying with requirements pertaining to packaging, marking and labeling of packages, loading of packages, monitoring, reporting, transportation and disposal. If any injury, damage or noncompliance with applicable regulations arises as a result of the transportation and disposal of the waste, South Carolina will most certainly rely on certifications contained in the waste transport permit, prior notification form, and radioactive waste shipment certification form as well as CNSI's Radioactive Shipment Record Form for Barnwell to hold Union Carbide liable for any penalties or damages. It is therefore important that reliance on other parties for performance of any of our legal obligations is well-placed.

Encl.

UCCNHT0001126

Bellone — A. Reynolds

South Carolina Department of Health and Environmental Control

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George G Graham D D S
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COMMISSIONER
Robert S Jackson M D
2600 Bull Street
Columbia S C 29201

June 23, 1981

TO. All Shippers and Carriers
of Radioactive Waste into or within South Carolina

FROM. Heyward G. Shealy, Chief
Bureau of Radiological Health

SUBJECT: Radioactive Waste Transportation Regulations and General Information

Enclosed is the Department's final Regulation No. 61-83, Transportation of Radioactive Waste into or within South Carolina which was promulgated pursuant to Act No. 429 of 1980, The South Carolina Radioactive Waste Transportation and Disposal Act and became effective May 22, 1981.

As a reminder, paragraph 4.1 of the Regulation requires shippers to give written notice to the Department not less than 72 hours nor more than 30 days before the expected date of arrival of the shipment in the State or departure from the shipper's facility within the State.

In addition, shippers and carriers are required to make notification to the Department of any changes as stipulated in paragraphs 4.1.2 and 5.2 of the Regulation.

A RAPICOM 1500 automated, Facsimile Telecopier has been provided by the Department to receive advance written notifications, and can be reached at (803) 799-6726 For those shippers not having compatible Facsimile equipment, the RAPICOM 1500 has now been equipped with a compatibility module, and will accept communication from other machines. However, this feature is not automated and requires assistance from the Telecopier operator. Therefore, between the hours of 8 30 A M. and 4 30 P.M , an operator will be available for voice communication and coordination of the Telecopier transmission. Compatible machines can still communicate automatically 24 hours daily.

(OVER)

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All Shippers and Carriers
Regulation No. 61-83
June 23, 1981

All changes in prior notifications to be made by shippers and carriers can be made by calling (803) 758-7806. After normal office hours (8 30 A.M. - 4.30 P.M.) and holidays, this number is switched to an automatic answering phone to accept notification changes.

Any question concerning the above or shipments of radioactive waste can be made to Mr. Virgil R. Autry, Director, Division of Radioactive Material Licensing and Compliance at (803) 758-7951.

HGS:bb

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South Carolina Department of Health

And Environmental Control

Regulation No. 61-83

Transportation of

Radioactive Waste Into or Within

South Carolina

Approved by the South Carolina

Board of Health and Environmental Control
November 13, 1980

Effective Date
May 22, 1981

Promulgated pursuant to Act No. 429 of 1980, The South Carolina Radioactive Waste Transportation and Disposal Act, Amending Section 13-7-10 et seq. of the 1976 Code of Laws, The South Carolina Atomic Energy and Radiation Control Act.

UCCNHT0001129

South Carolina
Department of Health and Environmental Control

Regulation 61-83

Transportation of Radioactive Waste Into or Within South Carolina

Table of Contents

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Attachments.

Attachment I	Form RHA-200P "Application for Radioactive Waste Transport Permit"	
Attachment II	Form RHA-PNC "Radioactive Waste Shipment Prior Notification and Manifest Form"	
Attachment III	Form RHA-CT "Radioactive Waste Shipment Certification Form"	

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1. SCOPE

1.1 This regulation applies to any shipper, carrier or other person who transports radioactive waste into or within this State, to any persons involved in the generation of radioactive waste within this State, and to any shipper whose radioactive waste is transported into or within this State or is delivered, stored, or disposed of within this State.

1.2 All persons subject to the provisions of this regulation shall comply with all applicable provisions of 49 CFR Parts 171-179, 49 CFR Parts 386-399, 10 CFR Part 71, Regulation 61-63 of the 1976 Code of Laws of South Carolina, and any disposal facility radioactive material license requirements regarding the packaging, transportation, disposal, storage or delivery of radioactive materials.

2. DEFINITIONS

2.1 "Carrier" means any person transporting radioactive wastes into or within the State for storage, disposal or delivery.

2.2 "Department" means the Department of Health and Environmental Control including personnel authorized to act on behalf of the Department.

2.3 "Disposal facility" means any facility located within the State, which accepts radioactive waste for storage or disposal.

2.4 "Generation" means the act or process of producing radioactive wastes.

2.5 "Manifest" means the document used for identifying the quantity, composition, origin, and destination of radioactive waste during its transport to a disposal facility.

2.6 "Operator" means every person who drives or is in actual physical control of a vehicle transporting radioactive waste.

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2.7 "Persons" means any individual, public or private corporation, political subdivision, government agency, municipality, industry, partnership or any other entity whatsoever.

2.8 "Permit" means an authorization issued by the Department to any person involved in the generation of radioactive waste, to transport such radioactive wastes or offer such waste for transport.

2.9 "Radioactive waste" means any and all equipment or materials, including irradiated nuclear reactor fuel, which are radioactive or have radioactive contamination and which are required pursuant to any governing laws, regulations, or licenses to be disposed of as radioactive waste.

2.10 "Radiological violation" means radioactive contamination or the emission of radiation in excess of applicable limits.

2.11 "Shipper" means any person, whether a resident of South Carolina or a non-resident:

2.11.1 who transfers radioactive waste to a carrier for transportation into or within the State; or,

2.11.2 who transports his own radioactive waste into or within the State; or,

2.11.3 who transfers radioactive waste to another person if such wastes are transported into or within the State.

2.12 "Transport" means the movement of radioactive wastes into or within South Carolina.

3. PERMITS

3.1 Before any shipper transports or causes to be transported radioactive waste into or within the State of South Carolina, he shall purchase an annual radioactive waste transport permit from the Department. An application for a permit shall be submitted on Department Form RHA-200P "Application for Radio-

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active Waste Transport Permit" together with the necessary fee to: Chief, Bureau of Radiological Health, S.C. Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina, 20201.

3.2 Before a permit shall be issued, the shipper must deposit and maintain with the Department a cash or corporate surety bond in the amount of Five Hundred Thousand Dollars ($500,000.00); or, provide to the Department satisfactory evidence of liability insurance.

3.2.1 For purposes of this regulation, liability insurance shall mean coverage of Five Hundred Thousand Dollars ($500,000.00) per occurrence and One Million Dollars ($1,000,000.00) aggregate, or as otherwise provided by State law.

3.2.2 Any insurance carried pursuant to Section 2210 of Title 42 of the United States Code and Part 140 of Title 10 of the Code of Federal Regulations shall be sufficient to meet the requirements of this section.

3.2.3 Liability insurance shall be specific to the packaging, transportation, disposal, storage and delivery of radioactive waste.

3.2.4 Shippers maintaining liability insurance for the purpose of this regulation may provide to the Department a certificate of insurance from their insurer indicating the policy number, limits of liability, policy date and specific coverage for packaging, transportation, disposal, storage and delivery of radioactive materials.

3.2.5 A cash or corporate surety bond previously posted will be returned to the shipper upon notification to the

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Department in writing of his intention to cease shipments of radioactive waste into or within the State. Such bond will be returned after the last such shipment is accepted safely at its destination.

3.3 Each permit application shall include a certification to the Department that the shipper will comply fully with all applicable State or Federal laws, administrative rules and regulations, licenses, or license conditions of the disposal facility regarding the packaging, transportation, storage, disposal and delivery of radioactive wastes.

3.4 Each permit application shall include a certification that the shipper will hold the State of South Carolina harmless for all claims, actions, or proceedings in law or equity arising out of radiological injury or damage to persons or property occuring during the transportation of its radioactive waste into or within the State including all costs of defending the same; provided, however, that nothing contained herein shall be construed as a waiver of the State's sovereign immunity; and, further provided, that agencies of the State of South Carolina shall not be subject to the requirements of this provision.

3.5 Permit fees will be annually determined and assessed by the Department based on the following classifications.

3.5.1 Class X - more than an annual total of 75 cubic feet or more than 100 curies of radioactive waste for disposal within the State.

3.5.2 Class Y - an annual total of 75 cubic feet or less of radioactive waste consisting of 100 curies or less total activity for disposal within the State.

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3.5.3 Class Z - any shipment of radioactive waste which is not consigned for storage or disposal within the State, but which is transported into or within the State.

3.6 Permits will be valid from the date of issuance through December 31 of each calendar year. Permit fees are not refundable. Permits may be renewed by filing a new application with the Department.

4. SHIPPER'S REQUIREMENTS

4.1 Before any shipment of radioactive waste may be transported into or within the State, the shipper shall give written notice to the Department not less than 72 hours nor more than 30 days before the expected date of arrival of the shipment or departure from the shipper's facility within the State as the case may be, except as provided in paragraph 4.1.3.

4.1.1 All prior notifications shall be filed on a Department form designated as RHA-PNC "Radioactive Waste Shipment Prior Notification and Manifest Form."

4.1.2 The shipper shall immediately notify the Department of any cancellations or significant changes in the prior notification or manifest summary which may occur prior to the shipment departing his facility. For example, such changes include changes in date of arrival, carrier, route, waste description, curie content, volume, or waste classification.

4.1.3 For shipments consisting of 75 cubic feet or less containing one curie of radioactive material or less which may be consigned as non-exclusive use shipments according

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to applicable U.S. Department of Transportation regulations, the requirement for prior notification contained in paragraph 4.1 is waived. Such shipments must otherwise comply with all other applicable requirements regarding the packaging, transportation, storage, disposal and delivery of radioactive wastes.

4.2 The shipper shall provide to the carrier with each separate shipment a copy of the RHA-PNC "Radioactive Waste Shipment Prior Notification and Manifest Form" required by paragraph 4.1. Such copy shall show any changes made pursuant to paragraph 4.1.2 above. Each shipper shall instruct the carrier to comply with the route and schedule contained therein.

4.3 The manifest accompanying each shipment of radioactive waste shall include a copy of the shipper's certification prepared on Department form RHA-CT, Part I, "Radioactive Waste Shipment Certification Form," which shall include certification that the shipment has been inspected and complies with all applicable State and Federal laws and administrative rules and regulations, license or license conditions of the disposal facility regarding the packaging, transportation, storage, disposal and delivery of radioactive wastes.

4.4 Following acceptance of each separate shipment at a disposal facility or at the consignee's facility, it shall be the responsibility of each shipper to provide to the Department for such shipment a copy of Department form RHA-PNC "Radioactive Waste Prior Notification and Manifest Form" with the Consignee Acknowledgement properly executed and to provide the Department with the "Radioactive Waste Shipment Certification Form," Department form RHA-CT, which accompanied that shipment.

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5. CARRIER REQUIREMENTS

5.1 For each shipment of radioactive waste materials shipped into or within the State, a carrier shall complete Part II: Carrier's Certification on the form RHA-CT provided by the shipper. The certificate shall be signed by a principal, officer, partner, responsible employee or other authorized agent of the carrier.

5.1.1 The carrier shall certify that the shipment is properly placarded for transport and that all shipping papers required by law and administrative rules and regulations have been properly executed, and,

5.1.2 that the transport vehicle has been inspected and meets the applicable requirements of the Federal government and the State of South Carolina, and that all safety and operational components are in good operative condition, and,

5.1.3 that the carrier has received a copy of the shipper's "Radioactive Waste Prior Notification and Manifest Form," specified in paragraph 4.2 and the "Radioactive Waste Shipment Certification Form," form RHA-CT specified in paragrah 4.3; and,

5.1.4 that the carrier shall comply fully with all applicable laws and administrative rules and regulations, both State and Federal, regarding the transportation of such waste.

5.2 A carrier shall immediately notify the Department of any variance, occurring after departure, from the primary route and estimated date of arrival of shipment as provided by the shipper on Form RHA-FNC.

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5.3 The copies of Forms RHA-CT and RHA-PNC shall accompany the shipment to the destination and shall be presented together with the manifest and other shipping papers.

6. DISPOSAL FACILITY OPERATOR

6.1 Owners and operators of disposal facilities shall permanently record, and report to the Department within twenty-four (24) hours after discovery, all conditions in violation of the requirements of this regulation discovered as a result of inspections required by any license under which the facility is operated.

6.2 Prior to the receipt of radioactive wastes at a disposal facility in this State, the owners and operators of such facility shall notify each shipper of any special requirements, if any, in effect regarding the packaging, transportation, storage, disposal or delivery of such wastes at that facility.

6.3 No owner or operator of a disposal facility located within this State shall accept radioactive waste for storage or disposal unless the shipper of such waste has a valid, unsuspended permit issued pursuant to this regulation.

7. PENALTIES

7.1 Any person who commits a radiological violation shall:

7.1.1 be fined not less that One Thousand Dollars ($1,000.00) nor more than Five Thousand Dollars ($5,000.00), and,

7.1.2 if such person is a shipper, have his permit suspended for a period of not less than thirty (30) days and until such time as he demonstrates to the Department's satisfaction that adequate measures have been taken to prevent reoccurrence of the violation.

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7.2 Any person who commits a second radiological violation within twelve (12) months of the first such violation shall:

7.2.1 be fined not less than Five Thousand ($5,000.00) nor more than Twenty-five Thousand Dollars ($25,000.00); and,

7.2.2 if such person is a shipper, have his permit suspended for a period of not more than one year and until such time as he demonstrates to the satisfaction of the Department that adequate measures have been taken to prevent reoccurrence of the violations.

7.3 Any person who commits a non-radiological violation of the provisions of this regulation shall be fined not more than One Thousand Dollars ($1,000.00) for each violation, provided, that should the Department determine that a series of such violations has occurred, the Department shall suspend or revoke that person's permit for a period of not more than twelve (12) months.

7.4 Any person to whom an order, injunction, suspension, or fine issued under this article is directed shall comply therewith immediately, but on application to the Department, within twenty (20) days after the date of the order, shall be afforded a hearing within thirty (30) days of such application.

8. SEVERABILITY CLAUSE

8.1 It is hereby declared that each of the sections and provisions of this regulation are severable, and in the event that any one or more of such sections are declared unconstitutional or invalid, the remaining sections and provisions of this regulation shall remain in effect.

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ATTACHMENTS

Form P'A-200P
(10/80)

SOUTH CAROLINA D[illegible]MENT OF HEALTH AND E[illegible]NMENTAL CONTROL
APPLICATION FOR RADIOACTIVE WASTE TRANSPORT PERMIT

Instructions: Complete Items 1 through 8. Submit original and one copy to Chief, Bureau of Radiological Health, S.C. Dept. of Health and Environmental Control, 2600 Bull Street, Columbia, S.C. 29201. All [illegible]ies must be signed and dated. Additional sheets may be used if necessary. U[illegible] approval, the Department will return one copy with your transport permit. All permit fees should be made payable to the S.C. Dept. of Health and Environmental Control, Bureau of Finance, 2600 Bull Street, Columbia, S.C. 29201. Please note on remittance, "For Radioactive Waste Transport Permit."

Note: Radioactive Waste Transport Permits may be purchased for more than one facility or location of a company, corporation, etc. However, an application shall be submitted for each facility to include the additional fee and the required certificate of insurance or bond.

1. Name and Address of Applicant (Shipper):	2. Person responsible for Radioactive Waste shipment: (a) Name: (b) Title: (c) Address: (d) Telephone:
3. Locations from which waste will be shipped if application is for more than one facility. (a) (b)	4. NRC or Agreement State Radioactive Material License No. for each location. (a) (b)
5. Estimated Annual Cubic Footage.	6. Amount of permit fee remitted.

Information to be Submitted as Attachment

7. A Certificate of Liability Insurance shall be submitted as evidence of financial ability to protect the State of South Carolina and the public at large from possible radiological injury or damage due to packaging, transportation, disposal, storage, or delivery of radioactive waste. For those applicants not maintaining liability insurance, they must deposit and maintain with the Department a cash or corporate surety bond in the amount of Five Hundred Thousand Dollars ($500,000 00).

CERTIFICATE

8. In compliance with Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act, I hereby certify on behalf of the above-named applicant (shipper) to the South Carolina Department of Health and Environmental Control that: (A) the above-named applicant (shipper) will comply fully with all applicable laws and administrative rules and regulations, both State and Federal, and any disposal facility radioactive material license requirements regarding the packaging, transportation, storage, disposal, and delivery of such wastes; (B) the above-named applicant (shipper) will hold the State of South Carolina harmless for all claims, actions, proceedings in law or equity arising out of radiological injury or damages to persons or property occuring during the transportation of its radioactive waste into or within the State including all costs defending same, provided, however, that nothing contained herein shall be construed as a waiver of the State's sovereign immunity; (C) the above-named applicant (shipper) has current copies of the Regulations for the Transportation of Radioactive Waste into or within the State of South Carolina, DOT Regulations 49 CFR Parts 171-179, and when applicable, the disposal site radioactive material license and the disposal site waste acceptance criteria; (D) the above-named applicant (shipper) has prepared this application to conform with South Carolina Department of Health and Environmental Control Regulation for Transportation of Radioactive Waste Into or Within South Carolina, and that all information contained herein, including any required supplements attached hereto, is true and correct to the best of my knowledge and belief.

Date _____

_____
Typed Name and Title of Agent of Applicant (Shipper)

_____
Signature

DHEC 800
(10/80) Revision

UCCNHT0001141

Form RWA-PNC
(5/80)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Waste Shipment Prior Notification and Manifest Form

See Reverse Side for Instructions

1. Name and Address of Shipper	2 Person Responsible for Radioactive Waste Shipment: (a) Name (b) Title (c) Telephone No ( )
3. Radioactive Waste Transport Permit No.	4. Shipment Identification No.:
5. Location from which waste will be shipped	6. Name and Address of Consignee
7. Scheduled Date of Departure of Shipment.	8. Estimated Date of Arrival of Shipment.

9. Carrier	10. Type of Transport Vehicle	11. Trailer No. and Owner (if available)

12 Routes shipment will follow in State of South Carolina (Be Specific)

Manifest Summary

13 Type Container or Cask	14. Container Spec.	15. Total No of Containers
16 Waste Description, Physical and Chemical Form	17. Prominent Radionuclides	
18 Total Curies	19 Transport Group	20 Total Cubic Feet

21. Waste Classification

		Normal Form	Special Form	Fissile
[] Radioactive LSA	[] Bulk LSA			
[] Radioactive LSA greater than Type A quantities	[] Limited quantities and radioactive devices	[] Type A quantity [] Type B quantity [] Large quantity	[] Type A quantity [] Type B quantity [] Large quantity	[] Class I [] Class II [] Class III

CERTIFICATION

I hereby certify on behalf of the above-named shipper to the South Carolina Department of Health and Environmental Control that the information provided herein is complete and correct to the best of my knowledge and that the shipper has complied with all the provisions as required by Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act.

Date_____

Typed Name and Title of Agent of Shipper

Signature

CONSIGNEE ACKNOWLEDGEMENT

This acknowledges to the South Carolina Department of Health and Environmental Control that the above-described radioactive waste shipment was received

Date of Delivery

Signature of Consignee or authorized Agent

Typed or Printed Name and Title

DHEC 802
(5/80)

(Copies of this form may be reproduced locally as needed)

UCCNHT0001142

General Instructions and Information

1. This form is to be used to provide the Department with prior notification of radioactive waste shipments transported into or within the State of South Carolina. This notificati is to be made 72 hours before the expected date of arrival in the State. All written notices should be mailed to:

   Bureau of Radiological Health
   Radioactive Waste Management Section
   S.C. Dept. of Health and Environmental Control
   2600 Bull Street
   Columbia, South Carolina 29201

2. A separate form shall be submitted for each radioactive waste shipment.

3. Prior notification is required of all radioactive waste shipments as defined in paragraph 2 of Interim Regulations for the Transportation of Radioactive Waste into or within South Carolina except as provided in paragraph 4.1.2 of the Regulation.

4. The "Manifest Summary" portion of this form will satisfy requirements of providing the Department with a shipping manifest, however, it does not satisfy the requirements of shipping documents which shall accompany the shipments as required by DOT Regulations and the disposal facility's license and criteria.

5. A copy of this completed form shall be provided to the carrier and all drivers of the radioactive waste shipment.

6. Upon delivery of the shipment to the consignee, acknowledgement of receipt shall be obtained, and a copy of this form and the shipper/carrier's certification form shall be returned to the Department.

Specific Instructions

Item Number

1. Self Explanatory
2. Self Explanatory
3. This item applies to all shipments of radioactive waste transported to and within the State of South Carolina.
4. Each shipment of radioactive waste shall be identified in some manner by the shipper. This number can be a radioactive shipment record number, bill of lading number, allocation number, etc. The identification number shall only be used once to identify the one shipment for which notification is being made.
5. Self Explanatory
6. Indicate in this item the disposal facility, company, organization, etc., to which this shipment has been consigned.
7. Self Explanatory
8. For through shipments, indicate in this item estimated date shipment will pass through the state.
9. Self Explanatory

10.& 11. Applies only to exclusive use, sole use, and full load shipments.

12. All routing information must be specific. You should check with carrier to insure routes you prescribe are appropriate. The carrier is responsible to inform the Department of any changes of routes in South Carolina after departure.

13 thru 21. Self Explanatory

Certification: To be signed only by an authorized representative or agent of the shipper and carrier.

UCCNHT0001143

GILLS PLUMBING SUPPLY INC.

Wholesale Distributor of Plumbing and Heating Supplies
4601 Military Rd • Niagara Falls, N.Y. 14305 • Phone 297-0030

102759

Sold To: DUBE CONSTRUCTION
Address: 2267 LOCKPORT ROAD
SANBORN

ORDER DATE: 8-7-84
CUSTOMER P O #:
DELIVERY DATE:

Ship To	PHONE	SALESMAN	PICKED BY	SPECIAL ORDER	BACK ORDER	WILL CALL
CArBide Job		[illegible]		BY / D O	BY	BY / DATE

QUANTITY ORDERED	UNIT	QUANTITY SHIPPED	DESCRIPTION	UNIT PRICE	AMOUNT
2	Ea	2	Ridgid 173 Shovels		34 66

Dube

TERMS Net 30 da[illegible]
Goods returned without [illegible] due accounts are subject to a FINANCE CHARGE of 1½ percent per month (18% annually) on unpaid balance
[illegible] permission cannot be credited Our responsibility ceases on delivery in good order

UCCNHT0001144

GILLS PLUMBING SUPPLY INC.

Wholesale Distributor of Plumbing and Heating Supplies

4607 Military Rd. • Niagara Falls, N.Y. 14305 • Phone 297-0030

10161

DUBE CONSTRUCTION

2267 LOCKPORT ROAD

SEIBOR, NY 14132

ORDER DATE

CUSTOMER P.O.

DELIVERY DATE

Ship To

PHONE

SALESMAN

PICKED BY

SPECIAL ORDER BY

D.O.

BACK ORDER BY

WILL CALL BY

DATE

QUANTITY ORDERED	UNIT	QUANTITY SHIPPED	DESCRIPTION	UNIT PRICE	AMOUNT
10		10			

TERMS: Net 30 days. Past due accounts are subject to a FINANCE CHARGE of 1½ percent per month (18% annually) on unpaid balance

UCCNHT0001145

GILLS PLUMBING SUPPLY INC.

Wholesale Distributor of Plumbing and Heating Supplies
4601 Military Rd • Niagara Falls, N Y 14305 • Phone 297-0030

Sold To: DUBE CONSTRUCTION
Address: 2267 LOCKPORT ROAD
SANBORN, NY 14132

ORDER DATE: 8-3-84
CUSTOMER P O #:
DELIVERY DATE:

Ship To	PHONE	SALESMAN	PICKED BY	SPECIAL ORDER	BACK ORDER	WILL CALL
Union Carbide	6	WC		BY / D O	BY	BY / DATE

QUANTITY ORDERED	UNIT	QUANTITY SHIPPED	DESCRIPTION	UNIT PRICE	AMOUNT
2	Ea	2	Derusto 867-13 oz Dark Blue spray		6 80
2	E	2	" 753-PC-73 " Black spray		6 80
					13 60
				Less 10%	1 36
					12 24

J Dube

TERMS Net 30 days Past due accounts are subject to a FINANCE CHARGE of 1½ percent per month (18% annually) on unpaid balance
Goods returned without our permission cannot be credited Our responsibility ceases on delivery in good order

UCCNHT0001146

GILLS PLUMBING SUPPLY INC.

103289

Wholesale Distributor of Plumbing and Heating Supplies
4601 Military Rd. • Niagara Falls, N.Y. 14305 • Phone 297-0030

Sold To: DUBE CONSTRUCTION
2267 LOCKPORT ROAD
Address: SANBORN, NY 14132

ORDER DATE: 8/8/84
CUSTOMER P.O. #:
DELIVERY DATE:

Ship To	PHONE	SALESMAN	PICKED BY	SPECIAL ORDER	BACK ORDER	WILL CALL
Union Carbide Metals Div				BY / D.O.	BY	BY / DATE

QUANTITY ORDERED	UNIT	QUANTITY SHIPPED	DESCRIPTION	UNIT PRICE	AMOUNT
10	Ea	10	Carex Caulk Drp - Rely On Gray		95

TERMS: Net 30 days. Past due accounts are subject to a FINANCE CHARGE of 1½ percent per month (18% annually) on unpaid balance. Goods returned without our permission cannot be credited. Our responsibility ceases on delivery in good order.

UCCNHT0001147

DELIVERY RECEIPT

02810

MODERN DISPOSAL SERVICES, INC.
P O Box 209
Model City, New York 14107
Phone: 754-8226

Date

Sold To

QUANTITY	DESCRIPTION	PRICE

Williams Advertising

DELIVERY RECEIPT

754-8226

MODERN DISPOSAL SERVICES, INC.
P.O Box 209
Model City, New York 14107

31595

Date

Sold To

QUANTITY	DESCRIPTION	PRICE

UCCNHT0001148

DELIVERY RECEIPT

054228

MODERN DISPOSAL SERVICES, INC
P O Box 203
Model City New York 14107
Phone: 754-8226

Date

Sold To

QUANTITY	DESCRIPTION	PRICE

DELIVERY RECEIPT

054228

MODERN DISPOSAL SERVICES, INC
P O Box 203
Model City New York 14107
Phone: 754-8226

Date

Sold To

QUANTITY	DESCRIPTION	PRICE

UCCNHT0001149

D&A RENT-ALL

RENTS A LOT EVERY DAY

OPEN MON-SAT 8-5 FRI-SAT

716-282-3663

2930 PINE AVE • NIAGARA FALLS, N.Y. 14301

P.O. OR REQ. NO.

NAME	LIC	
ADDRESS	PHONE	PLACE
CITY	OTHER	
LOCATION EQUIP. USED		

AMT.	ITEM & DESCRIPTION	MIN. RATE	4 HR. OUT	8 HR. OUT	24 HR. OUT	WK.	MO.

AMT.	MERCHANDISE (CREDIT ALLOWED ON UNUSED SALEABLE ITEMS)	AMT. USED	UNIT COST	TOTAL

CHARGES	
RENTAL	
MDSE	
DEL'Y ☐ P.C.-U.P. ☐	
NET	
S. TAX	
TOTAL	
DEPOSIT	
ADD'L RENT	
ADD'L MDSE	
CLEANING ☐ DAMAGE ☐	
NET	
S. TAX	
TOTAL A/D	
REFUND	
GRAND TOTAL	

CONDITIONS UNDER WHICH TOOLS AND OTHER EQUIPMENT ARE RENTED

All tools and other equipment are rented on the express condition that Lessee will exercise proper care in keeping such equipment in good condition. Conditions which prevent satisfactory operation of equipment do not relieve Lessee of its responsibility for rental charges.

Lessee assumes all responsibility for equipment while out of possession of lessor, including operation of said equipment according to local, state, and federal laws, and agrees to return such equipment to the lessor in as good condition as it was at the effective date of the lease, natural wear and unavoidable use excepted. Lessee shall be liable for any loss, theft, damage or destruction of leased property.

All equipment lost or damaged beyond repair will be paid for by the lessee at the regular replacement price and all damaged equipment which may be repaired will be repaired at the lessee on return thereof and the cost for such repairs shall be paid by the lessee. Accrued rental charges can not be applied against the purchase price or cost of repairs of such damaged or lost equipment. All cartage charges must be borne by lessee.

Scheduled rental rates begin when equipment leaves our store and continue until returned thereto. A cleaning charge will be made on items returned uncleaned.

CALL FOR ANY CHANGE IN RENTAL AGREEMENT

As hereby authorized herein, the tools and equipment listed above are in good working condition and I/we agree to take care of all said items and equipment and use only for all charges for repair damages. Accruing or materials will be paid, and that collection fees, attorney fees, court costs or any other necessary collection or legal costs will be made by me in behalf of the county in which said premises is located.

Lessee's Signature X

THANK YOU FOR YOUR BUSINESS

CUSTOMER'S COPY

UCCNHT0001150

BUFFALO WELDING SUPPLY COMPANY, INC.

Serving Western New York Since 1937

396 GRAND ISLAND BOULEVARD TONAWANDA, NEW YORK 14150 6596 (716) 875 3340

B W S

DUBE CONSTRUCTION

DUBE00
DUBE CONSTRUCTION
2267 LOCKPORT RD
SANBORN, N Y 14132

INVOICE #	DATE	ST #	CUSTOMER P.O. NUMBER	A	S/M	TERMS
116500	07/10/82	1		D	ZZ	NET 30 DAYS 199

SHIP	RT. OR B/O	TYPE	PART NUMBER	DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
2			[illegible]	OXYGEN CYL - 251 CF	[illegible]	6 75	33 89
2	1		ACE000	ACETYLENE CYL	[illegible]	16 [illegible]	102 71

PE 411 PO
[illegible]

STATE	FEDERAL TAX	SALES TAX	DELIVERY CHARGE	TOTAL
00	00	9 56	[illegible]	151 16

PLEASE PAY THIS AMOUNT

UCCNHT0001151

INVOICE

No 15 '0

CONCRETE

Invoice Date: August 22, 1984

CONVENTIONAL DRUMS OR METERED MOBILE

OFFICE & PLANT
2186 CORY DR
SANBORN N Y 14132

CENTRAL DISPATCH
694-4300

2nd PLANT
11 PFOHL RD
CHEEKTOWAGA N Y 14225

TO

Dube Construction
2267 Lockport Road
Sanborn, NY - 14132

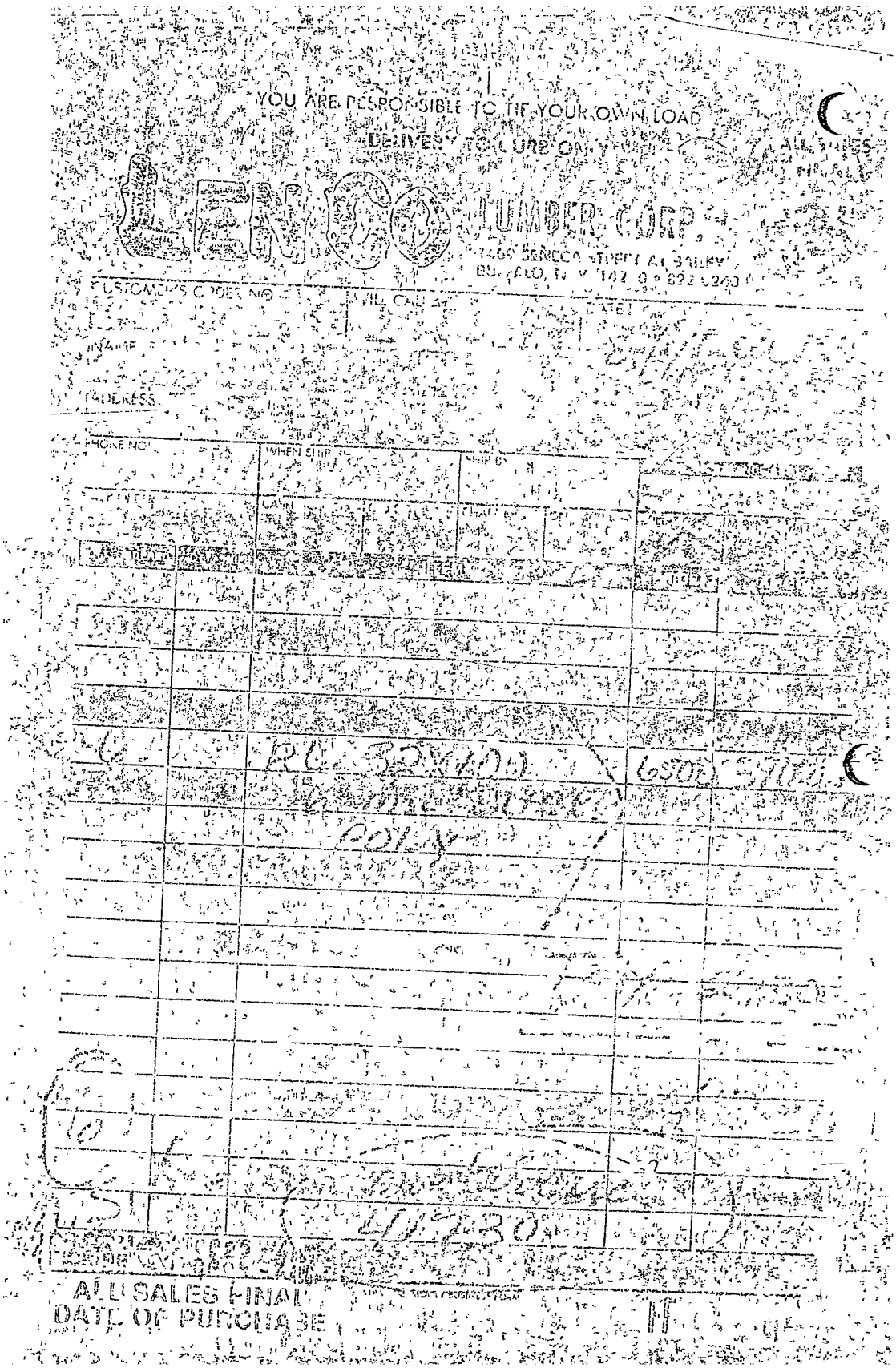
TERMS $2.00 yd. dis. 10th; Net 30 days.

% INTEREST PER MONTH ON PAST DUE AMOUNTS

DATE	DESCRIPTION		AMOUNT	TOTAL
8/13/84	Elkem Mills			
	3 yards 3500 #1 @ 46.00		$138.00	
	Tax	NC	9 66	
	Trucking @ 9.00		27.00	
	Short Load		20.00	$194.66
	THANK YOU HAVE A NICE DAY!			

DISCOUNT OF $ 6 00 MAY BE TAKEN IF ACCOUNT IS PAID IN FULL BY Sept. 10, 1984

UCCNHT0001152


YOU ARE RESPONSIBLE TO TIE YOUR OWN LOAD
DELIVERY TO CURB ONLY
LUMBER CORP.
1409 SENECA STREET AT BAILEY
BUFFALO, N Y 142 8 • 822 5240
CUSTOMER'S ORDER NO.
FILL OUT
DATE
NAME
ADDRESS
PHONE NO.
WHEN SHIP
SHIP BY
CASH
CHARGE
ALL SALES FINAL
DATE OF PURCHASE

UCCNHT0001153

CUSTOMER COPY

67832

CALKINS LUMBER CO.

2674 NIAGARA ST
P O BOX 312B
SANBORN N Y 14132

PHONE
AREA CODE 716
731 3213

CUSTOMER ASSUMES ALL RESPONSIBILITY FOR ANY DAMAGES CAUSED BY TRUCKS DELIVERING BEYOND STREET PAVEMENT

10% Handling Charge Deducted on Material Returned

Customer's Order No _____ Date July 31 1984

Name [illegible] Sale - Rubbe Construction

Address _____

SOLD BY	CASH	C O D	CHARGE	ON ACCT	MDSE RETD	PAID OUT	

QUAN	DESCRIPTION	PRICE	AMOUNT	
2	[illegible] 24 [illegible]			
	[illegible] Poly Plastic	59.99	119	10
30	[illegible] 2x4-8 [illegible] Spruce	1.49	44	70
	Coupling [illegible]	2.99	[illegible]	[illegible]
			[illegible]	58
		7.47	11	74
			182	52
	[illegible]			
	SALES TAX			
	TOTAL			

All claims and returned goods MUST be accompanied by this bill

Rec'd By _____

CUSTOMER COPY

6788

CALKINS LUMBER CO.

2674 NIAGARA ST
P O BOX 312B
SANBORN N Y 14132

PHONE
AREA CODE 7
731 3213

CUSTOMER ASSUMES ALL RESPONSIBILITY FOR ANY DAMAGES CAUSED BY TRUCKS DELIVERING BEYOND STREET PAVEMENT

10% Handling Charge Deducted on Material Returned

Customer's Order No _____ Date August 1 1984

Name Rubbe Construction

Address Union Carbide [illegible]

SOLD BY	CASH	C O D	CHARGE	ON ACCT	MDSE RETD	PAID OUT	

QUAN	DESCRIPTION	PRICE	AMOUNT	
	50# Crown 8 [illegible] Sinkers	18.9[illegible]	37	9[illegible]
[illegible]	[illegible] 1x2 - 8# Spruce Furring			
			37	9
		Tax	[illegible]	[illegible]
			40	[illegible]
	[illegible]			
	SALES TAX			
	TOTAL			

All claims and returned goods MUST be accompanied by this bill

Rec'd By _____

UCCNHT0001154

CUSTOMER COPY

71264

CALKINS LUMBER CO.

2674 NIAGARA ST
P O BOX 3120
CANBORN, N Y 14132

PHONE
AREA CODE
731 321

CUSTOMER ASSUMES ALL RESPONSIBILITY FOR ANY DAMAGES CAUSED BY TRUCKS DELIVERING BEYOND STREET PAVEMENT

10% Handling Charge Deducted on Material Returned

Customer's Order No _____ Date 8/15 19 [illegible]

Name [illegible]

Address _____

SOLD BY	CASH	C O D	CHARGE	ON ACCT	MDSE RETD	PAID OUT	

QUAN	DESCRIPTION	PRICE	AMOUNT	
20	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]
	SALES TAX			
	TOTAL			

All claims and returned goods MUST be accompanied by this bill

5103

Rec'd By _____

UCCNHT0001155

INTERNAL
CORRESPONDENCE

UNION CARBIDE CORPORATION OLD RIDGEBURY ROAD DANBURY CT 06817

To (Name) Mr. L G Evans
Division UMETCO
Location Niagara Falls, NY
Area 615

Date September 11, 1984
Originating Dept Corporate Transportation Services
Area A1129
Subject

Copy to S. L. Gagliardi
W. K. Hall
G. Kreuzwieser
S. D Tableman
J A Vincennie
J. H Wilson

Dear Lee

Thank you for offering Corporate Transportation Services moves of TA-CB ore from Niagara Falls to Uravan, GA Our rate is $1 65 per mile ($1 65 X 1,854 miles = $3,059).

We understand that TA-CB ore is a "low specific activity (LSA)" radioactive material, with a 06 millicurie level of radiation, requiring radioactive placards for highway transportation Once emptied, our trailer will be safe for reloading all commodities, including foodstuffs Upon our advance notification, you could arrange for an inspection of the unloaded trailer to confirm that no residual radiation is present

We will adhere to the same routing used by Tri State Motor Transit

New York
US 62 - I 290 - I 90 - NY 400 - NY 277 - US 20

Pennsylvania
US 20 - I 79 - I 90

Ohio
I 90 - I 80

Indiana, Illinois, Iowa, Nebraska, Wyoming
I 80 - WY 789

Colorado
CO 13 - I 70 - CO 146 - US 50 - CO 141

Please work with Gray Kreuzwieser, our dispatch planner in Mercer, PA, to schedule each shipment. You can reach Gary on Unicom 8-655-2490

S P Hirshman

SPH/rms

UCCNHT0001156

TELECON REPORT

TO Bill Ruckar, Tri-State

LOCATION Joplin, Missouri

FROM Gil Walck

LOCATION Niagara.

SUBJECT Scheduling Trucks

DATE 9-18-84

TIME 11:10 AM

FILE NO 11309

DISTRIBUTION

9-1-800-641-7591

✓ (1) One Truck (Van 40'). Marietta to Uravan — Sept. 28, 1984.
OK

✓ (2). Four Trucks - Niagara Falls to Batesburg, S.C.
OK
A
✓ 2 Truck Oct. 2 (One 44' Van)
✓ 2 Truck Oct 3 (Could be 40' Van:)

(3) Gave Cisler Construction Office As Contact Phone
614-373-8597

(4) Gave Highway 7 and County Road 10 As Location.
Call Ruckar With More Detailed Instructions on How.
To Get There.

From I-77 @ Marietta, Ohio Take State Highway 7 West
Thru Marietta Continue Past The Elkem Metals
Plant Entrance, Take Next Right on To County Road 10
To Union Carbide Plant Entrance (About ½ Mile)
Will call in From Marietta - We will Tell Him where To
Meet us.

Telephone Hours - 8:00 AM - 4:30 PM

Union Carbide - Battery Products - 614-373-9242

UCCNHT0001157

TELECON REPORT

TO Barnwell, S.C. Angie

LOCATION

DATE 9-18-84

TIME

FROM Gil Walck

LOCATION Niagara

FILE NO 11309

DISTRIBUTION:

SUBJECT Allotment for October

8-803-259-3577

OK

		Vol	Allotment No	Boxes	Arrive
Oct 2	Shipment	650 ft³	1084-110-A	10	Oct 4
Oct 2	Shipment	585	1084-111-A	9	Oct 4
Oct 3	Shipment	585	1084-112-A	9	Oct 5
Oct 3	Shipment	585	1084-113-A	9	Oct 5
		7405		37	

UCCNHT0001158

TELECON REPORT

TO Cisler
LOCATION Marietta
FROM Gid Walck
LOCATION Niagara
SUBJECT Shipping Truck To Uravan

DATE 9-18-84
TIME
FILE NO 11309
DISTRIBUTION

614-373-8597 - Steve, Wit Marshall.

Cisler will be ready for shipping boxes to Uravan on Sept 28.
Will do preparatory work as follows:

1. Open up main no of boxes to get 6 with soil only on Sept. 26
2. GBW will arrive on Sept. 27 to inspect boxes & select 6 for shipment
   Boxes opened will be marked with contents. Then sealed & strapped.
3. Wit Marshall will arrange for use of fork truck from Union Carbide
4. Will arrange for material needed to seal boxes & bend them
5. Will arrange for weighing truck in & out on Sept. 28

Told Wit - Tri-State has their telephone no for contract
Telephone Available 8:00 - 4:30 P.M.

Fork Lift Truck Available with operator

UCCNHT0001159

TELECON REPORT

TO Applied Health Physics. John Douglas.

LOCATION Pittsburgh, Pa.

FROM Gil Wolck

LOCATION Niagara

SUBJECT Return Alpha Meter
Calibrate Ultratech UR Meter —

DATE 9-18-84

TIME

FILE NO 11309

DISTRIBUTION

8-1-412-563-2242

ON 9-20-84

OK
can do

$50 — calibration

$15 — Service charge — Rush. takes 15 minutes

Pay out of Petty Cash?

UCCNHT0001160

0.30 1500

Th 3502 ppm
U 1390 ppm

15×10^{-4}
1×10^{6}

$1500 \times 10^{-6} \times 3.33 \times 10^{5} = 4995$ pCi/gm

$15 \times 10^{2} = 1500$

1.5×10^{5}

U $\frac{1500}{1 \times 10^{6}}$ ppm $\times 3.33 \times 10^{5}$ pCi/gm 499.5 pCi/gm

Th $\frac{5500}{1 \times 10^{6}}$ ppm $\times 1.09 \times 10^{5}$ pCi/gm 599.5 pCi/gm

1.99 mCi/gm

$\boxed{1099 \text{ pCi/gm}}$

~~1 mCi/gm~~ .002 μ Ci/gm

1000 mCi/g $= 1$ Ci/gm

$\frac{1.099 \times 10^{3}}{1 \times 10^{12}}$

1×10^{6} μ Ci/g $= 1$ Ci/gm

1×10^{9} n Ci/g $= 1$ Ci/g

1.099×10^{-9} Ci/gm

1×10^{12} p Ci/g $= 1$ Ci/g

499500 pCi/gm
599500

1,099,000 pCi/gm

$\frac{1.099 \times 10^{6}}{1 \times 10^{12}}$

8000
3900
4100

1.1×10^{-6}

.00001

To: - Purchasing Dept.
From: - Engineering Dept.
Please Obtain Bids on Items Covered by Subject Specification from Listed Bidders

Subject: Spec. Nos. _____

Plant Location _____ File _____

1. ATTACHMENTS FOR QUOTATION:

_____ COPIES, SPECIFICATION

_____ COPIES, PROPOSAL FORM

_____ COPIES, DRAWINGS

2. BIDS TO BE RECEIVED BY: _____

NO EARLIER THAN ____

3. EQUIPMENT NEEDED BY: _____

NO LATER THAN _____

4. APPROVAL/FINAL PRINTS BY _____

5. TECHNICAL CONTACT:
NAME _____ PHONE _____

6. PLEASE SEND COPIES OF THE R.F.Q. PACKAGE, WITH A COPY OF THIS TRANSMITTAL TO:

☐ _____ ☐ _____
☐ _____ ☐ _____
☐ _____ ☐ _____
☐ _____ ☐ _____

7. PLEASE HAVE BIDDERS SEND COPIES OF THEIR PROPOSALS TO:
A. _____ ENGR. DEPT.
B. _____

8. ESTIMATED COST: $ _____

9. RECOMMENDED BIDDERS: Page 1 of _____

A. _____
B. _____
C. _____
D. _____
E. _____

10. REMARKS:

_____ (SIGNATURE) _____ (DATE)

To: S.C. ZAMBOTTI - PURCHASING DEPT.
From: G.E. WALCK - ENGINEERING DEPT.
cc: ☒ L.G. EVANS. ☐ _____
☐ _____ ☐ _____

Please complete, validate and place attached ~~P.O. No.~~ PURCH REQ.

1. ATTACHMENTS FOR PURCHASE

_____ COPIES, SPECIFICATION

_____ COPIES, BID ANALYSIS

3 COPIES, DRAWINGS

2. RECOMMENDED SUPPLIER:

3. In addition to normal distribution, Purchasing to send validated copy of P.O. and Spec. to:

☒ L.G. EVANS ☐ _____
☐ _____ ☐ _____
☐ _____ ☐ _____
☐ _____ ☐ _____

4. Remarks:

J. E. Walck 5-22-84

UCCNHT0001162

TO Purchasing Department

7 PART PURCHASE REQUISITION/ORDER

10R8572B

REQUISITIONER—ENTER DATA UNDER RED CAPTIONS

PRINTED IN U.S.A.

COM CODE	CPA	SUP	ACCTG UNIT CODE	REQUISITIONED BY	PHONE	BLG/RM	DATE	NAME	DELIVER TO	LOCATION
			— 0	G.E. WALCK	278-3361		5-22-84	G.E. WALCK	BLDG 166	NIAGARA

NO E-C

APPROVED BY - SIGNATURE	TO BE USED FOR
L.J. Evans 5/24/84	LOADING HOPPER FOR RESIDUE REMOVAL

APPROVED BY PRINT OR TYPE NAME	DATE	LAST P.O. NUMBER	DATE WANTED
		FILE 11309	6-15-84

THIS ORDER NOT BINDING UNLESS UCC VALIDATION APPEARS

UNION CARBIDE CORPORATION
METALS DIVISION

HEREINAFTER CALLED BUYER

PAGE____ OF____

VENDOR

MAIL INVOICE IN DUPLICATE TO

UNION CARBIDE CORPORATION
Metals Division

SHIP TO

UNION CARBIDE CORPORATION
Metals Division
437 - 47TH STREET
NIAGARA FALLS, N.Y. 14302

020889

HEREINAFTER CALLED SELLER

BUYER HEREBY ORDERS UPON THE TERMS HEREIN CONTAINED INCLUDING THE ADDITIONAL TERMS ON THE REVERSE SIDE HEREOF

TERMS OF PAYMENT						TRANSPORTATION TERMS			FOB POINT		
SHIP TO ARRIVE BY	NET 30	% DISC	10 DAYS	10TH PROX	OTHER	PREPAID	OTHER		SHIP POINT	DEST	OTHER
6-15-84											

SUB TO U.S. TAX YES	SUB TO U.S. TAX NO	TAX %	TEXAS SEE SPECIAL INSTRUCTIONS	TAX EXEMPTION NO	SHIP VIA	F.O.B.	TRUCK	UPS	MAIL	AIR FRT	OTHER (SPECIFY ROUTING)	BUYER	COM CODE	VENDOR CODE	REC LOC
			☐												

ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U/M	DESCRIPTION	UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	MATERIAL CODE SUB	FIRST NO	SECOND NO	SHOP ORDER
1					ONE	EA.	CONTAINER LOADING HOPPER -		84-	615-	885	-10-	100	-2
							PER DRAWING SF-7960 FABRICATED							
							FROM STRUCTURAL STEEL PLATE & SHAPES							
							EST. COST $1500.00							

REQUISITIONER & DESCRIPTION (17) CHARACTER LIMITATION

PURCHASING AGENT'S NAME

TYPE OR PRINT NAME

☐ THIS ORDER SUPERSEDES ORAL ORDER OF ____ DATE WITH ____ VENDOR REPRESENTATIVE DO NOT DUPLICATE

UCCNHT0001163

1M 12 76
EM 174 9A

UNION CARBIDE CORPORATION METALS DIVISION

DRAWING NUMBER SF-7968

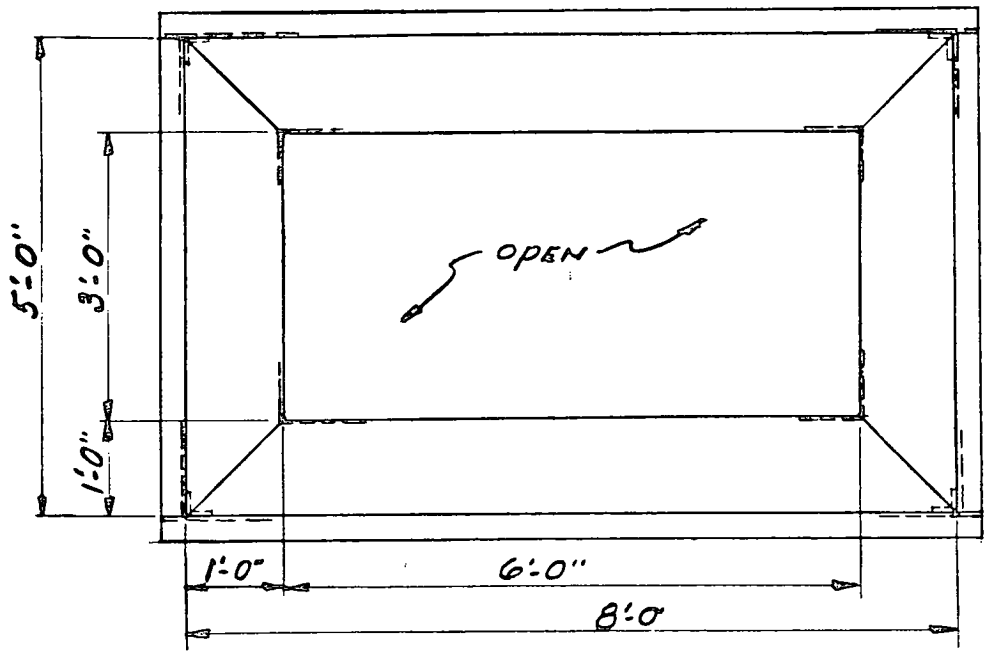
930 256 | FILE NO 11309

TITLE CONTAINER LOADING HOPPER

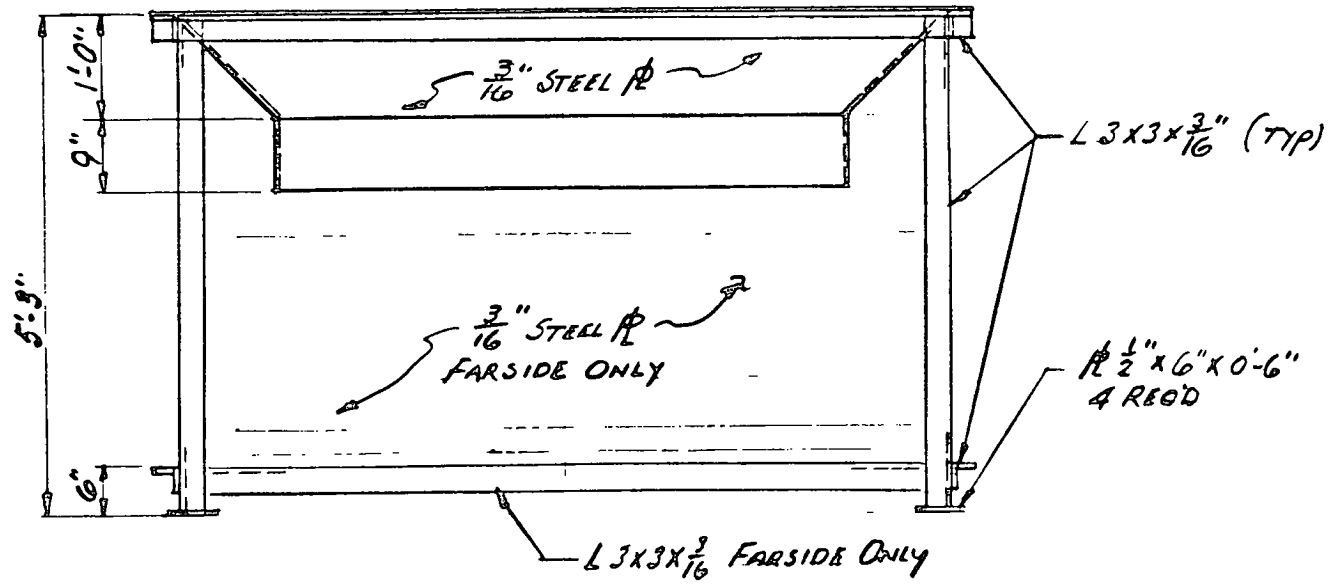
PLANT	DEPARTMENT	BLDG NO	DRAWN BY	CHECKED BY	APPROVED	EX	ACC ENG	DATE	DRAWING SCALE
NIAGARA	YARD	—	GEW				DSE	F-22-84	½" = 1'-0"

REV | REV

REV | REV



PLAN



ELEVATION

UCCNHT0001164

1 X Richard Tisch - Law
C F Raeburn - E-V

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

Sent 10-20 EM

PKW

File 3.9.15

OCT 17 1986

726

To (Name) Mr. F. V. McMillen
Umetco Minerals Corporation

Division Danbury, CT

Location

Area

Date October 14, 1986

Originating Dept

Area

Answering Letter Date

Subject Environmental Issues
Niagara Falls, NY

Copy to Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch

Dear Frank:

I keep hoping that in one of these letters I can write that everything is complete. At this time all I can tell you is that we are almost there. Highlights for the past month are:

1. Removal of asbestos from the Globar freight elevator was completed on October 8, 1986. Sampling was conducted inside the elevator for six (6) hours on October 9. Fiber count was .005 per cc or less which is as low as can be recorded. A second sampling is scheduled in approximately 30-days. If that test shows no fibers present I will approve final payment to Niagara Insulation and U. S. Vanadium will sign off at that time.

2. Samples that contain priority pollutant metals have been dumped into ten (10) 55-gallon drums. The contents of each drum has been sampled and categorized. Presently we are in contact with SCA hazardous waste disposers who at the completion of the paper work and other red tape will remove the drums from the property. Also included for disposal are a couple of dozen samples or organic chemicals that must be handled specially.

The empty sample cans and numerous full cans containing non-hazardous material were disposed of last week. As you recall, radioactive samples were sent to Barnwell on September 19th. Depending on SCA's schedule, the last of the samples should be removed from the property before the end of October.

3. The retrofilled transformers were sampled October 5, 1986. The results have not been reported to U. S. Vanadium at this time. One transformer, No. 143, was not at temperature and may have to be resampled. Transformer No. 22 is not in use (a backup for furnace operations) therefore it has not had 60 days operation required for sampling. I have a tentative agreement with U. S. Vanadium that this will not holdup signing off on the PCB issue.

4. I have written six (6) letters requesting sign off by U. S. Vanadium. These are:

(1) "Super Sucker Dust", (2) Plant Building Radioactivity Decontamination, (3) Pond (Lake Linde) Remedial Action, (4) Chrome Oxide, (5) High Antimony Tungsten, and (6) Yard Area Radiation and Surface Sampling. Although I have not received the signed letters as yet I understand that the first three have been signed and the last three will be signed next week when Craig Wentzel meets with Rich Miller in Hot Springs.

5. U. S. Vanadium has had to remove a leaking gasoline storage tank. Contaminated soil was removed and is being sampled today to determine if the last traces of gasoline have evaporated. This item (Exhibit E-3-K) appears to be ongoing and would not require a sign off.

I am enclosing an update of the status of all the environmental issues.

Regards,

D. J. Hansen

/mau
Enclosure

UCCNHT0001166

10/14/86

PROJECT	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est. $/M	Actual $/M
1.0 Halide Scrubber						
1.1 Install Venturi Scrubber	1.1 Complete					
1.2 Install Trough to collect heels from returned cylinders	1.2 Complete					
1.3 Enclose trough and install a fume collection system	1.3 Accrued costs and new estimate. Sent to F. V. McMillen 10/3/86.		11/30/86		118	
2.0 Asbestos Removal						
Elevator shaft, Bldg. 111, storage room, boiler rooms (Niacet), six (6) pipes running 800' on pipe rack.	Asbestos removed from from UCAR freight elevator completed 10/8/86.	A second test of airborn fiber content to be made about November 15th.				61.8
3.0 Sample Cans						
Approximately ~~300~~ 1200 one quart cans containing different alloys, slags, and ores to be classified as toxic or non-toxic and disposed of.	10 55-gallon drums and 12 containers of organics to be removed by SCA Chemical Waste.		10/31/86		10	
4.0 "Super Sucker Dust"						
Dust collected from rafters of plant in commercial vacuum cleaner and dumped in piles throughout yard area.	Complete			7/11/86		

UCCNHT0001167

PROJECT	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est. $/M	Actual $/M
5.0 Fill in Lake						
Low area east of No. 5 Fce. Room collected rainfall and discharge from L-Tec Plant. Drain and level.	Complete			8/22/86		6.4
6.0 Remove Radioactive Waste						
Slag and contaminated soil from No. 30 Furnace (twenty 55-gallon drums). Radioactive samples.	Complete			9/19/86	125	
7.0 Remove Radioactive Source						
Previously used to calibrate X-ray equipment in VAI.	Complete					
8.0 Reclaim Elkem Property						
Hold over from "Tiger" project. UCC agreed to remove clay and backfill when State released property for unrestricted use.	Complete			8/15/86		18.3

UCCNHT0001168

PROJECT	STATUS	ACTION	COMPLETION DATE Est.	COMPLETION DATE Actual	BUDGET Est. $/M	BUDGET Actual $/M
9.0 Terminate Licenses						
9.1 210-0090						
Technology sources.	Complete			8/15/86		
9.2 950-0139						
Processing Columbium Ores.	Complete			8/15/86		
9.3 955-0139						
Plant Sources.	Complete			8/15/86		
10.0 Patents						
Finish filings. Respond to Patent Examiners.	Complete			9/5/86		
11.0 Files						
11.1 Uranium to Gr. Jct.	Complete			8/14/86		
11.2 V & W Files	Complete			10/10/86		
11.3 Active Files to Gr.Jct.		Jack Frost will visit Niagara Falls before shipping.				

UCCNHT0001169

PROJECT	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est. $/M	Actual $/M
12.0 Surplus Equipment	Sold approximately $3000 of equipment. Working in conjunction with Investment Recovery.	Processing of several small orders in progress.				
13.0 Remove Stacks						
Two stacks at old Boiler Room in Niacat.	Complete.			7/24/86		4.4

UCCNHT0001170

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

MAY 12 1986

May 9, 1986

Mr. Robert F. Kelly
Associate Radiophysicist
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Mr. Kelly:

Thank you for taking the time on Wednesday, May 7, 1986 to discuss with Bob Beverly and me our plans to complete the cleanup of radioactive material found in the Niagara Plant. After my letter of March 25 to you, we obtained samples of the areas in question and submitted these to EDA Instruments Inc. in Colorado for radiochemical analyses. That results shown in Table 1 were the basis for our discussion

I was concerned that we may have been misinterpreting Industrial Code Rule 38 but you kindly gave us a copy of an Inter-Office memo from Dr. Bradley to you dated March 26, 1982 which specified the limits for source material. This memo is appended.

Below I have summarized the topics we discussed and outlined the actions we plan to take.

A. Material from Pit in Building 24

A gamma radiation level of 170 µR/hr prompted us to remove the illmenite sand that had been used to backfill a 9'-6" x 10' concrete pit in Building 24. The pit was much deeper than anticipated and we filled one hundred twenty-five 55-gallon drums before reaching a depth of 9 feet. Subsequently when we received the results of the analyses (Samples 40-6 and 40-7) it was evident that the material contained less than 500 parts per million of combined uranium and thorium. This, coupled with a gamma radiation level well below 250 µR/hr, led to the conclusion that this material did not exceed the "Limits for Uncontrolled Areas" as specified in Table 5 of Code Rule 38. You concurred with this conclusion.

As we discussed, I plan to use this material as partial fill for a low area in the yard east of No. 6 Furnace Building. The pit will be backfilled with fresh soil or sand. However, as agreed, I will not proceed with this plan until after May 15 to allow you time to think more about it and possibly confer with Dr. Bradley.

UCCNHT0001171

B. Slag East of No. 6 Furnace Building

This is what you refer to as the "rock area" in your Investigative Report of March 26 (appended). Since that date we were able to move the slag pile and found that it was the slag itself and not the ground that was radioactive. As we discussed I was puzzled at the relatively high reading of Th-230 in Samples 40-3 and 40-4. Because the Th-230 is in the decay chain of U-238 I would have expected the uranium analyses to be appreciably higher. The explanation is probably that some uranium oxide impurity was inadvertently introduced to a few vanadium aluminum furnace heats and the uranium passed on to the metal and the thorium went with the slag.

As Bob Beverly discussed, although the Th-230 analyses were 299 and 466 ρCi/g, these represent very small quantities of the pure nuclide (1.53×10^{-8} and 2.39×10^{-8} grams of Th-230 per gram of slag). The calculations are included as Appendix 3.

Again, since this material contains much less than .05% source material and the radiation is less than 250 μR/hr it need not be controlled. I also plan to dispose of it as fill in the yard east of Furnace Room 6.

C. Slag and Soil Contamination South of Furnace No. 30

will ship to Barnwell

Sample 40-5 was taken from the slag that had been splattered south of Furnace No. 30. Years ago this furnace had been used to prepare ferrocolumbium. As can be seen, the uranium at 389 μg/g is approaching the 500 μg/g limit and the Th-232 at 241 pCi/g is well above the 55 ρCi/g limit. Seventeen (17) 55-gallon drums of material were removed from around the furnace. Samples 41-2 and 41-3 taken after the cleanup are well within the uncontrolled limits:

D. Sample from North of Furnace No. 30

As can be seen from the analyses of Sample 41-1 (Th-232 at 139 ρCi/g) the cleanup was not complete in this area. An additional three 55-gallon drums of material were removed and the gamma radiation dropped from 120 μR/hr to about about 35 to 40 μR/hr. I am convinced we have successfully reduced the radiation to limits for uncontrolled areas. I will defer backfilling until you, as a representative for the Department of Labor, take confirmation samples.

I plan to immediately begin the paper work to secure space and a permit for burial, either at Barnwell, SC or Richland, WA. We will dispose of the material removed from the area surrounding Furnace No. 30 as well as the samples in cans that you refer to in your report of March 1986.

UCCNHT0001172

As you know, we are quite anxious to obtain the results of the wipe tests and soil samples taken on Elkem property that hopefully will allow termination of License 210-0090 and License 950-0139. I was pleased to hear that you will have them designated as top priority and will communicate the results to me as soon as you obtain them.

Again I want to thank you for a very pleasant and helpful meeting.

Very truly yours,

Donald J. Hansen

cc: Mr. R. G. Beverly
Mr. F. V. McMillen

mau/369h
Attachments

BLIND COPIES: Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch
R. L. Miller
W. D. Smith
C. T. Wentzel

UCCNHT0001173

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

Sample No.		Description	Analyses: URANIUM SERIES Uranium µg/g	URANIUM SERIES Th-230 pCi/g	THORIUM SERIES Th-232 pCi/g	THORIUM SERIES Th-228 pCi/g	Gamma Radiation µR/hr*
Book 2446		Code Rule 38 Limit	[500]	**	[55]	***	[250]
A	40-6	Bldg. 24 (VA1) Top of Pit	28.9	12±2	16±2	17±2	170
	40-7	Bldg. 24 7' Depth in Pit	44.3	22±2	37±2	39±3	150
B	40-3	Dark Slag-Yard East of Fce. Bldg.	20.2	299±7	16±2	40±9	150
	40-4	Light Slag-Yard East of Fce. Bldg.	18.6	466±9	37±3	14±2	200
C	40-5	Slag Before Digging South of Furnace 30	389	186±6	241±7	241±7	200-420
	41-2	Sample in Front of Fce. 30 After Cleanup	68.4	19±2	35±3	35±3	40
	41-3	Sample from Southwest of Furnace 30 After Cleanup	24.9	6.2±1.1 5.9±1.1	9.6±1.3 8.5±1.3	9.5±1.3 9.2±1.33	30
D	41-1	Sample from North Support of Fce. 30 After Cleanup	122	76±4	139±5	145±5	120
		Area of North Support of Fce. 30 After Second Cleanup	-	-	-	-	35-40

*Ludlum Model 19 Micro R Meter - Reading at surface of location where sample was taken.
**pCi/g equivalent to .05% (500 ppm) calculated to be 9.7×10^6
***pCi/g equivalent to .05% (500 ppm) calculated to be 4.1×10^{11}

UCCNHT0001174

APPENDIX 1

NEW YORK STATE DEPARTMENT OF LABOR

INTER-OFFICE MEMORANDUM

To R. Kelly Date March 26, 1982
Office. RHU

From F.J. Bradley Office RHU

Subject Union Carbide/Niagara Falls

Based on your survey of December 1, 1981 and the attached results, issue supplemental Notice of Inspection Findings and include our survey results. Require clean up to Table 5 limits within a specified time span. Contact Radiation Safety Officer to arrive at mutually agreable clean up time schedule.

Union Carbide's internal memo dated October 31, 1981 confirms our results and that they are aware of their responsibilities. All we need now is a clean up schedule.

Code Rule 38, Table 5 limits are as follows:

U-nat: 200pCi, $\frac{\text{U-nat}}{\text{gram of soil}}$

Th-nat: 55 pCi, $\frac{\text{Th-nat}}{\text{gram of soil}}$

and external surface dose levels
250 $\frac{\mu R}{hr}$ on surface.

We need to rely on their results with mixed U/Th contamination. I circled soil contamination values above 200 pCi/g (assuming all U-nat).

F.J. Bradley, Ph.D.
Principal Radiophysicist

FJB:bd

UCCNHT0001175

APPENDIX 2

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING
65 COURT STREET
BUFFALO, N Y 14202

RAMONA L GALLAGHER
Assistant Commissioner of Labor

INVESTIGATIVE REPORT

Umetco - 47th and Royal Avenues, Niagara Falls

Report prepared by Robert F. Kelly on 25 MAR 86.

Report reviewed by _____ on _____.

On 20 MAR 86 after obtaining soil samples on the Umetco property, Dr. Richard Hanson related to me possible "problem" areas when he performed an external radiation survey of the plant facilities a short time ago.

There are four possible problem areas; all seem minor since external readings almost at contact showed levels at about 3-5 times background.

These are described below:

A) "Rock area" outside Building 24 -- This area shows some potential for a bigger problem; rocks on frozen grounds showed the readings mentioned above. Warmer weather will let facility determine what is under these piles.

B) Number 6 Furnace Room in Building 77 - Area shows slight contamination; its mainly on surface and doesn't seem to be a big problem.

C) Building 24 -- dust near furnace. Again doesn't seem to be a big hazard.

D) Samples in cans -- Now located in caged area in Building 25, they will be shipped as radioactive waste.

As related to Dr. Hansen, samples are to be analyzed in all three areas listed above and results sent to the Department. If within the limits, the Department will resurvey premises to insure compliance with Coderule 38.

Robert Kelly
Associate Radiophysicist

UCCNHT0001176

APPENDIX 3

Conversion of ρCi to g

$$\text{Specific Activity} = \frac{1.13 \times 10^{13}}{TA} \quad \text{curries per gram of pure nuclide}$$

Where T = half life in seconds
A = mass number

For Th-230:

$T = 8.0 \times 10^4$ years $= 8.0 \times 10^4 \times 3.15 \times 10^7 = 2.52 \times 10^{12}$ seconds

$A = 230$

$$\text{Specific Activity per Gram of Th-230} = \frac{1.13 \times 10^{13}}{2.52 \times 10^{12} \times 230} = .0195 \text{ Ci}$$

$$= .0195 \times 10^{12} = 1.95 \times 10^{10} \ \rho\text{Ci}$$

Sample 40-3 299 ρCi/g:

$$\frac{299 \ \rho\text{Ci/g}}{1.95 \times 10^{10} \ \rho\text{Ci/g Th-230}} = 1.53 \times 10^{-8}\text{g Th-230/g}$$

Sample 40-4 466 ρCi/g:

$$\frac{466 \ \rho\text{Ci/g}}{1.95 \times 10^{10} \ \rho\text{Ci/g Th-230}} = 2.39 \times 10^{-8}\text{g Th-230/g}$$

UCCNHT0001177

Umetco Minerals Corporation

PO BOX 66 137 47th STREET • NIAGARA FALLS NEW YORK 14302

November 26, 1986

RECEIVED
DEC 8 1986

Rick Miller

Mr. C. T. Wentzel
U. S. Vanadium Corporation
P. O. Box 66
Niagara Falls, NY 14302

Subject Disposal of Sample Cans

Dear Craig

The last of the metallurgical samples stored in the Globar area that dated back as far as 1902 were removed from the Niagara Plant on November 24, 1986 by SCA Chemical Services. A copy of the Hazardous Waste Manifest is appended. An earlier shipment of non-hazardous samples were removed by BFI Waste Systems on October 10, 1986 (manifest appended). Radioactive samples were included in a shipment to Barnwell Waste Management Facility, South Carolina September 19, 1986.

On Wednesday, November 26, 1986, Al Gonas and I accompanied Mr. Herb Wilber to inspect the area in Globar where the samples has been stored. A radioactive survey was made at that time to confirm that no traces of the radioactive samples had been left on the shelves or in the storage containers. A copy of the letter from Herb Wilber to you attesting to the satisfactory completion of the sample cans removal is also appended.

This completes the obligation of Umetco Minerals to Stratcor Minerals Corporation as outlined in Item 3 (g) of the Environmental Agreement (Niagara Falls) between Umetco Minerals Corporation and U. S. Vanadium Corporation which reads

> "(g) Sample Cans Umetco further agrees to assume the cost of removal and disposal of the numerous small sample cans in the globar area."

UCCNHT0001178

Would you and Dr. Miller, as members of the Stratcor Environmental Coordination Committee for the Niagara Plant, acknowledge acceptance by signing the second copy of this letter and returning it to me.

Very truly yours,

Donald J. Hansen

ACCEPTED BY:

U. S. VANADIUM

By C. T. Wentzel

Title Gen Mgr - U.S Vanadium Niagara Plant

By: Richard L Miller

Title Director Community Health & Safety

cc. Messrs.
W. G. Beattie
J. F. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller

UCCNHT0001179

40-14-1 (4/80)

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

P.O Box 12826, Albany, New York 12212

2 copies

Form Approved. OMB No 2000-0404 Expires 7-31-86

Please print or type

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No: NYD009411715 | Manifest Document No: NYA 410922 0

2 Page 1 of 1 | Information in the shaded areas is not required by Federal Law

3 Generator's Name and Mailing Address: UMETCO MINERALS CORP
137-47TH ST
NIAGARA FALLS, N.Y.
14302

4 Generator's Phone: 716 286-4028

5 Transporter 1 (Company Name): CHEMICAL WASTE MANAGEMENT | 6 US EPA ID Number: LDD008066604

7 Transporter 2 (Company Name) | 8 US EPA ID Number

9 Designated Facility Name and Site Address: SCA CHEMICAL SERVICES
1550 BALMER RD
MODEL CITY, N.Y. 14107 | 10 US EPA ID Number: NYD049836679

11 US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12 Containers No	Type	13 Total Quantity	14 Unit Wt/Vol
a. HAZARDOUS WASTE SOLID NOS, (Ni) NA 9189	010	DM	9000	P
b. HAZARDOUS WASTE SOLID NOS, (Ni) NA 9189	020	DM	800	P
c.				
d.				

12 Additional Descriptions for Materials Listed Above | K Handling Codes for Wastes Listed Above: a. L b.

15. Special Handling Instructions and Additional Information
a.) (607702)
b. (607701)

16 GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.
Unless I am a small quantity generator who has been exempted by statute or regulation from the duty to make a waste minimization certification under Section 3002 (b) of RCRA, I also certify that I have a program in place to reduce volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment.

Printed/Typed Name: Albert M Gowas | Signature | Mo Day Year

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: PAT HEGAN | Signature: Pat Hegan | Mo 12 Day 14 Year

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name | Signature | Mo Day Year

FACILITY

19. Discrepancy Indication Space

20 Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name | Signature | Mo Day Year

NYA 410922 0

In case of emergency or spill call the following numbers: 5

EPA Form 8700-22 (Rev. 4-85) Previous edition is obsolete. **Copy 8—Generator—retained by generator**

UCCNHT0001180

INSTRUCTIONS FOR THE UNIFORM HAZARDOUS WASTE MANIFEST

General Information
New York State regulation requires proper completion of all information on a manifest Omissions false coding or illegibility is considered a violation All generators are responsible under New York State and Federal Law for the proper identification labeling manifesting and ultimate disposal of all hazardous waste they generate The manifest system is designed to track hazardous waste from the point of generation until its final disposal (cradle to grave) In order to accomplish this goal it is essential that all items on a manifest be properly completed

Distribution
Distribution of each copy of the manifest is indicated on the bottom of the form Copies of the manifest must be mailed promptly New York State regulations provide five (5) working days for generator and two (2) for a TSDF The Disposer s state is the state in which the designated TSD facility is located Generator s state is the state in which the installation generating the hazardous waste is located TSD facility is a treatment storage or disposal facility

Generator Section
Item 1 Enter the US EPA ID number (twelve digit number issued by the federal government) The generator must assign a sequential unique five digit number different for each manifest as the manifest number

Item 2 If a continuation sheet is used, please enter the total number of sheets here Any EPA approved continuation sheet may be used but distribution and completion must meet New York manifest requirements The document number in Item A must be placed in Item L of each continuation sheet

Item 3 and 4-Self Explanatory These must correspond to the generators US EPA ID number

Items 5, 6, 7 and 8-These are self explanatory These numbers must be secured from the transporter If more than one transporter is used the generator must supply additional copies of this manifest (copy#5) for each transporter

Items 9 and 10-The designated TSD facility, name, address and ID number should appear here

NOTE All US EPA ID numbers are a twelve digit code starting off with the letters corresponding to the state in which the facility or transporter is located

NOTE Only New York State authorized transporters and TSD facilities are allowed to transport or receive hazardous waste in New York State The generator shall check for authorization

Item 11 USDOT requires the word waste before or in the shipping name for all hazardous waste See 49 CFR 171 thru 173 Contact USDOT office for description assistance Any waste in this box is considered a hazardous waste

Item 12
Number—Indicate number of containers (use whole numbers)

Containers/Type
DM Metal drums barrels
TT-Cargo tank tank trucks
DT Dump trucks
CY Cylinders
DW Wooden drums barrels
TP Tanks, portable
CM Metal boxes cases roll-offs
CW Wooden boxes
DF Fiberboard or plastic drums (glass)
TC-Tank cars
CF Fiber or plastic boxes cartons
BA Burlap plastic paper bags

Item 13-Actual number of units indicated in box 14 (Do not use fractions or decimals)

Item 14-Units (wt/vol)
G Gallons (liquids only)* [8 3 pounds]
L Liters (liquid only)* [2 2 pounds]
Y-Cubic yards* [85 tons]
N Cubic meters* [2 200 pounds]
P Pounds
T Tons
K Kilograms [2 2 pounds]
M Metric tons (1 000 kilograms) [2 200 pounds]

*Specify gravity 1 00 unless indicated in box J

Item 15-Use this space to indicate special transportation, treatment, storage or disposal or Bill of Lading information If an alternate facility is designated, note it here For International shipments, enter point of departure Emergency response telephone numbers, or similar information may be included here

Item 16-The authorized agent of the generator must read and then sign (by hand) and date this certification The date is the date of receipt by transporter

NEW YORK STATE REQUIRES THIS ADDITIONAL INFORMATION

Item A Number preprinted by New York State Department of Environmental Conservation (NYSDEC)

Item B Generator site address If different from mailing address If same write in same

Item C and E State of registration and motor vehicle license plate number of waste carrying portion of vehicle used to transport

Item D and F Telephone number of authorized agent

Item G No entry required by NYSDEC

Item H Telephone number at site of TSD facility

Item I Hazardous waste numbers (letter and three digits) as assigned by Part 366/371 (40 CFR 261 subparts C and D) must be used to identify hazardous waste If waste is not hazardous in New York but regulated by another state, enter that state s waste code

Item J If description in Item 11 (a b,c d) contains NOS or other general term, the hazardous waste constituent must be provided here for each The specific gravity assumed to be one (1 00) unless indicated in lower right of each box

Item K Each material must be assigned an ultimate disposal method code as follows L = landfill B = incineration heat recovery burning T = Chemical physical, or biological treatment R = Material recovery of more than 75 percent of the total material Both the generator and the TSDF should agree on codes assigned in this item

Transporter Section
Items 17 and 18 Print or type the full name of person accepting responsibility and acknowledging receipt of material as listed on manifest for transport Enter date of receipt and signature

TSDF Section
Item 19 The authorized representative of the TSDF must note in the space any discrepancy between waste described on manifest and waste actually received Any rejected materials should be listed and destination of those materials provided

Item 20-The signature (by hand) of the authorized TSDF agent indicates acceptance (except for Item 19) and agreement with statements on this manifest The date is the date of signature and receipt of shipment A TSDF not providing ultimate disposal agrees to transfer waste to a TSDF authorized to provide ultimate disposal as indicated in Item K

Additional Information
1 If the Disposer State supplies a manifest that state's form must be used In any case New York requires that both the generator and TSDF mail copies to the generator s State and the disposer s State with the ultimate disposal method indicated in Item K

2 There may be variations in the requirements between various states regarding Items A thru K, therefore, the generator should contact the disposer s State for specific details

3 If assistance is needed in completion of this manifest, please contact NYSDEC Manifest Section at 518/457-0530 weekdays from 9 00 a m to 4 00 p m

UCCNHT0001181

SCA CHEMICAL SERVICES, INC
P.O Box 200, 1550 Balmer Road
Model City, New York 14107

WORK ORDER #

DATE 11/4/11

TRACTOR | TRAILER

PICK UP

SHIPPER
NAME Unitro
STREET 137 17th St
CITY Niagara Falls STATE NY ZIP CODE 1303
CONTACT NAME
SCHEDULED TIME

DELIVERY

CONSIGNEE
NAME SCA Chemical Services
STREET 155 Balmer Rd
CITY Model City STATE ZIP CODE
CONTACT NAME
SCHEDULED TIME

ADDITIONAL INFORMATION

ADDITIONAL INFORMATION

PRODUCT CODE	MATERIAL DESCRIPTION	QUANTITY
607202	Metal oxides	10dr
607203	plc	2dr

GROSS
TARE
NET

FLAMMABILITY
HEALTH REACTIVITY
WATER

SHIPPERS RECOMMENDED PLACARD (CIRCLE)
NON-FLAMMABLE
FLAMMABLE
SOLID ☐
LIQUID ☐
CORROSIVE
POISON
DRIVE SAFELY
PCB
DANGEROUS
OTHER

PICK UP

ARRIVAL TIME AM PM RELEASE TIME AM PM

TRAILER EMPTY UPON ARRIVAL ☐ YES ☐ NO
(If not, explain below)

DIP MEASUREMENT (Tankers Only) _____ INCHES

COMMENTS (EXPLAIN ALL DELAYS)

I, THE UNDERSIGNED, CERTIFY THAT THE ABOVE INFORMATION IS TRUE AND COMPLETE

X
DRIVER'S SIGNATURE

X
SHIPPER'S SIGNATURE FIRM

DELIVERY

DRIVER _____ DATE _____

ARRIVAL TIME AM PM RELEASE TIME AM PM

TRAILER EMPTY UPON DEPARTURE ☐ YES ☐ NO
(If not, explain below)

COMMENTS (EXPLAIN ALL DELAYS)

I, THE UNDERSIGNED, CERTIFY THAT THE ABOVE INFORMATION IS TRUE AND COMPLETE

X
DRIVER'S SIGNATURE

X
CONSIGNEE'S SIGNATURE FIRM

UCCNHT0001182

BFI Waste Systems™
ROWNING FERRIS INDUSTRIES

NON-HAZARDOUS WASTE MANIFEST

Full Sample Cans re: bet Parker

GENERATOR

enerator Name Umetco Minerals Shipping Location Umetco Minerals

ddress P.O. Box 1029 Address 47th & Royal

Grand Junction CO 81502 Niagara Falls NY

hone No ___ - ___ Phone No 716 - 2783214

BFI Lab Number	Description of Waste	Quantity	Units	Containers No	Containers Type
26661	Non haz. ore 5 yrs	50	Y	1	[illegible]

Codes
D - Drum
C - Carton
B - Bag
T - Truck
P - Pounds
Y - Yards
O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260 10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations

[signature] 10/16/96
nerator Authorized Agent Name Signature Shipment Date

TRANSPORTER

ansporter Name Niagara Sanitation Inc Driver Name (Print) Anthony G Beck

ddress PO Box 571 Vehicle License No /State 43411 GK N.Y.

Kenmore NY 14072 Vehicle Certification 9A065

ereby certify that the above named material was picked up the generator site listed above

I hereby certify that the above named material was delivered without incident to the destination listed below

ver Signature Shipment Date Driver Signature Delivery Date

DESTINATION

te Name Nenco Landfill Inc. Phone No. 716 - 2828693

ddress 56th & Pine Ave Niagara Falls NY

ereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

me of Authorized Agent Signature Receipt Date

64 BFI260 720

UCCNHT0001183

WORK ORDER NO. 111409

CWM-WASTE CODE. G07702

Landburial Ban
WASTE CERTIFICATION FORM

(To be attached to the Manifest Form for first time shipments, annually, when the waste stream composition changes, or when otherwise required by NYSDEC)

Part A (General)

1. Describe the process producing the waste (including the representative SIC code).

MANUFACTURING OF METAL ALLOYS

METAL ORES

2. Is this material a "one time" shipment or a continuing waste stream? ONE TIME

3. Is this material from an inactive hazardous waste site or spill cleanup? NO

4. a. Does this waste contain organic chemicals? NO

b. If so, does this waste contain:

1. aromatics? NO
2. halogenated organics? NO
3. nitrogenated organics? NO
4. low molecular weight organics? NO

5. Does this stream contain any organic materials listed in 6NYCRR 366.4(d)(5) and 366.4(d)(6) (P-list or U-list)? If so, list them: NO

If any of the answers to question 4 or 5 were yes or unknown, complete Part B of this certification for those classes of materials which are known or suspected to be in the waste. If you answered no to all of these questions, please sign the following certification:

BASED ON MY KNOWLEDGE OF THE PROCESS AND CHEMICALS USED IN GENERATING THE WASTE, I CERTIFY THAT THESE WASTES QUALIFY FOR LANDBURIAL UNDER THE NEW YORK STATE LANDBURIAL BAN AS DESCRIBED ON THIS FORM. I FURTHER CERTIFY THAT I WILL RESUBMIT THIS FORM IF THE WASTE STREAM COMPOSITION CHANGES IN A WAY WHICH MIGHT INCREASE THE CONCENTRATIONS OF ORGANIC CHEMICALS IN THE WASTE STREAM.

IT IS A CRIME, PUNISHABLE AS A CLASS A MISDEMEANOR UNDER THE LAWS OF THE STATE OF NEW YORK, FOR A PERSON, IN AND BY A WRITTEN INSTRUMENT, TO KNOWINGLY MAKE A FALSE STATEMENT, OR TO MAKE A STATEMENT WHICH SUCH PERSON DOES NOT BELIEVE TO BE TRUE.

Name: Albert M Gonas (Please type or print) Signature: Albert M Gonas

Title. Tech Date 11/25/86

Firm: Umatco Minerals Corp

Address: 137-47th St. Niagara Falls N.Y.

UCCNHT0001184

STRATCOR
Internal Correspondence

P. O Box 66
Niagara Falls, NY 14302

November 26, 1986

TO: C. T. Wentzel

COPY: D. J. Hansen

SUBJECT: Sample Cage

The sample cage is clean and all samples have been removed. This area is also clean of radioactivity. Numerous sample jars have been left for J. Cooper. These jars are physically clean, but haven't been rinsed. As far as I'm concerned, Umetco has fulfilled their clean-up requirements.

H. M. Wilber

HMW:lp

UCCNHT0001185

RECEIVED

D J. HANSEN

UNION CARBIDE CORPORATION
LINDE DIVISION
RESEARCH & DEVELOPMENT
ANALYTICAL SERVICES
TONAWANDA, NEW YORK 14150

TEST REPORT

Test No R86001

Date 4/14/86

Requested by D.J. Hansen

Sample Received From Strategic Minerals Corp. Niagara Falls, NY

Date Requested 3/10/86

Date Received 3/10/86

Subject Radiation Survey and Assays - Furnace and V-AL Areas

Test Data Two areas at Strategic Minerals Corp. (formerly UMETCO) were suspected to contain low level radioactive material. These are the old furnace area and the V-AL area in Building 24. Survey and assay assistance was requested. Two separate visits were made in order to survey the areas, and on both occassions samples of loose material were removed for radioassay at Tonawanda. Between the first and second visits extensive removal operations were undertaken, in order to determine if the low-level radioactive material could be completely removed.

Surveys

On the date of the first visit (March 10, 1986) surveys revealed a number of "hot spots" in both areas where radiation levels at or near the surface were several times background levels. The same areas were re-surveyed on March 21, 1986. In the interim a large amount of the loose material in both areas had been removed and placed in 55 gallon waste drums, pending disposal. The second surveys indicated radioactive material remained. In the furnace area readings as high as 0.1 mR/hr were seen. This is slightly above background (0.02-0.07 mR/hr). In the V-AL section readings up to 0.2 mR/hr were observed, at a depth of approximately 2 feet.

Radioassays

Sample	Date	Activity	
		α, pCi/g	$\alpha\beta\gamma$, μCi/g
Furnace Base	3/10	14.6	.0097
Furnace Chunk	3/10	8.6	.0060
Passageway Front	3/10	48	.0230
Furnace Base North	3/21	14.5	.0060
Passageway Front	3/21	5.3	.0024
Passageway Back	3/21	8.0	.0029
V-AL Bldg. 24	3/21	10.9	.0040

Tested by W.D. Smith

Reported by W.D. Smith
W.D. Smith

Approved by J.B. Goddard
J.B. Goddard

Copies to J.B. Goddard-W.D. Smith-file

UCCNHT0001186

REMARKS

1. It is apparent that the digging and removal operations did not totally remove all of the low-level material. More extensive removals will be necessary, although it is uncertain exactly how much.

2. For disposal purposes, an identification of the radioisotopes present in the samples will be necessary.

3. The above-background radiation levels detected in some areas do not constitute an occupational exposure hazard.

UCCNHT0001187

Umetco Minerals Corporation

INTERNAL CORRESPONDENC

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

APR 17 1986

To (Name) Mr. D G. Millenbruch
Division Umetco Minerals Corporation
Location Danbury, CT
Area

Date April 15, 1986
Originating Dept TECHNOLOGY
Area
Answering Letter Date

Subject Niagara Plant Radioactive Material License 950-0139

Copy to Messrs
R. G. Beverly/R Jones
L. G. Evans
T. J Kagetsu
F V McMillen
W D Smith

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background

For your convenience, I am appending my letter of March 25, 1986 to Mr R F Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed

In cleaning up the area around No 30 furnace we filled seventeen 55-gallon drums We had Mr. William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada The activity suggested the cleanup was not complete

The radiation in Building 24 (V-Al) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite. This pit seemed endless; we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet In addition, the pit was found to extend beneath the floor of the V-Al operation.

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area. So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons Even this amount presents problems in packaging for disposal.

UCCNHT0001188

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time. The gamma radiation increases from 200 μR/hr at the surface to about 600 μR/hr at a depth of one foot.

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses. The sample identification and results are reported in the attached Table 1. Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license. Section 38.11, 38.29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One.

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified; all radioactive material must be shipped to an approved recipient; the premises must be decontaminated and surveyed to show decontamination took place; and the survey must be verified by the State. Source material (uranium and thorium) must be reduced to 0.05 percent by weight to meet decontamination. (This is 500 ppm or 500 μg/g) For non-source material for which we are not licensed, the levels are specific for each element e.g. for radium the exempt concentration is 0.1 pico currie per gram.

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in μg/g). 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm). Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination. Looking at samples from each of the areas:

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance. We have made no attempt to determine the amount of soil that is contaminated.

Slag Pile East of No. 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226. The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally). This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag. This falls into the category of non-licensed material and possibly we need a ruling on it.

Furnace No. 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area. As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium.

Sample 41-1 tells us we have more cleanup to do around the north furnace support. This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports.

UCCNHT0001189

TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY: EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No.	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34.7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33.8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No. 6 Furnace Building	4.4±1.1	20.2	16±2	299±7	4.0±.9	17±2
2446-40-4	Light Slag - East of No. 6 Furnace Building	7.0±1.4	18.6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No. 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No. 24, V-Al	19±2	28 9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No. 24, V-Al	31±3	44.3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No. 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No. 30 After Cleanup	42±3	68.4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No. 30 After Cleanup	43±3	24 9	9.6±1.3 8.5±1.3	6.2±1 1 5.9±1.0	9.5±1.3 9.2±1.3**	

*Th229 (not positively identified)
**Duplicate Analyses

UCCNHT0001190

Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access.

Pit in Building No. 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium. However gamma radiation next to a drum will read 150 µR/hr. I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard. The pit is still not completely clean with radiation of about 50 µR/hr above the pit and about 150 µR/hr. at the surface 9 feet down. Background is about 9µR/hr.

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use. I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation.

We are faced with the decision on how to proceed (1) Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc. and would be unable to sell the property, (2) Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination. If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R. F. Kelly.

Hopefully we can tackle this on your planned visit next week.

Sincerely,

D. J. Hansen

mau/357h
Attachments

UCCNHT0001191

Niagara Falls, New York
July 13, 1983

Design Memo No. 1

File No. 11309

JUL 18 1983

SUBJECT: Radiological Survey, Cleanup Options and Cost Estimates

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UCCNHT0001192

OC 14.2

INTERNAL CORRESPONDENCE

METALS DIVISION

P.O. BOX 97, NIAGARA FA

To (Name) Mr. R. J. Klotzbach
Division UCC-Metals Division
Location Niagara Falls, NY

July 13, 1983

Answering letter date

Copy to See Attached Distribution

Sub Design Memo No. 1
Radiological Survey, Cleanup
Options and Cost Estimates
File No. 11309

Dear Bob:

Attached is Design Memo No. 1 "Radiological Survey, Cleanup Options and Cost Estimates".

Union Carbide Corporation presently is out of compliance with its New York Radioactive Materials License No. 950-0139 due to radioactive source concentrations in excess of 500 ppm behind Niagara Building 166, where access to employees is unrestricted. To identify the area and depth of contamination, the area south of Building 166 was surveyed by Mr. D. R. Brosnahan and the author. The results indicate that a soil volume of 5130 $ft.^3$ must be restricted or removed for compliance with New York State regulations. An additional 1700 $ft.^3$ must be removed for delicensing and unrestricted use.

The following five alternatives have been considered and cost estimates prepared as part of the design memo.

Alternative	Description	Cost
1	Fence in Place	$ 10,000
2	Remove & Fence on Elkem Property	65,000
3	Remove & Fence on UCC Property	120,000
4	Remove & Bury - UCC Niagara	175,000
5	Remove & Ship to a Repository	335,000

The recommendation is to proceed with Alternative No. 3, based primarily on the condition that the property will be deeded to Elkem Metals Company. The material remains available for implementing Alternative No. 4, "Bury on UCC Property", or Alternative No. 5, "Ship to an Approved Repository", in the future. An R & D effort can also proceed to investigate ways to reduce the volume. Far less expense is required for the alternative to "Fence in Place", which is recommended if property ownership does not change.

L. G. Evans

LGE/dac
Attachments

Union Carbide Corporation
Metals Division
Technology Department - Engineering
Niagara Falls, New York

File No. 11309

DESIGN MEMORANDUM
SPONSOR: T. J. KAGETSU

PROJECT: Soil Decontamination - South of Building 166, Niagara

BY: L. G. Evans/D. R. Brosnahan

DATE: May 20, 1983

Design Memo No. 1
Revision 0
Subject: Radiological Survey, Cleanup Options and Cost Estimates

1.0 INTRODUCTION

1.1 Scope

To include an engineering evaluation of the alternatives available for disposal of the radioactive contaminants from areas south of Building 166.

1.2 History

The U. S. Department of Energy performed surveys in 1976 to assess the radiological status of facilities utilized under Manhattan Engineer District contract during the period 1943-1946. UCC's Metals Division at Niagara was one of those sites. They discovered contamination South of Building 166 and notified Union Carbide and New York State.

As a result, New York State Department of Labor performed a follow up survey on December 1, 1981 and cited UCC for violation of its New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access to employees.

Later, thorium was found to be a major radioactive contaminate indicating that the radiation is unrelated to the Manhattan Engineer Project.

This problem is further complicated by the divestiture of the ferroalloys business and anticipated eventual ownership of the property by Elkem Metals Company.

UCCNHT0001194

2.0 DISCUSSION

2.1 General

All phases of a waste clean up project are directly affected by the quantity of waste to be handled. Therefore, the first priority was to develop a reasonably good estimate of the volume.

A gamma radiation survey was performed over the entire fenced area behind Building 166 to determine the area of involvement excluding areas covered by asphalt or concrete. Soil samples were obtained from several areas and analyzed for % U_3O_8 and % ThO_2. Samples were extracted at various levels in five holes to determine depth of involvement. Samples were also taken to obtain a rough correlation between gamma readings and uranium/thorium content.

2.2 Cleanup Criteria

2.2.1 General

The cleanup criteria is dependent upon the use or future use of the property. New York State Regulations would apply with continuance of license. NRC Regulations would apply for delicensing.

2.2.2 New York State Regulations

NYS requires restriction of access to areas where the radioactive contaminants exceed 500 ppm of source materials. Below 500 ppm radioactive materials can be stored with unrestricted access.

To facilitate a comparison of this limit to the NRC limits a conversion to pCi/gm is made assuming a 2:1 (thorium:uranium) ratio. (See calculations attached).

These limits for unrestricted access are the total of the following:

≤36 pCi/gm Thorium
≤57 pCi/gm Uranium

These limits are used only for determination of compliance with our license for restricted or unrestricted access.

If the State is approached by UCC for criteria for delicensing they probably will require compliance with NRC Regulations due to Agreement State principles.

2.2.3 NRC Regulations

The NRC proposed regulations[1] provide four options for burial and delicensing. A fifth option deals with continuing the license.

[1] Federal Register/Vol. 46 No. 205/Friday Oct. 23, 1981, Notices (attached).

UCCNHT0001195

Option 1 ≤10 pCi/gm Thorium and/or 10 pCi/gm Uranium - unrestricted use and delicensing. (Burial not required).

Option 2&3 ≤50 pCi/gm Thorium and 40 pCi/gm Uranium - deed amendment and delicense, restricted access by burial with minimum four foot cover. No residential building. Option 2 specifies thorium and Option 3 uranium.

Option 4 ≤500 pCi/gm Thorium and 200 pCi/gm Uranium - much more restricted use of the land than Options 2 and 3. No excavation or building.

Option 5 of the Regulation deals with on-site storage of higher concentrations pending the availability of space at an approved repository. No burial is permitted.

2.3 Radiological Survey

2.3.1 Gamma Survey

The survey was performed with a portable gamma ray spectrometer, Model GR-410 manufactured by Geometries Exploranium and detector Model No. GPX-21 employing a sodium iodide thallium activated crystal as a scintillation phosphor.

All of the area south of Building 166 and bounded by the chain link fence was surveyed except areas covered by concrete or asphalt. The actual area surveyed was approximately 26,000 ft.^{2}. Concrete and asphalt cover 63,000 ft.^{2}.

A 10' x 10' grid was established and readings were taken at the intersection points. Extra readings were taken along the west track center line and near the edge of the concrete on both sides.

A resurvey of a 400 ft.^{2} area was done using a 2' x 2' grid to assess the reliability of the general survey. The location of this area is shown on Drawing SF-7902 as Detail 1. The data are also displayed in Figure I (attached).

All gamma meter readings were reduced to the number of times background and are reported on Drawing SF-7902.

2.3.2 Analytical Survey

Soil Samples - The physical samples were essentially 'grab' samples. No systematic sampling technique was used. The analytical work was performed by Elkem's laboratory at Niagara Falls. The results are shown in Table III (attached) and on Drawing SF-7902.

The chemical analyses of the surface soil samples ranged from 0.006% to 0.40% ThO_2 and from 0.002% to 0.17% U_3O_8.

UCCNHT0001196

2.4 Survey vs Regulations

The following Table I is a comparison of the surface soil sample analyses converted to pCi/g and the gamma radiation readings (times background). Below the table is a guide comparing gamma readings to cleanup or storage criteria. The gamma range is estimated based on the analyses of Table III (attached).

TABLE I

GAMMA X BKG	URANIUM pCi/gm	THORIUM pCi/gm	SAMPLE NO.	CONTAMINANTS PPM
1	3	2	11	20
3	11	11	9	131
5	6	6	8	70
6	11	19	2	210
8	8	22	5	228
9	14	40	1	401
12	26	61	3	650
13	8	12	10	140
17	26	66	4	674
21	42	105	12	1094
26	57	164	14	1664
33	82	201	13	2091
83	466	382	5	4957

GAMMA RANGE	NYS/NRC REQUIREMENTS
1 - 5	Will meet NRC proposed regulations for delicensing and unrestricted land use. NRC Option 1 (Sec. 2.3.3) - no burial required.
6 - 9	NYS allows unrestricted access and continue license. NRC allows burial and delicensing. Options 2 and 3 - burial required.
10 - 60*	NYS requires restricted access. NRC allows burial and delicensing - Option 4.
>60	NYS requires restricted access. NRC requires restricted access and storage until space is available at an approved repository, e.g., Barnwell, SC.

*Interpolated

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2.5 Contamination Volume

2.5.1 General

The gamma survey, surface and subsurface soil analyses and the guide above are combined to estimate the quantity of material of each class in each area.

The depth of contamination varies throughout the area of involvement, but is generally less than six inches. However, to expedite cleanup, the rails and ties must be removed, requiring a minimum removal depth of eight inches.

2.5.2 High Concentration Area

This area contains material which exceeds NRC burial limits and must be disposed of (eventually) at an approved repository. Gamma readings are above 60 times background. This area is the most heavily contaminated both in radiation level and depth of contamination. Contamination can be found 12 inches below the surface.

Volume = 400 $ft.^2$ x 1 ft. deep = 400 $ft.^3$

2.5.3 Medium Concentration Area

This area contains material which requires restricted access. Gamma readings are 10-60 times background.

Volume = 6400 $ft.^2$ x 2/3 ft. deep = 4267 $ft.^{3*}$

*Approximately 30% of the area found to be low concentration on the general survey (10' x 10' Grid) was found to be medium concentration upon resurvey (2' x 2' Grid). See Drawing SF-7902 or Figure I. This volume is included.

2.5.4 Low Concentration Area

This area contains material which must be removed to delicense but which can remain with unrestricted access under current license. Gamma readings are 6-9 times background.

Volume = 2200 $ft.^2$ x 2/3 ft. deep = 1467 $ft.^3$

2.5.5 Summary

The following summarizes the above volumes including a 15 percent contingency:

High Concentration	-	230 $ft.^3$
Medium Concentration	-	4900 $ft.^3$
Low Concentration	-	1700 $ft.^3$
TOTAL		6830 $ft.^3$

UCCNHT0001198

NOTE: No exploration was done beneath any of the concrete or asphalt pads. The depth of involvement and the location of contamination along the railroad tracks indicates the radioactive materials were spilled during handling from rail cars and contamination under the pads is unlikely.

3.0 DESCRIPTION OF CLEANUP ALTERNATIVES

3.1 Summary

Five cleanup alternatives are considered in this memorandum. The major factors influencing final selection of an alternative are: term of solution (short or long), delicensing, property transfer to Elkem, compliance with NYS Regulations, and cost.

Table II below summarizes the alternatives opposite these factors.

TABLE II

ALTER-NATIVE NO.	DESCRIPTION	TERM	DELICENSE*	TRANSFER PROPERTY TO ELKEM	COST $000
1	Fence in place	Short	No	No	10
2	Remove & fence on Elkem Property	Short	No	No	65
3	Remove & fence on UCC Property	Medium	No	Yes	120**
4	Remove & bury - UCC Niagara	Long	Yes	Yes	175
5	Remove & ship to repository	Permanent	Yes	Yes	335

* Assumes that this is the only contaminated area in the plant.

**If a concrete pad is available the cost would be $90,000.

3.2 Alternative No. 1 - Fence in Place

Simply enclose the contaminated area thus restricting access.

Requirements - 400 feet of fence.

Advantages - Quick solution to come into compliance with NYS.
- Minimum cost.

Disadvantages - Contamination remains requiring future action.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

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3.3 Alternative No. 2 - Remove and Fence on Elkem Property

As mentioned earlier, much of the area South of Building 166 is covered with concrete and asphalt. The material (soil) could be removed and stored on an existing pad in the Southeast corner of the property. The pad and a plastic covering would provide stability and a fence would provide restricted access until final disposal.

Requirements
- Removal of railroad tracks.
- Disposal of scrap and debris**.
- 100 ft. fence required - S & E corner site.
- Concrete/asphalt pad - already available.
- Replacement of railroad track.

Advantages
- Consolidation of contaminants.
- Access can be restricted.
- This work is required for ultimate disposal in any event.

Disadvantages
- Short term solution.
- 1/10 acres of land would not be available for Elkem use.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

**This includes
- Three flat bed railroad cars loaded with induction furnaces.
- Stacks of deteriorating 55 gallon drums.
- Stacked wooden boxes containing steel shot, etc.
- Numerous 5' x 5' x 5' steel boxes.
- Various ladles, furnaces, carbon electrodes, etc.

3.4 Alternative No. 3 - Remove and Fence on UCC Property

The work required here is essentially the same as in 3.3 above. Costs increase and extra care must be taken to avoid contamination of other areas of the plant. However, the property can then be released for transfer to Elkem. An area in the Niagara Plant has been designated by plant personnel for possible use.

Requirement
- Same as 3.3 except more fence and a new concrete pad may be required.

Advantage
- Same as 3.3 except it has the additional advantage of not interfering with Elkem property use. Property can be transferred to Elkem.

Disadvantage
- Medium term solution.

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3.5 Alternative No. 4 - Remove and Bury - UCC Niagara

Burial on Union Carbide owned property was explored for the Marietta TaCb cleanup project. The main problems are: finding a suitable burial site, getting State and Local approval, future use or transfer of the burial site is restricted, and long term monitoring of the site is necessary.

Requirements
- Remove and replace railroad tracks.
- Dispose of scrap and debris at approved repository.
- A suitable burial site.
- Containers (55 gallon drums) may be required.
- Dispose of 400 $ft.^3$ soil at approved repository.

Advantages
- Long term solution.
- Delicense.

Disadvantages
- Use of the burial site will be restricted - no construction.

3.6 Alternative No. 5 - Remove and Ship to Repository

This alternative is permanent. Once the material is received at the repository, the host state becomes owner and the licensee's accountability ends. However, this is the most expensive alternative.

Requirements
- Remove and replace railroad tracks.
- Disposal of scrap and debris at approved repository.
- Containers.
- Loading system.

Advantage
- Permanent solution.

Disadvantage
- Highest cost.

3.7 Remove and Ship to Uravan

This alternative was selected for the TaCb residue cleanup project in Marietta. The uranium content of the TaCb residue was 0.13% U_3O_8 and processing to recover uranium values was feasible and acceptable to the Colorado Department of Health. The material (soil) analyses at Niagara indicate 0.01% U_3O_8. Therefore, transfer to Uravan cannot be considered.

4.0 COST ESTIMATES

As discussed in Section 2.4, the radiological survey indicates three levels of contamination above NRC delicensing limits. They are: 6-9 x BKG (background), 10-60 x BKG and greater than 60 x BKG. Volumes were calculated

UCCNHT0001201

for each area with the thought that some alternatives would not require the removal of the combined total volume but only those areas with the highest concentrations. However, to simplify costings and cost comparison, only the total volume of Section 2.5.5 is considered. All medium and high concentration material requires fencing or removal. The low concentration material adds an additional 25% to the volume, but adds only 10% to the cost. The volume for cost estimating is then 6830 ft.^{3}.

Cost Estimates No. 6342 through 6346 are attached.

Cost Estimate No. 6342	Fence in Place	$ 10,000
Cost Estimate No. 6343	Remove and Fence - Elkem	$ 65,000
Cost Estimate No. 6344	Remove and Fence - UCC Niagara	$120,000
Cost Estimate No. 6345	Remove and Bury - UCC Niagara	$175,000
Cost Estimate No. 6346	Remove and Ship to Barnwell	$335,000

Note: Costs do not reflect removal of debris which is assumed to be Elkem's accountability.

5.0 RECOMMENDATIONS

Removal and relocation of the contaminated soil to the Niagara plant as described in Alternative No. 3 is recommended based on the following:

1. The property will be deeded to Elkem Metals Company.

2. Any restriction to the use of the property behind Building 166, or any potential cleanup liability to Elkem, is unacceptable.

3. EPA and NRC regulatory uncertainties exist concerning burial. (Perpetual maintenance costs are not included in the estimate for Alternative No. 4.) Burial also makes the material unavailable for disposal at an approved repository as discussed below. New York state may ban all burial within the state in the near future.

4. Disposal at Barnwell, SC is too costly and there is reason to believe that a new repository will be opened in the Northeast by 1986 which may reduce the cost of that option.

Any remedial effort must be approved by the State of New York, Department of Labor. For the material to be left on-site, Radioactive Materials License No. 950-0139 must be amended. This amendment or some form of approval should be received prior to the beginning of any cleanup.

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6342

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - FENCE IN PLACE (ALTERNATIVE 1)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	MATERIAL				
101	400' Fence (6 ft.) Along 1100N	-	8	8	-
	TOTAL		8	8	-
	TOTAL DIRECTS		8	8	-
	ENGINEERING			-	-
	CONTINGENCY			2	
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			-	-
	TOTAL			10	-

FRANGELORI/dac

cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

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Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6343

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE ELKEM (ALTERNATIVE 2)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3}	-	5	-	5
102	Fence 6 ft. - 100 ft.	-	2	-	2
	TOTAL		7		7
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
	TOTAL DIRECTS		40	23	17
	ENGINEERING			7	5
	CONTINGENCY			8	3
	RADIOLOGIST/HEALTH PHYSICS			2	-
	TOTAL			40	25

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001204

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6344

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE - UCC NIAGARA (ALTERNATIVE 3)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Concrete Pad - 60 cy.	-	30	30	-
103	Fence 6 ft. - 200 ft.	-	4	4	-
	TOTAL		44	34	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	-
	TOTAL DIRECTS		77	57	20
	ENGINEERING			9	6
	CONTINGENCY			10	2
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			14	2
	TOTAL			90	30

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001205

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6345

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND BURY - UCC NIAGARA (ALTERNATIVE 4)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Clay Lined Pit w/Drain System 40 ft.^{2} x 5 ft.	-	15	15	-
103	Clay Cap	-	15	15	-
	TOTAL		40	30	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation	-	1	-	1
302	Burial Fee (200 ft.^{3})	1	8	-	9
	TOTAL	1	9		10
	TOTAL DIRECTS	1	82	53	30
	ENGINEERING			8	8
	CONTINGENCY			15	5
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	SITE SELECTION			35	
	TOTAL			125	50

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001206

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6346

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND SHIP TO BARNWELL, SC (ALTERNATIVE 5)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove Soil 7000 ft.^{3} (haul)	-	5	-	5
102	Containers (80 boxes - 100 ft.^{3})	20	-	-	20
103	Loading Trucks (incl. Pallets, etc.)	5	4	-	9
	TOTAL	25	9		34
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation 1000_3$ (10 loads)	-	10	-	10
302	Burial Fee (8000 ft.^{3} incl Container)	-	160	-	160
	TOTAL		170		170
	TOTAL DIRECTS	25	212	23	214
	ENGINEERING			5	28
	CONTINGENCY			3	46
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	TOTAL			45	290

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

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CALCULATIONS

New York State regulations require that access be restricted to areas where the source material exceeds 500 ppm. For the purpose of comparison with NRC regulations a Thorium/Uranium ratio of 2:1 is assumed.

Therefore, the maximum activities for unrestricted access are:

NYS maximum Thorium activity equals:

$$330 \text{ parts/million} \times 1.09 \times 10^5 \text{ pCi/gm} = 36 \text{ pCi/gm}$$

NYS maximum Uranium activity equals:

$$170 \text{ parts/million} \times 3.33 \times 10^5 \text{ pCi/gm} = 57 \text{ pCi/gm}$$

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The Assistant Secretary finds that good cause exists for not publishing the supplement to the Puerto Rico State Plan as a proposed change and making the Regional Administrator's approval effective upon publication for the following reasons:

1. The standards are identical to the Federal standards which were promulgated in accordance with Federal law meeting requirements for public participation.

2. The standards were adopted in accordance with the procedural requirement of State Law and further participation would be unnecessary.

The decision is effective October 23, 1981.

(Sec. 18 Pub L. 91-596, 84 Stat. 1608 (29 U.S.C. 667))

Signed at New York City, New York, this 15th day of June 1981.

Roger A. Clark,

Regional Administrator.

[FR Doc. 81-30745 Filed 10-22-81, 8:45 am]

BILLING CODE 4510-26-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards, Subcommittee on Callaway Plant; Location Change

The ACRS Subcommittee on Callaway Plant will hold a meeting on November 4 and 5, 1981, at the HOLIDAY INN-WEST, 1900 I-70 Drive Southwest, Columbia, MO instead of the Hilton Inn.

Notice of this meeting was published in the Federal Register on October 19, 1981 (46 FR 51329), and all other items remain the same except for the location change as indicated above.

Dated: October 19, 1981.

John C. Hoyle,

Advisory Committee, Management Officer.

[FR Doc. 81-30733 Filed 10-22-81, 8:45 am]

BILLING CODE 7590-01-M

Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Discussion of options for NRC approval of applications for disposal or onsite storage of thorium or uranium wastes; interim use and public comment.

SUMMARY: This notice discusses five options for NRC approval of disposal or onsite storage or thorium or uranium wastes from past nuclear operations. The options are contained in a Branch Technical Position for administration by the Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

DATES: Comments on the options for disposal or onsite storage of thorium or uranium are encouraged. Such comments will be considered in any subsequent revision of the Branch Technical Position. Comments are due December 22, 1981.

Note.—Comments received after the expiration date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments filed on or before that date.

FOR FURTHER INFORMATION CONTACT: Ralph G. Page, Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, telephone 301-427-4309

SUPPLEMENTARY INFORMATION:

I. Introduction

Some of the sites formerly used for processing thorium and uranium are known today to be contaminated with residual radioactive materials. Some are currently covered by NRC licenses. Others were once licensed, but the licenses to possess and use material have expired. In many cases, the total amount of contaminated soil is large, but the activity concentrations of radioactive materials are believed sufficiently low to justify their disposal on privately owned lands or storage onsite rather than their transport to a licensed radioactive materials disposal (commercial) site. In many instances packaging and transporting these wastes to a licensed disposal site would be too costly and not justified from the standpoints of risk to the public health or cost-benefit. Furthermore, because of the total volume of these wastes, limited commercial waste disposal capacity, and restrictions placed on receipt of long-lived wastes at commercial sites, it is not presently feasible to dispose of these wastes at commercial low-level waste disposal sites.

Effective January 28, 1981, NRC regulations in 10 CFR 20, "Standards for Protection Against Radiation", were amended (45 FR 71761-71762) to delete § 20.304 which provided general authority for disposal of radioactive materials by burial in soil. Under the amended regulations, licensees must apply for and obtain specific NRC approval to dispose of radioactive materials in this manner under the provisions of 10 CFR 20.302. A case-by-case review was believed needed to assure that burial of radioactive wastes would not present an unreasonable health hazard at some future date.

The deleted provisions of § 20.304 previously permitted burial of up to 100 millicuries of thorium or natural uranium at any one time, with a yearly limitation of 12 burials for each type of material at each site. The only disposal standards specified were (1) burial at a minimum depth of four feet, and (2) successive burials separated by at least six feet. Thus a total of 1.2 curies of these materials were permitted to be disposed of each year by burial in a 12 foot by 18 foot or larger plot of ground.

Under the amended regulations, it is incumbent on an applicant who wants to bury radioactive wastes to demonstrate that local land burial is preferable to other disposal alternatives. The evaluation of the application takes into account the following information:

Types and quantities of material to be buried
Packaging of waste
Burial location
Characteristics of burial site
Depth of burial
Access restrictions to disposal site
Radiation safety procedures during disposal operations
Recordkeeping
Local burial restrictions, if any

For applications involving disposal of soils contaminated with low level concentrations of thorium and uranium (other than concentrations not exceeding EPA cleanup standards), the matters of principal importance are:

Concentrations of thorium and uranium (either in secular equilibrium with their daughters or without daughters present)
Volume of contaminated soil
Costs for offsite and onsite disposal
Availability of offsite burial space
Disposal site characteristics
Depth of burial and accessibility of buried wastes
State and local government views

II. Branch Technical Position

There are five acceptable options for disposal or onsite storage of thorium and uranium contaminated wastes. Applications for disposal or storage will be approved if the guidelines discussed under any option are met. Applications for other methods of disposal may be submitted and these will be evaluated on their own merits.

1. Disposal of acceptably low concentrations (which meet EPA cleanup standards) of natural thorium with daughters in secular equilibrium, depleted or enriched uranium, and

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uranium ores with daughters in secular equilibrium with no restriction on burial method.

Under this option, the concentrations of natural thorium and depleted or enriched uranium wastes are set sufficiently low that no member of the public is expected to receive a radiation dose commitment from the disposed materials in excess of 1 millirad per year to the lung or 3 millirads per year to the bone from inhalation and ingestion, under any foreseeable use of the material or property. These radiation dose guidelines were recommened by the Environmental Protection Agency (EPA) for protection against transuranium elements present in the environment as a result of unplanned contamination (42 FR 60956–60959). In addition, the concentrations are sufficiently low so that no individual may receive an external dose in excess of 10 microroentgens per hour above background. This is compatible with guidelines EPA proposed as cleanup standards for inactive uranium processing sites (46 FR 2556–2563).

For natural uranium ores having daughters in equilibrium, the concentration limit is equal to that set by the EPA (46 FR 2556–2563) for radium-226 (i.e., 5 pCi/gm, including background) and its decay products. The concentrations specified below are believed appropriate to apply. It is expected, however, that currently licensed operations will be conducted in such a manner as to minimize the possibility of soil contamination and when such occurs the contamination will be reduced to levels as low as reasonably achievable.

Kind of material	Concentration (pCi/gm)
Natural thorium (Th-232 plus Th-228) if all daughters are present and in equilibrium	10
Depleted Uranium	35
Enriched Uranium	30
Natural Uranium Ores (U-238 plus U-234) if all daughters are present and in equilibrium	10

The analysis upon which the Branch Technical Position is based is available for inspection at the Commission's Public Document Room at 1717 H St., N.W., Washington, D.C.

The concentrations specified under this option may be compared with naturally occurring thorium and uranium ore concentrations of 1.3 pCi/gm in igneous rock and uranium concentrations of 120 pCi/gm in Florida phosphate rock and 50–80 pCi/gm in Tennessee bituminous shale. Concentration limits for natural thorium and natural uranium ore wastes containing daughters not at secular equilibrium can be calculated on a case-by-case basis using the applicable isotopic activities data.

2. Disposal of certain low concentrations of natural thorium with daughters in secular equilibrium and depleted or enriched uranium with no daughters present when buried under prescribed conditions with no subsequent land use restrictions and no continuing NRC licensing of the material.

Under this option the concentrations of natural thorium and uranium are set sufficiently low so that no member of the public will receive a radiation dose exceeding those discussed under option 1 when the wastes are buried in an approved manner absent intrusion into the burial grounds. This option will require establishing prescribed conditions for disposal in the license, such as depth and distribution of material, to minimize the likelihood of intrusion. Burial will be permitted only if it can be demonstrated that the buried materials will be stabilized in place and not be transported away from the site.

Acceptability of the site for disposal will depend on topographical, geological, hydrological and meteorological characteristics of the site. At a minimum, burial depth will be at least four feet below the surface. In the event that there is an intrusion into the burial ground, no member of the public will likely receive a dose in excess fo 170 millirems to a critical organ. An average dose not exceeding 170 millirems to the whole body for all members of a general population is recommended by international and national radiation expert bodies to limit population doses. With respect to limiting doses to individual body organs, the concentrations are sufficiently low that no individual will receive a dose in excess of 170 millirems to any organ from exposure to natural thorium, depleted uranium or enriched uranium.

The average activity concentration of radioactive material that may be buried under this option in the case of natural thorium (Th-232 plus Th-228) is 50 pCi/gm, if all daughters are present and in equilibrium; for enriched uranium it is 100 pCi/gm if the uranium is soluble and 250 pCi/gm if insoluble, for depleted uranium it is 100 pCi/gm if the uranium is soluble and 300 pCi/gm if insoluble. Natural uranium ores containing radium 226 and its daughters are not included under this option, because of possible radon 222 emanations and resultant higher than acceptable exposure of individuals in private residences if houses were built over buried materials.

3. Disposal of low concentrations of natural uranium ores, with all daughters in equilibrium, when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the specified land contains buried radioactive materials and are conditioned in a manner acceptable under state law to impose a covenant running with the land that the specified land may not be used for residential building. (There is no continuing NRC licensing of the material.)

Disposal will be approved if the burial criteria outlined in option 2 (including burial at a minimum of 4 feet) are met. Depending upon local soil characteristics, burials at depths greater than 4 feet may be required. In order to assure protection against radon 222 releases (daughter in decay chain of uranium 238 and uranium 234), it is necessary that the recorded title documents be amended to state in the permanent land records that no residential building should be permitted over specified areas of land where natural uranium ore residues (U-238 plus U-234) in concentrations exceeding 10 pCi/gm has been buried. Industrial building is acceptable so long as the concentration of buried material does not exceed 40 pCi/gm of uranium (i.e., Ra-226 shall not exceed 20 pCi/gm).

4. Disposal of land-use-limited concentrations of natural thorium or natural uranium with daughters in secular equilibrium and depleted or enriched uranium without daughters present when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the land contains buried radioactive material and are conditioned in a manner acceptable under state law to impose a covenant running with land that the land (1) may not be excavated below stated depths in specified areas of land unless cleared by appropriate health authorities, (2) may not be used for residential or industrial structures over specified areas where radioactive materials in concentrations higher than specified in options 2 and 3 are buried, and (3) may not be used for agricultural purposes in the specified areas. (There is no continuing NRC licensing of the disposal site.)

Under this option, conditions of burial will be such that no member of the public will receive radiation doses in excess of those discussed under option 1 absent intrusion into the burial ground. Criteria for disposal under these conditions is predicated upon the assumption that intentional intrusion is less likely to occur if a warning is given

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in land documents of record not to excavate below burial depths in specified areas of land without clearance by health authorities; not to construct residential or industrial building on the site, and not to use specified areas of land for agricultural purposes. Because of this, we believe it appropriate to apply a maximum critical organ exposure limit of 500 millirems per year to thorium and uranium buried under this restriction instead of 170 millirems as used in options 2 and 3. In addition, any exposure to such materials is likely to be more transient than assumed (essentially continual exposure) under those options. These two factors combine to increase the activity concentration limits calculated under option 2 by about 10. Thus, the average concentration that may be buried under this option for thorium (Th-232 plus Th-228) is 500 pCi/gm if all daughters are present and in equilibrium, for enriched uranium it is 1000 pCi/gm if the uranium is soluble and 2500 pCi/gm if insoluble, and for depleted uranium it is 1000 pCi/gm if the uranium is soluble and 3000 pCi/gm if insoluble.

With respect to natural uranium with daughters present and in equilibrium, the concentration that may be buried under this option is 200 pCi/gm of U-238 plus U-234, i.e., 100 pCi/gm Ra-226. This concentration is based on a limited exposure of 2.4 hours per day to limit the radon dose to less than 0.5 working level month (WLM) which is equivalent to continuous exposure to 0.02 working level (WL). Depending upon local soil characteristics, burials at depths greater than 4 feet may be required.

SUMMARY OF MAXIMUM CONCENTRATIONS PERMITTED UNDER DISPOSAL OPTIONS

Kind of Material	Disposal Options			
	1[1]	2[2]	3[3]	4[4]
Natural Thorium (Th-232 + Th-228) with daughters present and in equilibrium	10	50		500
Natural Uranium (U-238 + U-234) with daughters present and in equilibrium	10		40	200
Depleted Uranium:				
*Soluble	35	100		1,000
*Insoluble	35	300		3,000
Enriched Uranium:				
*Soluble	30	100		1,000
*Insoluble	30	250		2,500

[1] Based on EPA cleanup standards.
[2] Concentrations based on limiting individual doses to 170 mrem/yr.
[3] Concentration based on limiting equivalent exposure to 0.02 working level or less.
[4] Concentrations based on limiting individual doses to 500 mrem/yr and, in case of natural uranium, limiting exposure to 0.02 working level or less.

5. Storage of licensed concentrations of thorium and uranium onsite pending the availability of an appropriate disposal site.

When concentrations exceed those specified in option 4, long term disposal other than at a licensed disposal site will not normally be a viable option under the provisions of 10 CFR 20.302. In such cases, the thorium and uranium may be permitted to be stored onsite under an NRC license until a suitable method of disposal is found. License conditions will require that radiation doses not exceed those specified in 10 CFR Part 20 and be maintained as low as reasonably achievable.

Before approving an application to dispose of thorium or uranium under options 2, 3, or 4, NRC will solicit the view of appropriate State health officials within the State in which the disposal would be made.

Dated at Silver Spring, Maryland this 19th day of October, 1981

Richard E. Cunningham,

Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

[FR Doc. 81-30603 Filed 10-22-81, 8:45 am]

BILLING CODE 7590-01-M

OFFICE OF PERSONNEL MANAGEMENT

Postponement of Application Deadline for Fund-Raising Privileges Among Federal Employees by Private Voluntary Organizations

Section 5.43 of the "Manual on Fund-Raising Within the Federal Service for Voluntary Health and Welfare Agencies" sets December 1 of each year as the deadline by which national voluntary agencies must submit applications for participation in the Combined Federal Campaign (CFC) to be conducted in the fall of the following year. This year's deadline is being postponed from December 1, 1981, to February 1, 1982. In June 1981, the U.S. Office of Personnel Management (OPM) announced that the eligibility criteria for participation in the 1982-83 CFC are being reviewed. The deadline date is being postponed to avoid national voluntary agencies having to revise their applications to meet eligibility criteria which may be changed.

Donald J. Devine,

Director.

[FR Doc. 81-30730 Filed 10-22-81, 8:45 am]

BILLING CODE 6325-01-M

OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

Resolution of Complaint of Price-Undercutting of Subsidized Cheese Imports

On October 1, 1981, the United States Trade Representative received a letter from the Secretary of Agriculture informing him of the Secretary's finding that imported Grade A Swiss type cheese produced in Finland has been offered for sale in the United States at duty-paid wholesale prices which are five cents per pound less than the domestic wholesale market price of similar cheese produced in the United States.

In accordance with Section 702(c)(2) of the Trade Agreements Act of 1979 (the Act) (19 U.S.C. 1202 note), the Office of the United States Trade Representative notified Finland of the price undercutting determination made by the Secretary of Agriculture, requested that corrective action be taken, and asked for appropriate assurances concerning the commitment made in the Arrangement Between the United States and Finland Concerning Cheese.

On October 14, 1981, Finland notified the United States Trade Representative that measures have been taken to ensure that the duty-paid wholesale price of imported Grade A Swiss type cheese produced in Finland will not be less than the domestic wholesale market price of similar cheese produced in the United States. In addition, Finland gave assurance that it will respect the price commitments in the Arrangement. Since the above notification by Finland has occurred within the 15-day period provided in Section 702(c)(3) of the Act, the United States Trade Representative has notified the Secretary of Agriculture of his belief that no further action is required.

William E. Brock,

United States Trade Representative

[FR Doc. 81-30584 Filed 10-22-81; 8:45 am]

BILLING CODE 3190-01-M

SECURITIES AND EXCHANGE COMMISSION

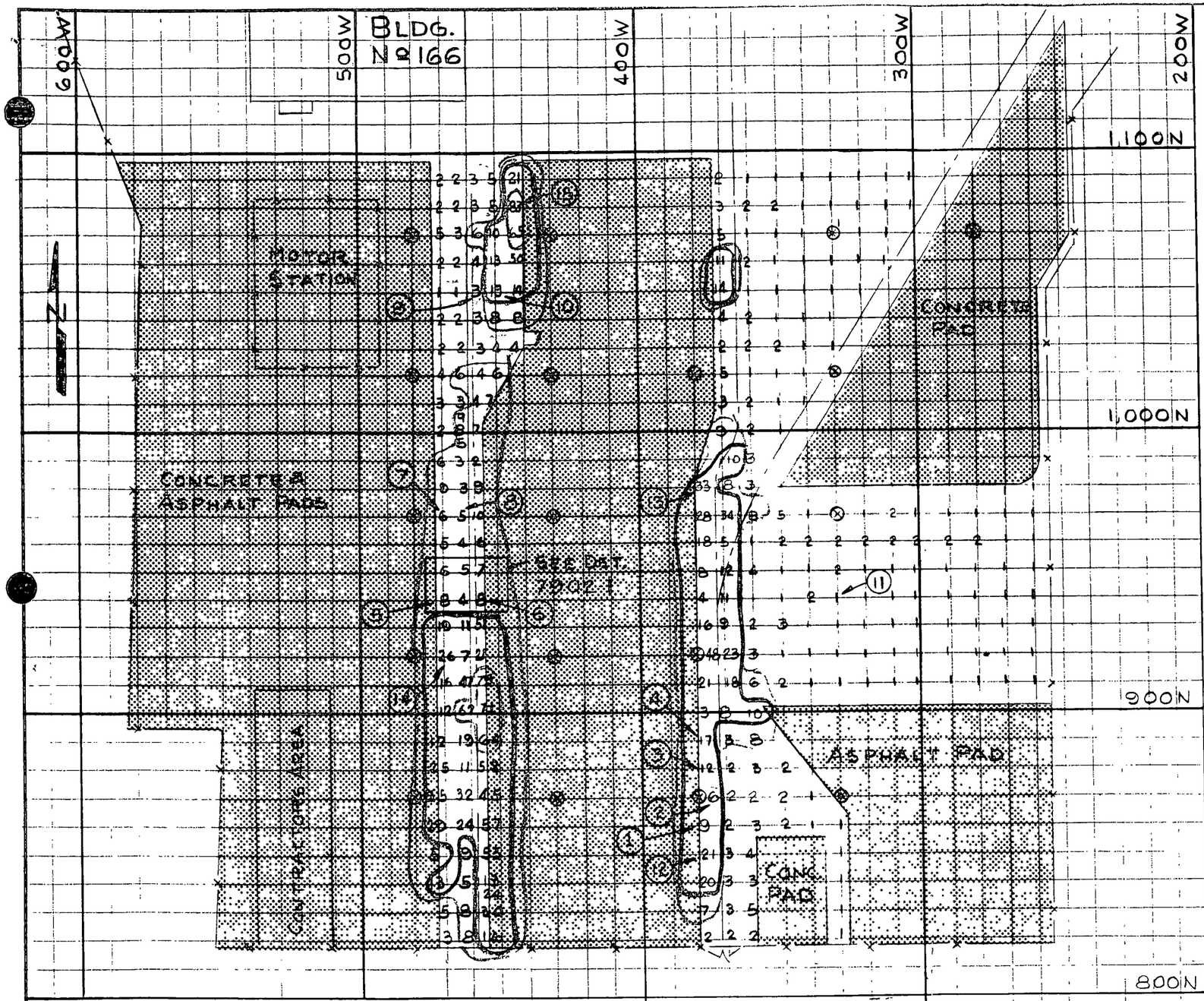
[Release No. 22236; 70-6650]

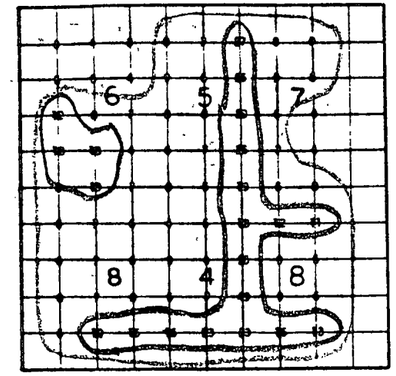
Arkansas Power & Light Co.; Proposed Issuance and Sale of First Mortgage Bonds

October 19, 1981.

Arkansas Power & Light Company

UCCNHT0001211





ENLARGED DETAIL 7902-1
2 x 2' GRID

SAMPLE NO	CHEMICAL ANALYSIS URANIUM/THORIUM pC1/gm DEPTH IN INCHES 0	3	6	9	12	15	21	24	26	GAMMA x BKg SURFACE
1	14/40									9
2	11/19									6
3	26/61									12
4	28/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/1		<3/2					33
14		57/164		<7/8		<7/3	7/2	3/3		26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pC1/gm (See report for calc)
THORIUM 37 pC1/gm

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pC1/gm
THORIUM 10 pC1/gm

- > 1 Times Background
- > .5 Times Background
- > 9 Times Background
- > 60 Times Background

LEGEND

⊗ - SURVEY STAKES
○ - SAMPLE NO.
READINGS - NO TIMES BACKGROUND @ SURFACE

REV	DATE	BY	DESCRIPTION

TITLE
RADIOLOGICAL SURVEY - BALL FIELD AREA

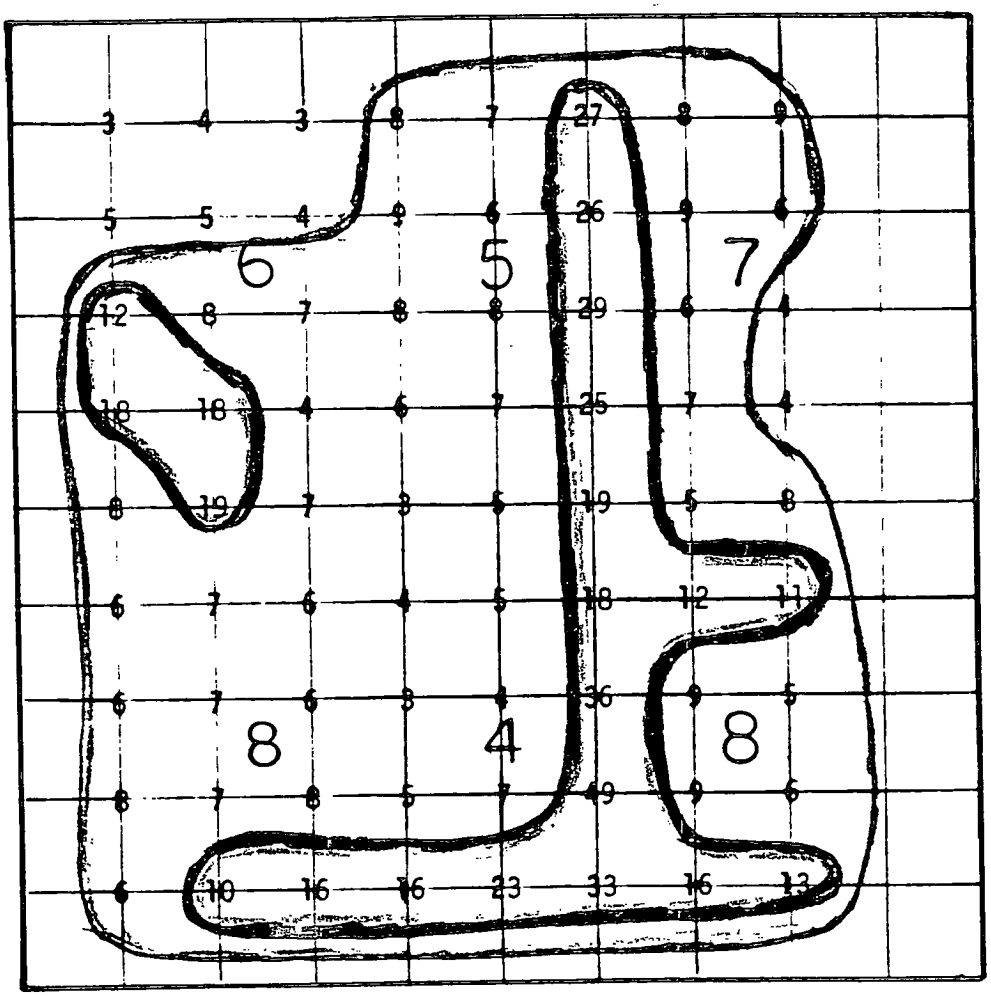
UNION CARBIDE CORPORATION
METALS DIVISION

PLANT	BLDG NO	DWN BY	CHKD BY	STAFF ENG	ACC ENG	EX	DATE	DRAWING NUMBER
NIAGARA		DGF			LSE		1-14-83	SF-7902

FILE NUMBER 930/256
DRAWING SCALE 1" = 40'-0"

UCCNHT0001212

FIGURE I



ENLARGED DETAIL 7902-1

2' x 2' GRID

> 1 Times Background

> 5 Times Background

> 9 Times Background

UCCNHT0001213

TABLE III

SAMPLE NO.	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm DEPTH IN INCHES									GAMMA X BKg SURFACE
	0	3	6	9	12	15	21	24	26	
1	14/40									9
2	11/19									6
3	26/61									12
4	26/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/<1		<3/2					33
14		57/164		<7/<8		<7/3	7/2		3/3	26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm
THORIUM 37 pCi/gm (See report for calc.)

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

UCCNHT0001214

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

April 4, 1984

Mr. Robert F Kelly, Senior Radiologist
Occupational Safety & Health
State of New York
Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139

Dear Mr Kelly:

Relatively high concentrations of radionuclides in the Th232 and U238 decay chains exist in the ground cover of portions of the Technology area, Union Carbide Corporation, Royal Avenue, Niagara Falls. The thorium indicates that not all of the material came from operations related to the Manhattan Engineer District (MED)/Atomic Energy Commission (AEC) on this site which was limited to production of uranium metal from UF_4 (green salt). However, because uranium occurs in significant amounts, contamination due to MED/AEC activities cannot be absolutely eliminated as a possible contributing source. The Manhattan District "Area" plant was contiguous with the site containing the contaminated soil. The location of the highest level of activity along railroad tracks would make MED/AEC operations an improbable source of most of the contamination. It is more likely that the bulk of the contaminated soil came from spillage of columbium bearing ores during rail unloading procedures and is restricted to relatively large pieces of insoluble ore mixed with the top 8 to 12 inches of ground cover. It is not deeply or widely disseminated. These operations were terminated 25 years ago so the low level ore contamination has existed for a prolonged period and was not identified when the AEC surveyed and decommissioned the "Area" plant in November 1953; perhaps because the survey was primarily limited to the building and not the environs. Nevertheless, the close proximity of the site to known uranium operations prevented identification of the problem until December 1980.

We are out of compliance with our New York State Radioactive Material License as you are aware. The area in question is fenced on three sides, is used for storage, receives no day-to-day personnel traffic and the railroad tracks on the site have not been used for at least five years.

UCCNHT0001215

Work has begun to make the area accessible for decontamination. Main obstacles are three flat bed railroad cars loaded with large furnace shells and copper bus, 5' x 5' x 5' steel skip hoppers, ladles, furnace parts, electrode stubs and masses of electric furnace debris These items are Elkem property and are being moved.

Our plan is to perform the following work:

Phase I - To be completed by July 31, 1984.

1 Clean up area for equipment access.

2 Removal of railroad tracks.

3 Remove 6800 ft^3 of contaminated top soils and store on a non-traffic area of the property with plastic liner and cover.

4 Fence temporary storage area for restricted access

5. Replace railroad tracks and backfill.

Estimated cost of Phase I is $130,000.

Phase II

Load soil debris in approved containers, ship and bury at approved repository We already have experience for this work in shipments from Marietta, Ohio to Barnwell, South Carolina.

Completion of shipments will take a minimum of one year after scheduling and cost $270,000.

Very truly yours,

R. J Klotzbach
Director of Technology

cc: Mr. W. C Thurber
Mr. F T Temple

/mau

UCCNHT0001216

Niagara Falls, New York
July 13, 1983

Design Memo No. 1

File No. 11309

SUBJECT: Radiological Survey, Cleanup Options and Cost Estimates

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UCCNHT0001217

UC 149 2

UNION CARBIDE **INTERNAL CORRESPONDENCE**

METALS DIVISION P O BOX 97, NIAGARA FALLS NEW YORK 14302

To (Name) Mr. R. J. Klotzbach
Division UCC-Metals Division
Location Niagara Falls, NY

Date July 13, 1983
Originating Dept *Engineering Department*
Answering letter date

Copy to See Attached Distribution

Subject Design Memo No. 1
Radiological Survey, Cleanup
Options and Cost Estimates
File No. 11309

Dear Bob:

Attached is Design Memo No. 1 "Radiological Survey, Cleanup Options and Cost Estimates".

Union Carbide Corporation presently is out of compliance with its New York Radioactive Materials License No. 950-0139 due to radioactive source concentrations in excess of 500 ppm behind Niagara Building 166, where access to employees is unrestricted. To identify the area and depth of contamination, the area south of Building 166 was surveyed by Mr. D. R. Brosnahan and the author. The results indicate that a soil volume of 5130 ft.^{3} must be restricted or removed for compliance with New York State regulations. An additional 1700 ft.^{3} must be removed for delicensing and unrestricted use.

The following five alternatives have been considered and cost estimates prepared as part of the design memo.

Alternative	Description	Cost
1	Fence in Place	$ 10,000
2	Remove & Fence on Elkem Property	65,000
3	Remove & Fence on UCC Property	120,000
4	Remove & Bury - UCC Niagara	175,000
5	Remove & Ship to a Repository	335,000

The recommendation is to proceed with Alternative No. 3, based primarily on the condition that the property will be deeded to Elkem Metals Company. The material remains available for implementing Alternative No. 4, "Bury on UCC Property", or Alternative No. 5, "Ship to an Approved Repository", in the future. An R & D effort can also proceed to investigate ways to reduce the volume. Far less expense is required for the alternative to "Fence in Place", which is recommended if property ownership does not change.

L. G. Evans

LGE/dac
Attachments

UCCNHT0001218

Union Carbide Corporation
Metals Division
Technology Department - Engineering
Niagara Falls, New York

File No. 11309

DESIGN MEMORANDUM
SPONSOR: T. J. KAGETSU

PROJECT: Soil Decontamination - South of Building 166, Niagara

BY: L. G. Evans/D. R. Brosnahan

DATE: May 20, 1983

Design Memo No. 1
Revision 0
Subject: Radiological Survey, Cleanup Options and Cost Estimates

1.0 INTRODUCTION

1.1 Scope

To include an engineering evaluation of the alternatives available for disposal of the radioactive contaminants from areas south of Building 166.

1.2 History

The U. S. Department of Energy performed surveys in 1976 to assess the radiological status of facilities utilized under Manhattan Engineer District contract during the period 1943-1946. UCC's Metals Division at Niagara was one of those sites. They discovered contamination South of Building 166 and notified Union Carbide and New York State.

As a result, New York State Department of Labor performed a follow up survey on December 1, 1981 and cited UCC for violation of its New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access to employees.

Later, thorium was found to be a major radioactive contaminate indicating that the radiation is unrelated to the Manhattan Engineer Project.

This problem is further complicated by the divestiture of the ferroalloys business and anticipated eventual ownership of the property by Elkem Metals Company.

UCCNHT0001219

2.0 DISCUSSION

2.1 General

All phases of a waste clean up project are directly affected by the quantity of waste to be handled. Therefore, the first priority was to develop a reasonably good estimate of the volume.

A gamma radiation survey was performed over the entire fenced area behind Building 166 to determine the area of involvement excluding areas covered by asphalt or concrete. Soil samples were obtained from several areas and analyzed for % U_3O_8 and % ThO_2. Samples were extracted at various levels in five holes to determine depth of involvement. Samples were also taken to obtain a rough correlation between gamma readings and uranium/thorium content.

2.2 Cleanup Criteria

2.2.1 General

The cleanup criteria is dependent upon the use or future use of the property. New York State Regulations would apply with continuance of license. NRC Regulations would apply for delicensing.

2.2.2 New York State Regulations

NYS requires restriction of access to areas where the radioactive contaminants exceed 500 ppm of source materials. Below 500 ppm radioactive materials can be stored with unrestricted access.

To facilitate a comparison of this limit to the NRC limits a conversion to pCi/gm is made assuming a 2:1 (thorium:uranium) ratio. (See calculations attached).

These limits for unrestricted access are the total of the following:

≤36 pCi/gm Thorium
≤57 pCi/gm Uranium

These limits are used only for determination of compliance with our license for restricted or unrestricted access.

If the State is approached by UCC for criteria for delicensing they probably will require compliance with NRC Regulations due to Agreement State principles.

2.2.3 NRC Regulations

The NRC proposed regulations[1] provide four options for burial and delicensing. A fifth option deals with continuing the license.

[1] Federal Register/Vol. 46 No. 205/Friday Oct. 23, 1981, Notices (attached).

UCCNHT0001220

Option 1 ≤10 pCi/gm Thorium and/or 10 pCi/gm Uranium - unrestricted use and delicensing. (Burial not required).

Option 2&3 ≤50 pCi/gm Thorium and 40 pCi/gm Uranium - deed amendment and delicense, restricted access by burial with minimum four foot cover. No residential building. Option 2 specifies thorium and Option 3 uranium.

Option 4 ≤500 pCi/gm Thorium and 200 pCi/gm Uranium - much more restricted use of the land than Options 2 and 3. No excavation or building.

Option 5 of the Regulation deals with on-site storage of higher concentrations pending the availability of space at an approved repository. No burial is permitted.

2.3 Radiological Survey

2.3.1 Gamma Survey

The survey was performed with a portable gamma ray spectrometer, Model GR-410 manufactured by Geometries Exploranium and detector Model No. GPX-21 employing a sodium iodide thallium activated crystal as a scintillation phosphor.

All of the area south of Building 166 and bounded by the chain link fence was surveyed except areas covered by concrete or asphalt. The actual area surveyed was approximately 26,000 ft.^{2}. Concrete and asphalt cover 63,000 ft.^{2}.

A 10' x 10' grid was established and readings were taken at the intersection points. Extra readings were taken along the west track center line and near the edge of the concrete on both sides.

A resurvey of a 400 ft.^{2} area was done using a 2' x 2' grid to assess the reliability of the general survey. The location of this area is shown on Drawing SF-7902 as Detail 1. The data are also displayed in Figure I (attached).

All gamma meter readings were reduced to the number of times background and are reported on Drawing SF-7902.

2.3.2 Analytical Survey

Soil Samples - The physical samples were essentially 'grab' samples. No systematic sampling technique was used. The analytical work was performed by Elkem's laboratory at Niagara Falls. The results are shown in Table III (attached) and on Drawing SF-7902.

The chemical analyses of the surface soil samples ranged from 0.006% to 0.40% ThO_2 and from 0.002% to 0.17% U_3O_8.

UCCNHT0001221

2.4 Survey vs Regulations

The following Table I is a comparison of the surface soil sample analyses converted to pCi/g and the gamma radiation readings (times background). Below the table is a guide comparing gamma readings to cleanup or storage criteria. The gamma range is estimated based on the analyses of Table III (attached).

TABLE I

GAMMA X BKG	URANIUM pCi/gm	THORIUM pCi/gm	SAMPLE NO.	CONTAMINANTS PPM
1	3	2	11	20
3	11	11	9	131
5	6	6	8	70
6	11	19	2	210
8	8	22	5	228
9	14	40	1	401
12	26	61	3	650
13	8	12	10	140
17	26	66	4	674
21	42	105	12	1094
26	57	164	14	1664
33	82	201	13	2091
83	466	382	5	4957

GAMMA RANGE	NYS/NRC REQUIREMENTS
1 - 5	Will meet NRC proposed regulations for delicensing and unrestricted land use. NRC Option 1 (Sec. 2.3.3) - no burial required.
6 - 9	NYS allows unrestricted access and continue license. NRC allows burial and delicensing. Options 2 and 3 - burial required.
10 - 60*	NYS requires restricted access. NRC allows burial and delicensing - Option 4.
>60	NYS requires restricted access. NRC requires restricted access and storage until space is available at an approved repository, e.g., Barnwell, SC.

*Interpolated

UCCNHT0001222

2.5 Contamination Volume

2.5.1 General

The gamma survey, surface and subsurface soil analyses and the guide above are combined to estimate the quantity of material of each class in each area.

The depth of contamination varies throughout the area of involvement, but is generally less than six inches. However, to expedite cleanup, the rails and ties must be removed, requiring a minimum removal depth of eight inches.

2.5.2 High Concentration Area

This area contains material which exceeds NRC burial limits and must be disposed of (eventually) at an approved repository. Gamma readings are above 60 times background. This area is the most heavily contaminated both in radiation level and depth of contamination. Contamination can be found 12 inches below the surface.

Volume = 400 $ft.^2$ x 1 ft. deep = 400 $ft.^3$

2.5.3 Medium Concentration Area

This area contains material which requires restricted access. Gamma readings are 10-60 times background.

Volume = 6400 $ft.^2$ x 2/3 ft. deep = 4267 $ft.^{3*}$

*Approximately 30% of the area found to be low concentration on the general survey (10' x 10' Grid) was found to be medium concentration upon resurvey (2' x 2' Grid). See Drawing SF-7902 or Figure I. This volume is included.

2.5.4 Low Concentration Area

This area contains material which must be removed to delicense but which can remain with unrestricted access under current license. Gamma readings are 6-9 times background.

Volume = 2200 $ft.^2$ x 2/3 ft. deep = 1467 $ft.^3$

2.5.5 Summary

The following summarizes the above volumes including a 15 percent contingency:

High Concentration	- 230 $ft.^3$
Medium Concentration	- 4900 $ft.^3$
Low Concentration	- 1700 $ft.^3$
TOTAL	6830 $ft.^3$

UCCNHT0001223

NOTE: No exploration was done beneath any of the concrete or asphalt pads. The depth of involvement and the location of contamination along the railroad tracks indicates the radioactive materials were spilled during handling from rail cars and contamination under the pads is unlikely.

3.0 DESCRIPTION OF CLEANUP ALTERNATIVES

3.1 Summary

Five cleanup alternatives are considered in this memorandum. The major factors influencing final selection of an alternative are: term of solution (short or long), delicensing, property transfer to Elkem, compliance with NYS Regulations, and cost.

Table II below summarizes the alternatives opposite these factors.

TABLE II

ALTERNATIVE NO.	DESCRIPTION	TERM	DELICENSE*	TRANSFER PROPERTY TO ELKEM	COST $000
1	Fence in place	Short	No	No	10
2	Remove & fence on Elkem Property	Short	No	No	65
3	Remove & fence on UCC Property	Medium	No	Yes	120**
4	Remove & bury - UCC Niagara	Long	Yes	Yes	175
5	Remove & ship to repository	Permanent	Yes	Yes	335

* Assumes that this is the only contaminated area in the plant.

**If a concrete pad is available the cost would be $90,000.

3.2 Alternative No. 1 - Fence in Place

Simply enclose the contaminated area thus restricting access.

Requirements - 400 feet of fence.

Advantages - Quick solution to come into compliance with NYS.
- Minimum cost.

Disadvantages - Contamination remains requiring future action.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

UCCNHT0001224

3.3 Alternative No. 2 - Remove and Fence on Elkem Property

As mentioned earlier, much of the area South of Building 166 is covered with concrete and asphalt. The material (soil) could be removed and stored on an existing pad in the Southeast corner of the property. The pad and a plastic covering would provide stability and a fence would provide restricted access until final disposal.

Requirements
- Removal of railroad tracks.
- Disposal of scrap and debris**.
- 100 ft. fence required - S & E corner site.
- Concrete/asphalt pad - already available.
- Replacement of railroad track.

Advantages
- Consolidation of contaminants.
- Access can be restricted.
- This work is required for ultimate disposal in any event.

Disadvantages
- Short term solution.
- 1/10 acres of land would not be available for Elkem use.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

**This includes
- Three flat bed railroad cars loaded with induction furnaces.
- Stacks of deteriorating 55 gallon drums.
- Stacked wooden boxes containing steel shot, etc.
- Numerous 5' x 5' x 5' steel boxes.
- Various ladles, furnaces, carbon electrodes, etc.

3.4 Alternative No. 3 - Remove and Fence on UCC Property

The work required here is essentially the same as in 3.3 above. Costs increase and extra care must be taken to avoid contamination of other areas of the plant. However, the property can then be released for transfer to Elkem. An area in the Niagara Plant has been designated by plant personnel for possible use.

Requirement
- Same as 3.3 except more fence and a new concrete pad may be required.

Advantage
- Same as 3.3 except it has the additional advantage of not interfering with Elkem property use. Property can be transferred to Elkem.

Disadvantage
- Medium term solution.

UCCNHT0001225

3.5 Alternative No. 4 - Remove and Bury - UCC Niagara

Burial on Union Carbide owned property was explored for the Marietta TaCb cleanup project. The main problems are: finding a suitable burial site, getting State and Local approval, future use or transfer of the burial site is restricted, and long term monitoring of the site is necessary.

Requirements
- Remove and replace railroad tracks.
- Dispose of scrap and debris at approved repository.
- A suitable burial site.
- Containers (55 gallon drums) may be required.
- Dispose of 400 ft.^{3} soil at approved repository.

Advantages
- Long term solution.
- Delicense.

Disadvantages
- Use of the burial site will be restricted - no construction.

3.6 Alternative No. 5 - Remove and Ship to Repository

This alternative is permanent. Once the material is received at the repository, the host state becomes owner and the licensee's accountability ends. However, this is the most expensive alternative.

Requirements
- Remove and replace railroad tracks.
- Disposal of scrap and debris at approved repository.
- Containers.
- Loading system.

Advantage
- Permanent solution.

Disadvantage
- Highest cost.

3.7 Remove and Ship to Uravan

This alternative was selected for the TaCb residue cleanup project in Marietta. The uranium content of the TaCb residue was 0.13% U_3O_8 and processing to recover uranium values was feasible and acceptable to the Colorado Department of Health. The material (soil) analyses at Niagara indicate 0.01% U_3O_8. Therefore, transfer to Uravan cannot be considered.

4.0 COST ESTIMATES

As discussed in Section 2.4, the radiological survey indicates three levels of contamination above NRC delicensing limits. They are: 6-9 x BKG (background), 10-60 x BKG and greater than 60 x BKG. Volumes were calculated

UCCNHT0001226

for each area with the thought that some alternatives would not require the removal of the combined total volume but only those areas with the highest concentrations. However, to simplify costings and cost comparison, only the total volume of Section 2.5.5 is considered. All medium and high concentration material requires fencing or removal. The low concentration material adds an additional 25% to the volume, but adds only 10% to the cost. The volume for cost estimating is then 6830 ft.^{3}.

Cost Estimates No. 6342 through 6346 are attached.

Cost Estimate No. 6342	Fence in Place	$ 10,000
Cost Estimate No. 6343	Remove and Fence - Elkem	$ 65,000
Cost Estimate No. 6344	Remove and Fence - UCC Niagara	$120,000
Cost Estimate No. 6345	Remove and Bury - UCC Niagara	$175,000
Cost Estimate No. 6346	Remove and Ship to Barnwell	$335,000

Note: Costs do not reflect removal of debris which is assumed to be Elkem's accountability.

5.0 RECOMMENDATIONS

Removal and relocation of the contaminated soil to the Niagara plant as described in Alternative No. 3 is recommended based on the following:

1. The property will be deeded to Elkem Metals Company.

2. Any restriction to the use of the property behind Building 166, or any potential cleanup liability to Elkem, is unacceptable.

3. EPA and NRC regulatory uncertainties exist concerning burial. (Perpetual maintenance costs are not included in the estimate for Alternative No. 4.) Burial also makes the material unavailable for disposal at an approved repository as discussed below. New York state may ban all burial within the state in the near future.

4. Disposal at Barnwell, SC is too costly and there is reason to believe that a new repository will be opened in the Northeast by 1986 which may reduce the cost of that option.

Any remedial effort must be approved by the State of New York, Department of Labor. For the material to be left on-site, Radioactive Materials License No. 950-0139 must be amended. This amendment or some form of approval should be received prior to the beginning of any cleanup.

UCCNHT0001227

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6342

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - FENCE IN PLACE (ALTERNATIVE 1)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	MATERIAL				
101	400' Fence (6 ft.) Along 1100N	-	8	8	-
	TOTAL		8	8	-
	TOTAL DIRECTS		8	8	-
	ENGINEERING			-	-
	CONTINGENCY			2	
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			-	-
	TOTAL			10	-

FRANGELORI/dac

cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001228

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6343

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE ELKEM (ALTERNATIVE 2)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3}	-	5	-	5
102	Fence 6 ft. - 100 ft.	-	2	-	2
	TOTAL		7		7
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
	TOTAL DIRECTS		40	23	17
	ENGINEERING			7	5
	CONTINGENCY			8	3
	RADIOLOGIST/HEALTH PHYSICS			2	-
	TOTAL			40	25

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001229

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6344

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE - UCC NIAGARA (ALTERNATIVE 3)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Concrete Pad - 60 cy.	-	30	30	-
103	Fence 6 ft. - 200 ft.	-	4	4	-
	TOTAL		44	34	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	-
	TOTAL DIRECTS		77	57	20
	ENGINEERING			9	6
	CONTINGENCY			10	2
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			14	2
	TOTAL			90	30

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001230

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6345

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND BURY - UCC NIAGARA (ALTERNATIVE 4)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Clay Lined Pit w/Drain System 40 ft.^{2} x 5 ft.	-	15	15	-
103	Clay Cap	-	15	15	-
	TOTAL		40	30	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation	-	1	-	1
302	Burial Fee (200 ft.^{3})	1	8	-	9
	TOTAL	1	9		10
	TOTAL DIRECTS	1	82	53	30
	ENGINEERING			8	8
	CONTINGENCY			15	5
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	SITE SELECTION			35	
	TOTAL			125	50

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001231

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6346

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND SHIP TO BARNWELL, SC (ALTERNATIVE 5)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove Soil 7000 ft.^{3} (haul)	-	5	-	5
102	Containers (80 boxes - 100 ft.^{3})	20	-	-	20
103	Loading Trucks (incl. Pallets, etc.)	5	4	-	9
	TOTAL	25	9		34
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation 1000_3$ (10 loads)	-	10	-	10
302	Burial Fee (8000 ft.^{3} incl Container)	-	160	-	160
	TOTAL		170		170
	TOTAL DIRECTS	25	212	23	214
	ENGINEERING			5	28
	CONTINGENCY			3	46
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	TOTAL			45	290

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001232

CALCULATIONS

New York State regulations require that access be restricted to areas where the source material exceeds 500 ppm. For the purpose of comparison with NRC regulations a Thorium/Uranium ratio of 2:1 is assumed.

Therefore, the maximum activities for unrestricted access are:

NYS maximum Thorium activity equals:

$$330 \text{ parts/million} \times 1.09 \times 10^5 \text{ pCi/gm} = 36 \text{ pCi/gm}$$

NYS maximum Uranium activity equals:

$$170 \text{ parts/million} \times 3.33 \times 10^5 \text{ pCi/gm} = 57 \text{ pCi/gm}$$

UCCNHT0001233

The Assistant Secretary finds that good cause exists for not publishing the supplement to the Puerto Rico State Plan as a proposed change and making the Regional Administrator's approval effective upon publication for the following reasons:

1. The standards are identical to the Federal standards which were promulgated in accordance with Federal law meeting requirements for public participation.

2. The standards were adopted in accordance with the procedural requirement of State Law and further participation would be unnecessary.

The decision is effective October 23, 1981.

(Sec. 18 Pub. L. 91-596, 84 Stat. 1608 (29 U.S.C. 667))

Signed at New York City, New York, this 15th day of June 1981.

Roger A. Clark,

Regional Administrator.

[FR Doc. 81-30745 Filed 10-22-81 8:45 am]

BILLING CODE 4510-26-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards, Subcommittee on Callaway Plant; Location Change

The ACRS Subcommittee on Callaway Plant will hold a meeting on November 4 and 5, 1981, at the HOLIDAY INN-WEST, 1900 I-70 Drive Southwest, Columbia, MO instead of the Hilton Inn.

Notice of this meeting was published in the Federal Register on October 19, 1981 (46 FR 51329), and all other items remain the same except for the location change as indicated above.

Dated: October 19, 1981.

John C. Hoyle,

Advisory Committee, Management Officer.

[FR Doc. 81-30733 Filed 10-22-81 8:45 am]

BILLING CODE 7590-01-M

Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Discussion of options for NRC approval of applications for disposal or onsite storage of thorium or uranium wastes; interim use and public comment.

SUMMARY: This notice discusses five options for NRC approval of disposal or onsite storage or thorium or uranium wastes from past nuclear operations. The options are contained in a Branch Technical Position for administration by the Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

DATES: Comments on the options for disposal or onsite storage of thorium or uranium are encouraged. Such comments will be considered in any subsequent revision of the Branch Technical Position. Comments are due December 22, 1981.

Note.—Comments received after the expiration date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments filed on or before that date.

FOR FURTHER INFORMATION CONTACT: Ralph G. Page, Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, telephone 301-427-4309.

SUPPLEMENTARY INFORMATION:

I. Introduction

Some of the sites formerly used for processing thorium and uranium are known today to be contaminated with residual radioactive materials. Some are currently covered by NRC licenses. Others were once licensed, but the licenses to possess and use material have expired. In many cases, the total amount of contaminated soil is large, but the activity concentrations of radioactive materials are believed sufficiently low to justify their disposal on privately owned lands or storage onsite rather than their transport to a licensed radioactive materials disposal (commercial) site. In many instances packaging and transporting these wastes to a licensed disposal site would be too costly and not justified from the standpoints of risk to the public health or cost-benefit. Furthermore, because of the total volume of these wastes, limited commercial waste disposal capacity, and restrictions placed on receipt of long-lived wastes at commercial sites, it is not presently feasible to dispose of these wastes at commercial low-level waste disposal sites.

Effective January 28, 1981, NRC regulations in 10 CFR 20, "Standards for Protection Against Radiation", were amended (45 FR 71761-71762) to delete § 20.304 which provided general authority for disposal of radioactive materials by burial in soil. Under the amended regulations, licensees must apply for and obtain specific NRC approval to dispose of radioactive materials in this manner under the provisions of 10 CFR 20.302. A case-by-case review was believed needed to assure that burial of radioactive wastes would not present an unreasonable health hazard at some future date.

The deleted provisions of § 20.304 previously permitted burial of up to 100 millicuries of thorium or natural uranium at any one time, with a yearly limitation of 12 burials for each type of material at each site. The only disposal standards specified were (1) burial at a minimum depth of four feet, and (2) successive burials separated by at least six feet. Thus a total of 1.2 curies of these materials were permitted to be disposed of each year by burial in a 12 foot by 18 foot or larger plot of ground.

Under the amended regulations, it is incumbent on an applicant who wants to bury radioactive wastes to demonstrate that local land burial is preferable to other disposal alternatives. The evaluation of the application takes into account the following information:

Types and quantities of material to be buried
Packaging of waste
Burial location
Characteristics of burial site
Depth of burial
Access restrictions to disposal site
Radiation safety procedures during disposal operations
Recordkeeping
Local burial restrictions, if any

For applications involving disposal of soils contaminated with low level concentrations of thorium and uranium (other than concentrations not exceeding EPA cleanup standards), the matters of principal importance are:

Concentrations of thorium and uranium (either in secular equilibrium with their daughters or without daughters present)
Volume of contaminated soil
Costs for offsite and onsite disposal
Availability of offsite burial space
Disposal site characteristics
Depth of burial and accessibility of buried wastes
State and local government views

II. Branch Technical Position

There are five acceptable options for disposal or onsite storage of thorium and uranium contaminated wastes. Applications for disposal or storage will be approved if the guidelines discussed under any option are met. Applications for other methods of disposal may be submitted and these will be evaluated on their own merits.

1. Disposal of acceptably low concentrations (which meet EPA cleanup standards) of natural thorium with daughters in secular equilibrium, depleted or enriched uranium, and

UCCNHT0001234

uranium ores with daughters in secular equilibrium with no restriction on burial method.

er this option, the concentrations of natural thorium and depleted or enriched uranium wastes are set sufficiently low that no member of the public is expected to receive a radiation dose commitment from the disposed materials in excess of 1 millirad per year to the lung or 3 millirads per year to the bone from inhalation and ingestion, under any foreseeable use of the material or property. These radiation dose guidelines were recommened by the Environmental Protection Agency (EPA) for protection against transuranium elements present in the environment as a result of unplanned contamination (42 FR 60956–60959). In addition, the concentrations are sufficiently low so that no individual may receive an external dose in excess of 10 microroentgens per hour above background. This is compatible with guidelines EPA proposed as cleanup standards for inactive uranium processing sites (46 FR 2556–2563).

For natural uranium ores having daughters in equilibrium, the concentration limit is equal to that set by the EPA (46 FR 2556–2563) for radium-226 (i.e., 5 pCi/gm, including background) and its decay products.

concentrations specified below are believed appropriate to apply. It is expected, however, that currently licensed operations will be conducted in such a manner as to minimize the possibility of soil contamination and when such occurs the contamination will be reduced to levels as low as reasonably achievable.

Kind of material	Concentration (pCi/gm)
Natural thorium (Th-232 plus Th-228) if all daughters are present and in equilibrium	10
Depleted Uranium	35
Enriched Uranium	30
Natural Uranium Ores (U-238 plus U-234) if all daughters are present and in equilibrium	10

The analysis upon which the Branch Technical Position is based is available for inspection at the Commission's Public Document Room at 1717 H St., N.W., Washington, D.C.

The concentrations specified under this option may be compared with naturally occurring thorium and uranium ore concentrations of 1.3 pCi/gm in igneous rock and uranium cc ntrations of 120 pCi/gm in Florida phosphate rock and 50–80 pCi/gm in Tennessee bituminous shale. Concentration limits for natural thorium and natural uranium ore wastes containing daughters not at secular equilibrium can be calculated on a case-by-case basis using the applicable isotopic activities data.

2. Disposal of certain low concentrations of natural thorium with daughters in secular equilibrium and depleted or enriched uranium with no daughters present when buried under prescribed conditions with no subsequent land use restrictions and no continuing NRC licensing of the material.

Under this option the concentrations of natural thorium and uranium are set sufficiently low so that no member of the public will receive a radiation dose exceeding those discussed under option 1 when the wastes are buried in an approved manner absent intrusion into the burial grounds. This option will require establishing prescribed conditions for disposal in the license, such as depth and distribution of material, to minimize the likelihood of intrusion. Burial will be permitted only if it can be demonstrated that the buried materials will be stabilized in place and not be transported away from the site.

Acceptability of the site for disposal will depend on topographical, geological, hydrological and meteorological characteristics of the site. At a minimum, burial depth will be at least four feet below the surface. In the event that there is an intrusion into the burial ground, no member of the public will likely receive a dose in excess fo 170 millirems to a critical organ. An average dose not exceeding 170 millirems to the whole body for all members of a general population is recommended by international and national radiation expert bodies to limit population doses. With respect to limiting doses to individual body organs, the concentrations are sufficiently low that no individual will receive a dose in excess of 170 millirems to any organ from exposure to natural thorium, depleted uranium or enriched uranium.

The average activity concentration of radioactive material that may be buried under this option in the case of natural thorium (Th-232 plus Th-228) is 50 pCi/gm, if all daughters are present and in equilibrium; for enriched uranium it is 100 pCi/gm if the uranium is soluble and 250 pCi/gm if insoluble; for depleted uranium it is 100 pCi/gm if the uranium is soluble and 300 pCi/gm if insoluble. Natural uranium ores containing radium 226 and its daughters are not included under this option, because of possible radon 222 emanations and resultant higher than acceptable exposure of individuals in private residences if houses were built over buried materials.

3. Disposal of low concentrations of natural uranium ores, with all daughters in equilibrium, when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the specified land contains buried radioactive materials and are conditioned in a manner acceptable under state law to impose a covenant running with the land that the specified land may not be used for residential building. (There is no continuing NRC licensing of the material.)

Disposal will be approved if the burial criteria outlined in option 2 (including burial at a minimum of 4 feet) are met. Depending upon local soil characteristics, burials at depths greater than 4 feet may be required. In order to assure protection against radon 222 releases (daughter in decay chain of uranium 238 and uranium 234), it is necessary that the recorded title documents be amended to state in the permanent land records that no residential building should be permitted over specified areas of land where natural uranium ore residues (U-238 plus U-234) in concentrations exceeding 10 pCi/gm has been buried. Industrial building is acceptable so long as the concentration of buried material does not exceed 40 pCi/gm of uranium (i.e., Ra-226 shall not exceed 20 pCi/gm).

4. Disposal of land-use-limited concentrations of natural thorium or natural uranium with daughters in secular equilibrium and depleted or enriched uranium without daughters present when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the land contains buried radioactive material and are conditioned in a manner acceptable under state law to impose a covenant running with land that the land (1) may not be excavated below stated depths in specified areas of land unless cleared by appropriate health authorities, (2) may not be used for residential or industrial structures over specified areas where radioactive materials in concentrations higher than specified in options 2 and 3 are buried, and (3) may not be used for agricultural purposes in the specified areas. (There is no continuing NRC licensing of the disposal site.)

Under this option, conditions of burial will be such that no member of the public will receive radiation doses in excess of those discussed under option 1 absent intrusion into the burial ground. Criteria for disposal under these conditions is predicated upon the assumption that intentional intrusion is less likely to occur if a warning is given

UCCNHT0001235

in land documents of record not to excavate below burial depths in specified areas of land without clearance by health authorities; not to construct residential or industrial building on the site; and not to use specified areas of land for agricultural purposes. Because of this, we believe it appropriate to apply a maximum critical organ exposure limit of 500 millirems per year to thorium and uranium buried under this restriction instead of 170 millirems as used in options 2 and 3. In addition, any exposure to such materials is likely to be more transient than assumed (essentially continual exposure) under those options. These two factors combine to increase the activity concentration limits calculated under option 2 by about 10. Thus, the average concentration that may be buried under this option for thorium (Th-232 plus Th-228) is 500 pCi/gm if all daughters are present and in equilibrium, for enriched uranium it is 1000 pCi/gm if the uranium is soluble and 2500 pCi/gm if insoluble, and for depleted uranium it is 1000 pCi/gm if the uranium is soluble and 3000 pCi/gm if insoluble.

With respect to natural uranium with daughters present and in equilibrium, the concentration that may be buried under this option is: 200 pCi/gm of U-238 plus U-234, i.e., 100 pCi/gm Ra-226. This concentration is based on a limited exposure of 2.4 hours per day to limit the radon dose to less than 0.5 working level month (WLM) which is equivalent to continuous exposure to 0.02 working level (WL). Depending upon local soil characteristics, burials at depths greater than 4 feet may be required.

SUMMARY OF MAXIMUM CONCENTRATIONS PERMITTED UNDER DISPOSAL OPTIONS

Kind of Material	Disposal Options			
	1[1]	2[2]	3[3]	4[4]
Natural Thorium (Th-232 + Th-228) with daughters present and in equilibrium	10	50	—	500
Natural Uranium (U-238 + U-234) with daughters present and in equilibrium	10	—	40	200
Depleted Uranium:				
*Soluble	35	100	—	1,000
*Insoluble	35	300	—	3,000
Enriched Uranium:				
*Soluble	30	100	—	1,000
*Insoluble	30	250	—	2,500

[1] Based on EPA cleanup standards.
[2] Concentrations based on limiting individual doses to 170 mrem/yr.
[3] Concentration based on limiting equivalent exposure to 0.02 working level or less.
[4] Concentrations based on limiting individual doses to 500 mrem/yr and in case of natural uranium, limiting exposure to 0.02 working level or less.

5. Storage of licensed concentrations of thorium and uranium onsite pending the availability of an appropriate disposal site.

When concentrations exceed those specified in option 4, long term disposal other than at a licensed disposal site will not normally be a viable option under the provisions of 10 CFR 20.302. In such cases, the thorium and uranium may be permitted to be stored onsite under an NRC license until a suitable method of disposal is found. License conditions will require that radiation doses not exceed those specified in 10 CFR Part 20 and be maintained as low as reasonably achievable.

Before approving an application to dispose of thorium or uranium under options 2, 3, or 4, NRC will solicit the view of appropriate State health officials within the State in which the disposal would be made.

Dated at Silver Spring, Maryland this 19th day of October, 1981.

Richard E. Cunningham,

Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards

[FR Doc. 81-30908 Filed 10-22-81 8:45 am]

BILLING CODE 7590-01-M

OFFICE OF PERSONNEL MANAGEMENT

Postponement of Application Deadline for Fund-Raising Privileges Among Federal Employees by Private Voluntary Organizations

Section 5.43 of the "Manual on Fund-Raising Within the Federal Service for Voluntary Health and Welfare Agencies" sets December 1 of each year as the deadline by which national voluntary agencies must submit applications for participation in the Combined Federal Campaign (CFC) to be conducted in the fall of the following year. This year's deadline is being postponed from December 1, 1981, to February 1, 1982. In June 1981, the U.S. Office of Personnel Management (OPM) announced that the eligibility criteria for participation in the 1982-83 CFC are being reviewed. The deadline date is being postponed to avoid national voluntary agencies having to revise their applications to meet eligibility criteria which may be changed.

Donald J. Devine,

Director.

[FR Doc. 81-30730 Filed 10-22-81 8:45 am]

BILLING CODE 8325-01-M

OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

Resolution of Complaint of Price-Undercutting of Subsidized Cheese Imports

On October 1, 1981, the United States Trade Representative received a letter from the Secretary of Agriculture informing him of the Secretary's finding that imported Grade A Swiss type cheese produced in Finland has been offered for sale in the United States at duty-paid wholesale prices which are five cents per pound less than the domestic wholesale market price of similar cheese produced in the United States.

In accordance with Section 702(c)(2) of the Trade Agreements Act of 1979 (the Act) (19 U.S.C. 1202 note), the Office of the United States Trade Representative notified Finland of the price undercutting determination made by the Secretary of Agriculture, requested that corrective action be taken, and asked for appropriate assurances concerning the commitments made in the Arrangement Between the United States and Finland Concerning Cheese.

On October 14, 1981, Finland notified the United States Trade Representative that measures have been taken to ensure that the duty-paid wholesale price of imported Grade A Swiss type cheese produced in Finland will not be less than the domestic wholesale market price of similar cheese produced in the United States. In addition, Finland gave assurance that it will respect the price commitments in the Arrangement. Since the above notification by Finland has occurred within the 15-day period provided in Section 702(c)(3) of the Act, the United States Trade Representative has notified the Secretary of Agriculture of his belief that no further action is required.

William E. Brock,

United States Trade Representative

[FR Doc. 81-30804 Filed 10-22-81 8:45 am]

BILLING CODE 3190-01-M

SECURITIES AND EXCHANGE COMMISSION

[Release No. 22236; 70-6650]

Arkansas Power & Light Co.; Proposed Issuance and Sale of First Mortgage Bonds

October 19, 1981.

Arkansas Power & Light Company

UCCNHT0001236

TABLE III

SAMPLE NO.	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm DEPTH IN INCHES									GAMMA X BKg SURFACE
	0	3	6	9	12	15	21	24	26	
1	14/40									9
2	11/19									6
3	26/61									12
4	26/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/<1		<3/2					33
14		57/164		<7/<8		<7/3	7/2		3/3	26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm (See report for calc.)
THORIUM 37 pCi/gm

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

UCCNHT0001237

FIGURE 1

UCCNHT0001238

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

To (Name) Mr. P. K. Willmott
Umetco Minerals Corporation
Division Section P2615
Danbury, CT
Location
Area

Date January 14, 1987
Originating Dept
Area
Answering Letter Date
Subject Niagara Environmental

Copy to Messrs
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch

Dear Paul·

I am enclosing the signed second copy of the letter which acknowledges that U. S. Vanadium has accepted as satisfactorily completed Item 3(g) of the Environmental Agreement (Niagara Falls) dated May 13, 1986 between Umetco Minerals and Strategic Minerals Corporation. I have kept a copy for my files here at Niagara.

They are sitting on the write-off on Asbestos - primarily I think - because they do not understand the significance of the 0.01 (f/cc) limit suggested by EPA as a guide to levels that should be achieved after asbestos removal. I will try to straighten them out.

I have also written sign-off letters on the PCB's and Halide Scrubber-, you ~~should have~~ received copies.

My role here is just about complete. If you like, I can write a summary of what has been done on the Environmental Issues.

Meanwhile, take care and accept my congratulations on your promotion.

Regards,

D. J. Hansen

/mau
Enclosure

UCCNHT0001239

Umetco Minerals Corporation

PO BOX 66 137 47th STREET • NIAGARA FALLS, NEW YORK 14302

November 26, 1986

RECEIVED
DEC 8 1986
[redacted]

Mr. C. T. Wentzel
U. S. Vanadium Corporation
P. O. Box 66
Niagara Falls, NY 14302

Subject: Disposal of Sample Cans

Dear Craig:

The last of the metallurgical samples stored in the Globar area that dated back as far as 1902 were removed from the Niagara Plant on November 24, 1986 by SCA Chemical Services. A copy of the Hazardous Waste Manifest is appended. An earlier shipment of non-hazardous samples were removed by BFI Waste Systems on October 10, 1986 (manifest appended). Radioactive samples were included in a shipment to Barnwell Waste Management Facility, South Carolina September 19, 1986.

On Wednesday, November 26, 1986, Al Gonas and I accompanied Mr. Herb Wilber to inspect the area in Globar where the samples has been stored. A radioactive survey was made at that time to confirm that no traces of the radioactive samples had been left on the shelves or in the storage containers. A copy of the letter from Herb Wilber to you attesting to the satisfactory completion of the sample cans removal is also appended.

This completes the obligation of Umetco Minerals to Stratcor Minerals Corporation as outlined in Item 3 (g) of the Environmental Agreement (Niagara Falls) between Umetco Minerals Corporation and U. S. Vanadium Corporation which reads:

> "(g) Sample Cans Umetco further agrees to assume the cost of removal and disposal of the numerous small sample cans in the globar area."

UCCNHT0001240

Would you and Dr. Miller, as members of the Stratcor Environmental Coordination Committee for the Niagara Plant, acknowledge acceptance by signing the second copy of this letter and returning it to me.

Very truly yours,

Donald J. Hansen

ACCEPTED BY

U. S. VANADIUM

By. C. T. Wentzel

Title. Gen Mgr - US Vanadium Niagara Plant

By: Richard L Miller

Title: Director Community Health & Safety

cc: Messrs:
W. G. Beattie
J. F. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller

UCCNHT0001241

48-14-1 (4/85)

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HAZARDOUS WASTE MANIFEST

2 copies

P.O Box 12820, Albany, New York 12212

Please print or type

Form Approved. OMB No 2000-0404 Expires 7-31-86

LJH

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA No: NYD094171154 | Manifest Document No:

2 Page 1 of 1

Information in the shaded areas is not required by Federal Law

3 Generator's Name and Mailing Address: UMETCO MINERALS CORP 137-47TH ST NIAGARA FALLS, N.Y. 14302

4 Generator's Phone: (716) 286-4028

5 Transporter 1 (Company Name): CHEMICAL WASTE MANAGEMENT

6 US EPA ID Number: ILD000806604

7 Transporter 2 (Company Name):

8 US EPA ID Number:

9 Designated Facility Name and Site Address: SCA CHEMICAL SERVICES 1550 BALMER RD MODEL CITY, N.Y., 14107

10 US EPA ID Number: NYD049836679

11 US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12 Containers No.	Type	13 Total Quantity	14 Unit Wt/Vol
a. HAZARDOUS WASTE SOLID NOS, ORM E NA 9189	010	OM	9000	P
b. HAZARDOUS WASTE SOLID NOS, ORM E NA 9189	002	OM	800	P
c				
d				

15 Special Handling Instructions and Additional Information

a.) (60770d)

b. (60770[illegible])

16 GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

Unless I am a small quantity generator who has been exempted by statute or regulation from the duty to make a waste minimization certification under Section 3002 (b) of RCRA, I also certify that I have a program in place to reduce volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the method of treatment, storage or disposal currently available to me which minimizes the present and future threat to human health and the environment.

Printed/Typed Name: Albert M Gowas | Signature: [signature] | Mo Day Year: [illegible]

17 Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name: PAT HOGAN | Signature: Pat Hogan | Mo Day Year: [illegible]

18 Transporter 2 (Acknowledgement of Receipt of Materials)

Printed/Typed Name: | Signature: | Mo Day Year:

19 Discrepancy Indication Space

20 Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19

Printed/Typed Name: | Signature: | Mo Day Year:

GENERATOR

TRANSPORTER

FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N Y Department of Transportation (518) 457 7362.

NYA 410922 0

EPA Form 8700-22 (Rev 4-85) Previous edition is obsolete. Copy 8—Generator—retained by generator

UCCNHT0001242

SCA CHEMICAL SERVICES, INC.
P.O Box 200, 1550 Balmer Road
Model City, New York 14107

WORK ORDER #	
DATE	11/27/[illegible]
TRACTOR	TRAILER

PICK UP

SHIPPER
NAME: Umetco
STREET: 137 17th St
CITY: [illegible] STATE: NY ZIP CODE: [illegible]
CONTACT NAME:
SCHEDULED TIME:
ADDITIONAL INFORMATION:

DELIVERY

CONSIGNEE
NAME: SCA Chemical Services
STREET: 1550 Balmer Rd
CITY: [illegible] STATE: ZIP CODE:
CONTACT NAME:
SCHEDULED TIME:
ADDITIONAL INFORMATION:

PRODUCT CODE	MATERIAL DESCRIPTION	QUANTITY
607702	Metal oxides	10 dr
607703	pic	2 dr

GROSS
TARE
NET

FLAMMABILITY
HEALTH
REACTIVITY
WATER

SHIPPERS RECOMMENDED PLACARD (CIRCLE)
NON-FLAMMABLE
FLAMMABLE SOLID ☐ LIQUID ☐
CORROSIVE
POISON
DRIVE SAFELY
PCB
DANGEROUS
OTHER

PICK UP

ARRIVAL TIME _____ AM PM RELEASE TIME _____ AM PM

TRAILER EMPTY UPON ARRIVAL (If not, explain below) ☐ YES ☐ NO

DIP MEASUREMENT (Tankers Only) _____ INCHES

COMMENTS (EXPLAIN ALL DELAYS) _____

I, THE UNDERSIGNED, CERTIFY THAT THE ABOVE INFORMATION IS TRUE AND COMPLETE.

X _____
DRIVER'S SIGNATURE

X _____
SHIPPER'S SIGNATURE FRM

DELIVERY

DRIVER _____ DATE _____

ARRIVAL TIME _____ AM PM RELEASE TIME _____ AM PM

TRAILER EMPTY UPON DEPARTURE (If not, explain below) ☐ YES ☐ NO

COMMENTS (EXPLAIN ALL DELAYS) _____

I, THE UNDERSIGNED, CERTIFY THAT THE ABOVE INFORMATION IS TRUE AND COMPLETE.

X _____
DRIVER'S SIGNATURE

X _____
CONSIGNEE'S SIGNATURE FRM

UCCNHT0001243

BFI Waste Systems™
BROWNING FERRIS INDUSTRIES

NON-HAZARDOUS WASTE MANIFEST

Full Sample Cans re: Get Parker

GENERATOR

Generator Name: Umetco Minerals
Address: P.O. Box 1629
Grand Junction CO 81502
Phone No: ___-_____

Shipping Location: Umetco Minerals
Address: 47th & Royal
Niagara Falls NY
Phone No: 716-2783214

BFI Lab Number	Description of Waste	Quantity	Units	Containers No	Containers Type
26661	Non haz. core samples	30	Y	1	[illegible]

Codes
D - Drum
C - Carton
B - Bag
T - Truck
P - Pounds
Y - Yards
O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260 10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations

Generator Authorized Agent Name: [illegible] Signature: [illegible] Shipment Date: _____

TRANSPORTER

Transporter Name: Niagara Sanitation Inc
Address: PO Box 571
Kenmore NY 14072

Driver Name (Print): Anthony G Beck
Vehicle License No /State: 43411 GK N.Y.
Vehicle Certification: 9A065

I hereby certify that the above named material was picked up at the generator site listed above

Driver Signature: _____ Shipment Date: _____

I hereby certify that the above named material was delivered without incident to the destination listed below

Driver Signature: _____ Delivery Date: _____

DESTINATION

Site Name: Nemco Landfill Inc.
Phone No: 716-2828692
Address: 56th & Pine Ave Niagara Falls NY

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

Name of Authorized Agent: _____ Signature: _____ Receipt Date: _____

2-84 BFI260 720

GENERATOR RETAIN

UCCNHT0001244

WORK ORDER NO. 111409

Landburial Ban
WASTE CERTIFICATION FORM

CWM-WASTE CODE. G07702

(To be attached to the Manifest Form for first time shipments, annually, when the waste stream composition changes, or when otherwise required by NYSDEC)

Part A (General)

1. Describe the process producing the waste (including the representative SIC code).

MANUFACTURING OF METAL ALLOYS
METAL ORES

2. Is this material a "one time" shipment or a continuing waste stream? ONE TIME

3. Is this material from an inactive hazardous waste site or spill cleanup? NO

4. a. Does this waste contain organic chemicals? NO

   b. If so, does this waste contain:

   1. aromatics? NO
   2. halogenated organics? NO
   3. nitrogenated organics? NO
   4. low molecular weight organics? NO

5. Does this stream contain any organic materials listed in 6NYCRR 366.4(d)(5) and 366.4(d)(6) (P-list or U-list)? If so, list them: NO

If any of the answers to question 4 or 5 were yes or unknown, complete Part B of this certification for those classes of materials which are known or suspected to be in the waste. If you answered no to all of these questions; please sign the following certification:

BASED ON MY KNOWLEDGE OF THE PROCESS AND CHEMICALS USED IN GENERATING THE WASTE, I CERTIFY THAT THESE WASTES QUALIFY FOR LANDBURIAL UNDER THE NEW YORK STATE LANDBURIAL BAN AS DESCRIBED ON THIS FORM. I FURTHER CERTIFY THAT I WILL RESUBMIT THIS FORM IF THE WASTE STREAM COMPOSITION CHANGES IN A WAY WHICH MIGHT INCREASE THE CONCENTRATIONS OF ORGANIC CHEMICALS IN THE WASTE STREAM.

IT IS A CRIME, PUNISHABLE AS A CLASS A MISDEMEANOR UNDER THE LAWS OF THE STATE OF NEW YORK, FOR A PERSON, IN AND BY A WRITTEN INSTRUMENT, TO KNOWINGLY MAKE A FALSE STATEMENT, OR TO MAKE A STATEMENT WHICH SUCH PERSON DOES NOT BELIEVE TO BE TRUE.

Name. Albert M Gonas (Please type or print) Signature. Albert M Gonas

Title: Tech Date 11/25/86

Firm. Umatco Minerals Corp

Address. 137-47th St. Niagara Falls N.Y.

UCCNHT0001245

STRATCOR
Internal Correspondence

P. O. Box 66
Niagara Falls, NY 14302

November 26, 1986

TO: C. T. Wentzel

COPY: D. J. Hansen

SUBJECT: Sample Cage

The sample cage is clean and all samples have been removed. This area is also clean of radioactivity. Numerous sample jars have been left for J. Cooper. These jars are physically clean, but haven't been rinsed. As far as I'm concerned, Umetco has fulfilled their clean-up requirements.

H. M. Wilber

HMW:lp

UCCNHT0001246

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr. Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No. 950-0139

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site. We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed.

The location of the radioactivity and the levels of radiation observed are shown in Table I.

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce. Rm.)	5-10 µR/hr		
	- I-beam south of 30 Fce.		200 µR/hr.	20
	- Trunion support north of 30 Fce.		420 µR/hr.	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr		
	- Area below dust collector		170 µR/hr	15
2/20/86	Yard East of #6 Fce. Rm.	8-12 µR/hr.		
	- 6' x 6' Areas near slag pile		200 µR/hr	20
2/20/86	Yard East of #6 Fce. Rm			
	- 2' x 2' area near Bldg 191		210 µR/hr.	20

UCCNHT0001247

The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers.

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No. 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24.

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority.

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above.

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
Tisch
Wentzel

UCCNHT0001248

UMETCO MINERALS CORPORATION
Internal Correspondence

39 Old Ridgebury Road
Danbury, CT 06817

July 7, 1986

JUL 11 1986

To: Messrs.
R. G. Tisch
L. E. Barron

cc: J. F. Frost
D. J. Hansen
F. V McMillen (w/o attach.)

Re: Niagara Falls
Environmental Issues

Gentlemen:

Richard spoke to me regarding Umetco's action plan to address the environmental issues at Niagara Falls identified in the corporate audit. I indicated there is no official detailed action plan but that we are addressing the issues as covered under the Stratcor environmental agreement. I have attached a copy of Schedule A of that agreement as well as numerous memos and reports addressing the various issues. We plan to have a written agreement with Stratcor when each item on Schedule A is complete.

Briefly, the status of the items on Schedule A is as follows:

A. All PCB replacement, retrofitting or disposal etc., has been completed and we are awaiting completion of the three month power test to totally complete this item.

B. The scrubber is complete, has been tested and operated well. A minor modification to a fume hood is needed to totally complete this item and should be done shortly.

C. Complete and acknowledged by Stratcor.

D. Quotes are being obtained for removal of this asbestos as well as asbestos in Bldg. 111, the Niacet boilers and associated piping (Bldg. 4A) and some incidental asbestos in storage. It is expected to let a contract (+ $50M) for that work in 2 or 3 weeks.

E. Complete and acknowledged by Stratcor.

F. More than 50% complete and should be totally complete within one month.

UCCNHT0001249

G. Has been tested as non-hazardous and currently being disposed of in local landfill.

H. Yard has been tested and found to have no hazardous waste and a radioactive survey has been completed and any radioactive material removed.

I. Lake is drained and is currently being filled and graded by El-Tech and Umetco. Should be completed within one month.

J. All radioactive areas have been cleared and cleanup material is being disposed of through appropriate channels and at approved disposal sites. This entire activity including H above has been coordinated with and approved by N.Y. State, with the objective of terminating all radioactive licenses at the old Umetco site. When that is completed will depend upon the states' schedule.

If you have any questions about the attachments or other issues please contact me. We will forward copies of the completion acknowledgements with Stratcor for all Schedule A items when they are completed.

Very truly yours,

D. G. Millenbruch

DGM:er
0069e

UCCNHT0001250

Schedule A

Niagara Falls, New York

Description of the Work

Work to be Done	Estimated Cost M$	Estimated Completion Date
A. Replace, retrofill or dispose of PCB containing transformers, capacitors and dispose of cleanup materials.	200-250	8/86
B. Complete halide scrubber.	100	8/86
C. Dispose of chrome oxide	8-10	6/86
D. Remove globar elevator asbestos.	12-15	8/86
E. Dispose of hi antimony tungsten.	15-25	10/86
F. Dispose of sample cans	15-25	10/86
G. Sample, test and dispose of, if necessary, supersucker dust.	5-75	10/86
H. Yard area sampling and cleanup, if necessary.	25- ? (big)	3/87
I. Drain and fill Lake Linde	25-50	12/86
J. Clean up radioactive areas of plant.	25-50	8/86

UCCNHT0001251

Umetco Minerals Corporation

PO BOX 579 4625 POYAL AVENUE • NIAGARA FALLS NEW YORK 14302

MAY 19 19[illegible]

May 12, 1986

Dr. F. J. Bradley
Principal Radiophysicist
New York State Department of Labor
Division of Safety and Health
Radiological Health Unit
One Main Street - Room 813
Brooklyn, NY 11201

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr Bradley

I have reviewed an April 9, 1986 letter from Mr Edward G DeLaney of the Office of Nuclear Energy in the Department of Energy advising me of Umetco's elimination from consideration for inclusion in the Formerly Utilized Site Remedial Action Program Mr DeLaney references surveys and a report, both prepared for the Niagara Falls site in 1980, and states that, among other things, concentrations of thorium and uranium were found in soils at the site

As you are aware, since 1982 we have been actively engaged in removing the residual radioactivity and to date have expended in excess of $500,000 In March of this year Mr. Robert Kelly of your department visited the site and obtained samples to verify that the cleanup was complete We understand, pending the results of these analyses, the area in question will be restored to unrestricted use and our Radioactive Material License will be terminated We wish to thank you for the assistance you have provided in this regard

Very truly yours,

George P. Parker

George P. Parker
Manager
Employee Relationship
Safety, Health and Environmental
Affairs

cc: Mr. R. F. Kelly, DOL
Mr. W Librizzi, USEPA
Mr D. G Millenbruch

Blind Copies:
Mr. R. G. Tisch
Mr. F. V. McMillen
Mr. C. T Wentzel
Mr. D. J. Hansen

UCCNHT0001252

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

MAY 19 1986

May 15, 1986

Dr. F. J. Bradley
Principle Radiophysicist
New York State Department of Labor
Room 813
One Main Street
Brooklyn, NY 11202

Subject Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr. Bradley·

In our phone conversation of Tuesday, May 13 we discussed disposal of two low level radioactive materials that were discovered in a radiation survey of the Umetco property in Niagara Falls, NY. The first was illmenite sand (an iron titanium ore) that had been used to backfill a 10' x 10' concrete pit The second was an isolated quantity of slag (calcium-aluminum oxide) from the furnacing of ferrovanadium The illmenite sand was removed from the pit and currently is contained in 125 (one hundred twenty-five) 55-gallon drums I would estimate total weight at approximately 40 to 50 tons. The slag is in lumps in a pile that I would estimate to contain 50 to 75 tons Analyses of the materials are presented in the following Table 1.

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

	Analyses				
	URANIUM SERIES			THORIUM SERIES	
Description	Uranium µg/g	Th-230 pCi/g	Ra-226 pCi/g	Th-232 pCi/g	Th-228 pCi/g
Illmenite Sand - Top of Pit	28 9	12±2	19±2	16±2	17±2
Illmenite Sand - 7' in Pit	44.3	22±2	31±3	37±2	39±3
Dark Slag-Yard East of Fce. Bldg.	20.2	299±7	4.4±1 1	16±2	4±9
Light Slag-Yard East of Fce. Bldg	18.6	466±9	7.0±1.4	37±3	14±2

Industrial Code Rule 38, Table 5 "Limits for Uncontrolled Areas" limits source material to 0.05 percent by weight (500 µg/g or 500 ppm). For Thorium 232 this converts to 55 pCi/g. The concentrations of Th-232 reported in picocurries in Table 1 were converted to µg/g and added to the weight of uranium to determine the total source material present. This is shown in Table 2.

UCCNHT0001253

The gamma radiation measured at the surface during excavation of the pit and within the slag pile is also reported in Table 2.

TABLE 2

Weight of Source Material

Sample	Uranium µg/g	Th-232 µg/g	Total Source Material µg/g	Gamma Radiation µR/hr*
Illmenite-Top of Pile	28.9	145.5	174.4	170
Illmenite-7' In Pit	44.3	336.4	380.7	150
Dark Slag	20 2	145 5	165 7	150
Light Slag	18.6	336.4	355.0	200

*Ludlum Model 19 Micro R Meter - Reading at Surface

As we discussed the total source material in both materials is less than 500 µg/g, the limit for uncontrolled areas and the radiation is less than 250 µR, the limit for fixed surface contamination.

Although technically the material was not sufficiently radioactive to be controlled you convinced me that it was not a good idea to use it to fill a low area in the yard. If this were done then a rider would have to be appended to the lease that would restrict future building. Since this is not an attractive option I propose to dispose of both the slag and illmenite in a local hazardous waste repository.

Unless I misunderstood, you did not voice an objection to this during our phone conversation. Therefore, I plan to immediately begin the paper work to initiate this course of action. However I will not remove anything from the property before June to allow you time to reconsider. I will not expect to hear from you unless you disapprove.

I enjoyed talking to you on Monday and I want to thank you again for the assistance you provided

Sincerely

Donald J. Hansen

D. J. Hansen
Assistant Director - Technology

cc: Messrs:
R. F. Kelly
R. G. Beverly
F. V. McMillen

Blind Copies Messrs:
J. F. Frost
T. J. Kagetsu
D. G Millenbruch
R. L. Miller
W. D. Smith
C. T. Wentzel

UCCNHT0001254

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

OCT 6 1986

To (Name) Mr. K. E. Forrest
Umetco Minerals Corporation
Division Grand Junction, CO

Location

Area

Copy to Mr. J. F. Frost

Date October 1, 1986

Originating Dept

Area

Answering Letter Date

Subject Dube Invoice
P. O. No. 250-07126

Dear Ken:

The enclosed invoice from Dube Construction Company is approved for payment. The work covers the backfilling around Furnace No. 30 where radioactive slag had been removed. Hopefully, this is the last time we will require Dube's services.

Regards,

Don

Donald J. Hansen

/mau
Enclosure

UCCNHT0001255

Dube Construction Co.

GENERAL CONTRACTORS AND BUILDERS

Paving - Black Top Driveways - Trenching - Building - Trucking

2267 LOCKPORT RD
SANBORN, N Y 14132

SANBORN 731-3635

Oct. 1986

Umetco Minerals Corp.
137 47th Street
Niagara Falls N. Y. 14302
Attn Mr. Donald Hansen
P.O. #250-07126

Job location:
#6 Furnace Room

9/12/86	Ticket #6325	
	Truck & driver 3 hrs. @ $32.00 per hr	$ 96.00
	Del. 10 tons of # 2 R.O.C. @ $4.75 per ton	$ 47.50
	Service truck	$ 20.00
	1 labor 3 hrs. @ $14.00 per hr	$ 42.00
	Small tools	N/C
		$ 215.50
	State tax (mat only)	$ 3.33
	Total due	$ 218.83
	Thank You!	

Approved for payment D.J. Hansen

TERMS 2% per month on unpaid balance

UCCNHT0001256

DUBE CONSTRUCTION CO

Truck – Back Hoe – Hylift Service

2267 Lockport Rd Sanborn, N Y 14132

Phones 731 3635 – 731 3616

Unetco - 9/12/86

Job Location: #6 Tuscarora Rd

	HOURS
TRUCK 1 TRUCK + DRIVER	3 hrs.
BACK HOE 10 Ton 5 Ton	
HYLIFT Service Truck + man 4½	3 hrs
Small tire	
TOTAL	

DESCRIPTION	LOADS
TOTAL	

DRIVER _____

6325

RECEIVED BY _____

UCCNHT0001257

D. G MILLENBRUCH—EXT 4538
DANBURY
H1378

5/13

+ return

Typo — in sections A + B where Don says we will use Cleanup + slag as fill — Don has now talked to Kelly's boss Mr Bradley + has agreed to dispose of material in a local hazardous waste disposal site — which I believe is better.

Don

ok FVO
5/15

UNION CARBIDE
OLD RIDGEBURY ROAD, DANBURY, CT 06817

Umetco Minerals Corporation

MAY 12 1986

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

May 9, 1986

Mr. Robert F. Kelly
Associate Radiophysicist
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Mr. Kelly:

Thank you for taking the time on Wednesday, May 7, 1986 to discuss with Bob Beverly and me our plans to complete the cleanup of radioactive material found in the Niagara Plant. After my letter of March 25 to you, we obtained samples of the areas in question and submitted these to EDA Instruments Inc. in Colorado for radiochemical analyses. That results shown in Table 1 were the basis for our discussion

I was concerned that we may have been misinterpreting Industrial Code Rule 38 but you kindly gave us a copy of an Inter-Office memo from Dr. Bradley to you dated March 26, 1982 which specified the limits for source material. This memo is appended.

Below I have summarized the topics we discussed and outlined the actions we plan to take.

A. Material from Pit in Building 24

A gamma radiation level of 170 µR/hr prompted us to remove the illmenite sand that had been used to backfill a 9'-6" x 10' concrete pit in Building 24. The pit was much deeper than anticipated and we filled one hundred twenty-five 55-gallon drums before reaching a depth of 9 feet. Subsequently when we received the results of the analyses (Samples 40-6 and 40-7) it was evident that the material contained less than 500 parts per million of combined uranium and thorium. This, coupled with a gamma radiation level well below 250 µR/hr, led to the conclusion that this material did not exceed the "Limits for Uncontrolled Areas" as specified in Table 5 of Code Rule 38. You concurred with this conclusion.

As we discussed, I plan to use this material as partial fill for a low area in the yard east of No. 6 Furnace Building. The pit will be backfilled with fresh soil or sand. However, as agreed, I will not proceed with this plan until after May 15 to allow you time to think more about it and possibly confer with Dr. Bradley.

UCCNHT0001259

B. Slag East of No. 6 Furnace Building

This is what you refer to as the "rock area" in your Investigative Report of March 26 (appended). Since that date we were able to move the slag pile and found that it was the slag itself and not the ground that was radioactive. As we discussed I was puzzled at the relatively high reading of Th-230 in Samples 40-3 and 40-4. Because the Th-230 is in the decay chain of U-238 I would have expected the uranium analyses to be appreciably higher. The explanation is probably that some uranium oxide impurity was inadvertently introduced to a few vanadium aluminum furnace heats and the uranium passed on to the metal and the thorium went with the slag.

As Bob Beverly discussed, although the Th-230 analyses were 299 and 466 ρCi/g, these represent very small quantities of the pure nuclide (1.53×10^{-8} and 2.39×10^{-8} grams of Th-230 per gram of slag). The calculations are included as Appendix 3

Again, since this material contains much less than .05% source material and the radiation is less than 250 μR/hr it need not be controlled. I also plan to dispose of it as fill in the yard east of Furnace Room 6.

C. Slag and Soil Contamination South of Furnace No 30

will ship to Barnwell

Sample 40-5 was taken from the slag that had been splattered south of Furnace No. 30. Years ago this furnace had been used to prepare ferrocolumbium. As can be seen, the uranium at 389 μg/g is approaching the 500 μg/g limit and the Th-232 at 241 pCi/g is well above the 55 ρCi/g limit. Seventeen (17) 55-gallon drums of material were removed from around the furnace. Samples 41-2 and 41-3 taken after the cleanup are well within the uncontrolled limits.

D. Sample from North of Furnace No. 30

As can be seen from the analyses of Sample 41-1 (Th-232 at 139 ρCi/g) the cleanup was not complete in this area. An additional three 55-gallon drums of material were removed and the gamma radiation dropped from 120 μR/hr to about about 35 to 40 μR/hr. I am convinced we have successfully reduced the radiation to limits for uncontrolled areas. I will defer backfilling until you, as a representative for the Department of Labor, take confirmation samples

I plan to immediately begin the paper work to secure space and a permit for burial, either at Barnwell, SC or Richland, WA. We will dispose of the material removed from the area surrounding Furnace No. 30 as well as the samples in cans that you refer to in your report of March 1986.

UCCNHT0001260

As you know, we are quite anxious to obtain the results of the wipe tests and soil samples taken on Elkem property that hopefully will allow termination of License 210-0090 and License 950-0139. I was pleased to hear that you will have them designated as top priority and will communicate the results to me as soon as you obtain them.

Again I want to thank you for a very pleasant and helpful meeting.

Very truly yours,

Donald J. Hansen

cc: Mr. R. G. Beverly
Mr. F. V. McMillen

mau/369h
Attachments

BLIND COPIES: Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch
R. L. Miller
W. D. Smith
C. T. Wentzel

UCCNHT0001261

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

Sample No.		Description	Analyses: URANIUM SERIES Uranium µg/g	Th-230 pCi/g	THORIUM SERIES Th-232 pCi/g	Th-228 pCi/g	Gamma Radiation µR/hr*
Book 2446		Code Rule 38 Limit	[500]	**	[55]	***	[250]
A	40-6	Bldg. 24 (VA1) Top of Pit	28.9	12±2	16±2	17±2	170
	40-7	Bldg. 24 7' Depth in Pit	44.3	22±2	37±2	39±3	150
B	40-3	Dark Slag-Yard East of Fce. Bldg.	20.2	299±7	16±2	40±9	150
	40-4	Light Slag-Yard East of Fce. Bldg.	18.6	466±9	37±3	14±2	200
C	40-5	Slag Before Digging South of Furnace 30	389	186±6	241±7	241±7	200-420
	41-2	Sample in Front of Fce. 30 After Cleanup	68.4	19±2	35±3	35±3	40
	41-3	Sample from Southwest of Furnace 30 After Cleanup	24.9	6.2±1.1 5.9±1.1	9.6±1.3 8.5±1.3	9.5±1.3 9.2±1.33	30
D	41-1	Sample from North Support of Fce. 30 After Cleanup	122	76±4	139±5	145±5	120
		Area of North Support of Fce. 30 After Second Cleanup	-	-	-	-	35-40

*Ludlum Model 19 Micro R Meter - Reading at surface of location where sample was taken.
**pCi/g equivalent to .05% (500 ppm) calculated to be 9.7×10^6
***pCi/g equivalent to .05% (500 ppm) calculated to be 4.1×10^{11}

UCCNHT0001262

APPENDIX 1

NEW YORK STATE DEPARTMENT OF LABOR

INTER-OFFICE MEMORANDUM

To R. Kelly Date March 26, 1982
Office RHU

From F.J. Bradley Office RHU

Subject Union Carbide/Niagara Falls

Based on your survey of December 1, 1981 and the attached results, issue supplemental Notice of Inspection Findings and include our survey results. Require clean up to Table 5 limits within a specified time span. Contact Radiation Safety Officer to arrive at mutually agreable clean up time schedule.

Union Carbide's internal memo dated October 31, 1981 confirms our results and that they are aware of their responsibilities. All we need now is a clean up schedule.

Code Rule 38, Table 5 limits are as follows:

U-nat: 200pCi, $\frac{\text{U-nat}}{\text{gram of soil}}$

Th-nat: 55 pCi, $\frac{\text{Th-nat}}{\text{gram of soil}}$

and external surface dose levels
250 $\frac{\mu R}{hr}$ on surface.

We need to rely on their results with mixed U/Th contamination. I circled soil contamination values above 200 pCi/g (assuming all U-nat).

F.J. Bradley, Ph.D.
Principal Radiophysicist

FJB:bd

UCCNHT0001263

APPENDIX 2

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING
65 COURT STREET
BUFFALO N Y 14202

RAMONA L GALLAGHER
Assistant Commissioner of Labor

INVESTIGATIVE REPORT

Umetco - 47th and Royal Avenues, Niagara Falls

Report prepared by Robert F. Kelly on 25 MAR 86.

Report reviewed by _____ on _____.

On 20 MAR 86 after obtaining soil samples on the Umetco property, Dr. Richard Hanson related to me possible "problem" areas when he performed an external radiation survey of the plant facilities a short time ago.

There are four possible problem areas; all seem minor since external readings almost at contact showed levels at about 3-5 times background.

These are described below:

A) "Rock area" outside Building 24 -- This area shows some potential for a bigger problem; rocks on frozen grounds showed the readings mentioned above. Warmer weather will let facility determine what is under these piles.

B) Number 6 Furnace Room in Building 77 - Area shows slight contamination; its mainly on surface and doesn't seem to be a big problem.

C) Building 24 -- dust near furnace. Again doesn't seem to be a big hazard.

D) Samples in cans -- Now located in caged area in Building 25, they will be shipped as radioactive waste.

As related to Dr. Hansen, samples are to be analyzed in all three areas listed above and results sent to the Department. If within the limits, the Department will resurvey premises to insure compliance with Coderule 38.

Robert Kelly
Associate Radiophysicist

UCCNHT0001264

APPENDIX 3

Conversion of ρCi to g

$$\text{Specific Activity} = \frac{1.13 \times 10^{13}}{TA} \quad \text{curries per gram of pure nuclide}$$

Where T = half life in seconds
A = mass number

For Th-230:

$T = 8.0 \times 10^4$ years $= 8.0 \times 10^4 \times 3.15 \times 10^7 = 2.52 \times 10^{12}$ seconds

$A = 230$

$$\text{Specific Activity per Gram of Th-230} = \frac{1.13 \times 10^{13}}{2.52 \times 10^{12} \times 230} = .0195 \text{ Ci}$$

$$= .0195 \times 10^{12} = 1.95 \times 10^{10} \text{ ρCi}$$

Sample 40-3 299 ρCi/g:

$$\frac{299 \text{ ρCi/g}}{1.95 \times 10^{10} \text{ ρCi/g Th-230}} = 1.53 \times 10^{-8} \text{g Th-230/g}$$

Sample 40-4 466 ρCi/g:

$$\frac{466 \text{ ρCi/g}}{1.95 \times 10^{10} \text{ ρCi/g Th-230}} = 2.39 \times 10^{-8} \text{g Th-230/g}$$

UCCNHT0001265

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, ets., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Divrsion of Licensing.

CAUTION

1. Portable survey instrments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away, work with your arms extended
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on 60 Co up to 40 mCi and 173 Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 c.c. of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results The certificate should be retained for review by the Texas State Compliance Division upon request.

The cost of this service is based on the number of kits returned for assay at any one time. The price for 1 to 5 kits is $9.00 each, this cost being possible by your remittance of payment with the leak test request, thereby eliminating billing cost. For larger quantities, a leak test price list is available upon request. Kits received that are not prepaid will cause a $25.00 billing fee to be charged to all customers unless previous arrangements have been made i.e. purchase orders and etc.

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CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all sources in excess of 1 mCi to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 cc of water, which renews its effectiveness for testing.

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1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
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3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Replace the source back into its shielded container.
5. Place the plastic envelope, along with the completed "Leak-Test Inventory and Report Form" in the supplied self-addressed envelope and mail to Todd Research & Technical Division.
6. Upon receipt of your completed data sheet and smears from your test kit, Todd Research & Technical Division will perform the necessary assay and evaluation and will issue a certification of the results. The certificate should be retained for review by your licensing authority upon request.

UCCNHT0001268

Send all "SIT-1" Kits to:

TODD RESEARCH & TECHNICAL DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION. Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp, Metals Div

Address P.O. Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Cs 137 ACTIVITY 50 mCi

IDENT./SERIAL NO. CS - 2243 (storage) LEAK TEST DATE 5/23/83

SMEAR TAKEN BY D R Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage under our Texas Radioactive Material License No. 11-871 (copy available upon request)

Our findings show the leakage to be

ALPHA	BETA-GAMMA
—	<.0005

uCi. (Wet)

Certified by C. E. Minton, Jr. Date 5/27/83

([redacted] Health Physics Representative)
SUNTRAC SERVICES, INC.

TSC-RT-36
Rev. 4
5/2/80

UCCNHT0001269

UMETCO MINERALS CORPORATION
Internal Correspondence

39 Old Ridgebury Road
Danbury, CT 06817

To: F. V.McMillen

Date: February 6, 1986

CC: H. K. Jackson
R. G. Tisch

Subject: Niagara Falls Environmental Status

Dear Frank:

On February 4th I met at Niagara Falls with Rich Miller, Craig Wentzel and his staff and reviewed the environmental areas of concern vis-a-vis the SAC/Umetco divestiture. Although the letter agreement of December 23rd with SAC does not stipulate what the arrangements might be with regard to current environmental problems, I took the approach, just as in Arkansas, that Umetco has agreed in principle to accept the liability for all environmental situations that it has created.

I will list the various areas of environmental concern and review our discussions and my thoughts:

1. The most immediate environmental concern is PCB that exists in various transformers and capacitors throughout the facility. For your information Frank, the regulations stipulate that any electrical equipment which contains oils that contain less than 50 parts per million PCBs are categorized as non-PCB equipment. Those that contain 50 to 500 ppm are referred to as PCB Contaminated Electrical Equipment and the third category, referred to as PCB Equipment, is that equipment with higher than 500 parts per million PCB in the oil. No remedial action is required for that equipment with less than 50 parts per million PCB, nor for the other two categories, as long as the equipment, i.e. transformers, capacitors, etc., is not leaking. The last two categories must be inspected upon schedules required by the EPA and if a leak or seepage is detected, then the clock starts running and within limited time periods equipment must either be retrofilled, i.e. the oils removed and replaced with non-PCB oil, or the equipment must be disposed of. In the latter case, that means removing the oil and then land filling the carcass. From a practical standpoint, if the equipment contains oils containing high amounts of PCBs, it may not be possible to retrofill them, whereas the gaskets and other materials within the equipment may absorb and hold sufficient PCBs so that when refilled, the oil would simply be recontaminated. When you retrofill, it is required that after three months of operation, the equipment must again be sampled to ensure that it is non-PCB.

UCCNHT0001270

The Niagara plant has made a survey amd sampled all known electrical equipment that they believe might contain PCBs. Where they have found contaminated equipment they have made correction recommendations. I have reviewed those recommendations and inspected the various equipment and I concur with their recommendations. Seven relatively large transformers can probably be successfully retrofilled, which would be the most economic route. Those are transformers 33, 34, 35, 110, 111, 21 and 22. The estimated cost of retrofilling and disposing of the PCB contaminated oil, which must be burned by a qualified disposal firm, is approximately $60M. Firm quotes are currently being obtained and it will probably require three to four months to complete, plus a three month running period to retest the transformers. A second group of transformers, numbers 4, 23, 24, 122, and 161, are no longer required and in some cases are highly contaminated with PCBs. It is recommended that they be disposed of. We do not have a recent quote on the costs of performing that disposal, but it is estimated to be in the vicinity of $90M. It would also require three to six months to complete disposal and again, the plant is obtaining firm quotes. There are two relatively small transformers; no. 119 and 143, which would be cheaper to dispose of and replace at a total estimated cost of $2M.

There are 113 PCB capacitors that are no longer required and again, we are obtaining firm quotes for disposal. I would guess the cost could be in the $15M to $20M range. There are three medium sized capacitors in storage, plus twenty smaller PCB capacitors in the control cubicles for the shaft furnace. These capacitors are in acceptable storage and there is no evidence of leakage so I see no reason to either dispose of them or replace them. If SAC plans to use the shaft furnace, they may want larger capacitors since, as you will recall, these are underpowered.

There are three PCB transformers on the roof of 94 building and, as you probably recall, our Legal Department advised us that those are the responsibility of Elkem. The plant has been inspecting and maintaining them and is on record with the Niagara Falls Fire Department as performing those functions. I will ask our Legal Department to advise Elkem in writing that we will no longer perform that maintainance and that those transformers are their responsibility.

Beyond the electrical equipment, the plant has also accumulated seven drums of waste and sludge from clean up of PCB that has leaked from transformers and there will probably be another thirty or so drums that will accumulate from clean up when the above described equipment is either removed or retrofilled. It will be necessary to dispose of that material by a qualified agent. The estimated cost for that is $15M to $20M.

UCCNHT0001271

Three of the above transformers already discussed are sitting outside and are known to have leaked. That leakage could possibly have contaminated a fair amount of soil and it will be necessary to sample that soil and if contaminated, remove and drum it, and dispose of it. There could be as much as ten or twenty barrels and the approximate disposal costs are $300 to $500 per barrel.

The main switching station at Niagara Falls has been the responsibility of Umetco and it is now to be transferred to Linde. That station contains 1,008 PCB capacitors, all of which are sealed, are carefully enclosed, and none have ever been known to leak, nor are there any leaking now. I understand that Linde has already indicated that they would like to see those removed and replaced and have obtained an estimate for removal and disposal of $250M. Our own estimate is less, i.e. $150M. We have no quotes on the reinstallation and replacement costs but I suspect the total cost would be in excess of half a million dollars. There is no legal requirement as long as there are no leaks and as long as the proper inspections are made to replace those capacitors. It makes absolutely no sense to me from the standpoint of Union Carbide's exposure, etc., to replace them at this time, and there may never be a need to.

The only area regarding PCBs that is undefined at Niagara involves the many oil filled switches around the plant. No testing has ever been done. The plant will randomly sample some of the oil fill switches in the near future and have PCB assays run. Hopefully, we will find none and, that being the case, there will be no problem there.

The approximate cost of all of the actions listed above is something in the order of $200M to $250M, not counting the main switching station, for clean up of the PCB situation.

2. The second most critical environmental item is the discharge from the halide cylinder dumping and cleaning operations that we have discussed before. There has been an air discharge of HCl and chlorine gas and a liquid discharge into the Elkem sewer. On occasion, low Phs occur due to HCl and there is also some vanadium. The Engineering group and the plant has designed and tested a new fume control scrubbing system, which is in the process of being installed, to control and correct those problems. This involves a new venturi scrubber and a high pressure blower to collect the fumes and scrub them so that only clean air is discharged and so that the liquid can be released in a controlled fashion. The current schedule is to complete the installation of that facility by the end of April. Tests have shown that the system should collect from 95% to 97% of the particulate fumes which should be acceptable. When complete it will be necessary to obtain an air discharge permit from the

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DEC, which should be no problem, except they may ask why we have not obtained that permit heretofore. It may also be necessary to obtain a water permit, unless we are covered under permits held by Elkem. Craig Wentzel and Don Hansen will attempt to find the answer to the latter question.

I'm sure you appreciate that as we proceed to obtain permits, the discussions we have had in the past with Elkem with regard to discharging into their sewer may arise again. An estimate has been made to install a new sewer extension, so that the discharge would go into our own sewers of about $35M. There is no environmental reason to do so and the new scrubber should alleviate Elkem's previous concerns.

3. Chrome Oxide - There are about 64 drums of a chrome oxide material at Niagara which came from the Strasbourg facility. At this time, there is no obvious home for this. It does classify as a hazardous waste and the quickest and simplest way to resolve the problem would be to have it buried as a hazardous waste. We obtained an estimate of $6M to $7M to do that.

4. There is 78M pounds at Niagara of a high antimony tungsten moly oxide material, which resulted as a part of the Bishop problem some time in the past. There have been efforts to market this unsuccessfully through Investment Recovery and by George Lincoln. This material, unfortunately, is in paper bags, which are beginning to break open. It does classify as a hazardous waste and to dispose of it would require repackaging the material into steel drums and disposal by a qualified agent. Perhaps the material is marketable but if not the disposal would probably cost about $30M.

5. You should be aware, Frank, that there is a collapsed, buried sewer on our property, which was filled many years ago with some kind of a crushed fly ash or slag. We understand it is leaking into the Elkem sewer and the city may be giving Elkem some problems. The source of the leakage is not from us. We understand it is material coming from Hooker's property which is passing through and under this crushed filled sewer, which is merely providing a route to Elkem's sewer. No action is required on this.

6. The freight elevator in the globar area, at some time in the past, was lined with asbestos for "fire protection?" Due to a leak in the roof a few months ago, some fell off, dropped down through the elevator shaft and contaminated the area. The plant had to bring in people to clean it up and since it represents an environmental hazard an estimate has been obtained for an outside firm to remove the asbestos and get rid of it. The cost estimate was $12M, and probably should be done. As far as other asbestos throughout the plant, over the last year or so the plant has encapsulated or removed most of the asbestos pipe

UCCNHT0001273

insulation throughout the plant. They believe they have corrected over 95% of that problem. There is some asbestos stored in the plant that needs to be disposed of at a minimal cost.

7. Twice a year, an outside firm, referred as Super Sucker, comes in and vacuums all of the crane rails, etc.. The dust is collected as a sludge which is dumped in the yard. It is scattered over a relatively wide area and no testing has ever been done to determine whether this material qualifies as a hazardous waste. The plant will sample the material and if it is a hazardous waste, an inventory will be taken. To dispose of the material it would have to be drummed and disposed of at a cost of $200 to $300 per drum. I have no firm feel for the quantity of this material, but there could be over a hundred drums.

8. There are in storage in the globar area thousands of small coffee cans, which represent samples of material that have been made at Niagara Falls since 1906. No one knows what is in these cans; whether they are "hazardous waste", radioactive, etc. A program has been started with plant people in their spare time to open each and every can, identify it, categorize it, and separate it for disposal. At the current rate this is proceeding, it probably won't be completed for well over a year. I have recommended that we get an outside firm to quote on coming in and doing that work so that it could be wrapped up and completed in a reasonable time. I would estimate we are talking in the order of $10M to $15M for that task.

9. We talked about numerous other small piles of miscellaneous materials lying around, i.e. lime, etc., and there are no other significant items at issue. However, there is about 20M pounds of moly vanadium aluminum remelts, which is not a hazardous material, but it is the plant's position that they should be written off to the account of Umetco. Perhaps at some stage it may be necessary to landfill them.

There is some concern that there might be material lying around from ancient history that could be thorium bearing and thus radioactive, such as the material we cleaned up in the yard last year. I believe it would be better to determine if there is any potential problem now and have asked Don Hansen to conduct a radiation survey throughout the plant and yard to see if anything crops up. If we find nothing from a surface radiation survey, that should alleviate all concerns.

10. There is a pile in the yard of approximately 4M tons of slag that has come from the various furnacing operations. That slag is currently being sold under contract to Federal Cement Company, who is purchasing the material for $12.00 per ton. The rate at which they are purchasing is at about the rate that it

UCCNHT0001274

is being produced. However, they have shown a strong interest in purchasing all of the material in due course. This material is not hazardous and I do not view it as any liability for Umetco.

11. There are some empty drums scattered around the plant but those can be used by SAC or disposed of, if necessary, by simply washing them out. I view this as no environmental liability.

12. The plant was advised by a Union Carbide Security inspection that it may be advisable to erect a fence between what will be the SAC facilities and the L-Tech facilities. That fence would go across the yard and across where all the various and sundry piles of slag, etc., are and would also go right across the middle of a large pond called Lake Linde. The plant is obtaining an estimate for this fence. Not only will the fence be expensive, it will be extremely difficult to install due to the lake. I do not consider this item an environmental matter and would question that the fence is really needed for security. The fence would be approximately 1500 feet long, would need to be chain length, and, as I say, will not be cheap.

13. Frank, the Lake Linde area that I referred to above and the general yard area, although not representing any immediate environmental probem, does raise some concerns. There have been many different types of materials dumped out there for 60 or 70 years. No one knows whether any of the materials have been leachable, whether they have in any way contaminated the soil, and if so, to what depth, or if there could be any potential ground water contamination. As we dump and identify the contents of the sample cans, we should get some guidance as to what might be out there. Lake Linde has collected drainage from the area and L-Tech is discharging into it and no one really knows the characteristic of that water. The concern I have is that when Umetco no longer has any control over the property, the lessees, i.e. L-Tech, SAC, etc., could dump or discharge in the area, creating environmental problems and a liability for UCC. Ideally, it would be good to go in and sample the area; maybe even by drilling, and establish a base for UCC's liability at this time. The radiation survey will help there. The only danger of this is that with all of the industrial contamination that is either known or suspected in that vast industrial area, we could find something that would open up a real Pandora's box, and so I, therefore, hesitate to recommend that course of action. I suggest we should discuss this particular issue further and perhaps in depth with legal counsel.

14. When the property to the north of our current facility was sold to Niacet, Union Carbide retained ownership of three large boilers and the building and associated equipment contained therein. Prior to 1980 or '81, the boilers were operated to provide steam for our facility. I do not know exactly the legal

situation, i.e. who's responsibility they are, but Umetco has been the UCC manager and, in any event, they are still owned by Union Carbide. The Niacet individual who showed me around is aware of that. He pointed out that the supports on two huge stacks on the top of the building are failing and if the stacks are not resupported or removed, they will fall down. The boilers themselves have asbestos insulation on the external piping and they may have asbestos insulation internally throughout the boilers. I have asked the fellows at Niagara to try and find drawings so that we can determine how severe the asbestos problem is. If we are legally responsible for these boilers, it may be necessary to either remove the asbestos, certainly to either support the stacks or tear them down, and possibly demolish the boilers. These are large units and the costs would be significant. I will ask our Legal Department to give me an opinion as to what our responsibilities are. This issue does not involve SAC except perhaps for a service agreement but may have to be resolved before Umetco can withdraw from Niagara Falls.

15. Under the agreement with SAC, Carbide has said that they will share the final and eventual reclamation costs of the site, if and when it is ever abandoned. To fix that liability now, we could get a demolition contractor to make an estimate now of demolishing and reclaiming the facility. However, the logical final solution would probably be to clean out and scrap the equipment and sell the buildings at that time. If the parties agree to resolve Items 1 through 14, I suggest the final buildings reclamation be left and the cost or credit be shared based on relative time of occupancy.

16. Miscellaneous - We touched on numerous other minor areas, such as underground tanks, and there are no problems there. We talked about bulk storage and although initially there appeared to be a caustic tank problem, it was tested and checked out okay. We talked about the 86 or so vanadium halide tanks scattered around the country, and they seem to be under control and all in good condition. There is no major waste oil problem, etc. There are no radiation sources on the site. I believe, Frank, that if the situations described in this memo are addressed, we can fairly well define the environmental liabilities of Union Carbide at Niagara Falls.

Very truly yours,

D. G. MILLENBRUCH

DGM:blb
0214b

UCCNHT0001276

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

To (Name) Mr. F. V. McMillen
Umetco Minerals Corporation
Division Danbury, CT 06817

Location

Area

Copy to Messrs. J. F. Frost
T. J. Kagetsu
D. G. Millenbruch

Date July 21, 1986

Originating Dept

Area

Answering Letter Date

Subject Environmental Issues
Niagara Falls, NY

Dear Frank·

A number of environmental issues at Niagara Falls are coming to a head and I thought that it was time I brought you up-to-date.

1 The disposal of the "Supersucker" dust that was piled on the east side of No. 6 Furnace Room has been completed.

2 Dube Construction Company is currently filling in the low lying area referred to as "Lake Linde".

3 The stacks on the boiler house on Niacet property are scheduled to be removed by Scrufari Construction Company tomorrow, July 22.

4. The soil samples taken by Bob Kelly in March from the Elkem property located along side of Building 166 showed no evidence of radionuclides. The restoration of the property is scheduled to begin July 28.

5. The radioactive slag and samples are scheduled to be transporated to Barnwell, SC the second week of September.

6 The bids on the removal of asbestos have been extended for one week to allow for the additional material on the Niacet pipe rack.

I am enclosing a copy of my worksheet which summarizes the status of the above and the remaining environmental issues.

I am planning to be on vacation the last three weeks of August and expect that by that time the workload will be reduced substantially. Beginning in September, I would expect that my time should be minimal.

Regards,

D. J. Hansen

DJH/dv
Enclosures

UCCNHT0001277

7/15/86

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
1.0 Halide Scrubber					$/M	$/M
1.1 Install Venturi Scrubber 1.2 Install trough to collect heels from returned cylinders. 1.3 Enclose trough and install a fume collection system.	1.1 Complete 1.2 Complete 1.3 Discussed with R. Miller on 7/9/86.	1.3 Peter Sherman in conjunction with Ron Sullivan to complete design.	9/30/86		100	67.7
2.0 Asbestos Removal Elevator shaft, Bldg. 111, storage room, boiler rooms (Niacet), six (6) pipes running 800' on pipe rack.	Bids to be closed out on 7/18/86.	Contract to be let. EPA to be notified.	9/30/86		90	
3.0 Sample Cans Approximately 300 one quart cans containing different alloys, slags, and ores to be classified as toxic or non-toxic and disposed of.	Discussed with R. Miller on 7/9/86. George Parker working on identification.	Make composits of toxic & non-toxic samples. Sample - Complete EP Tox. analyses. Arrange for disposal.	10/31/86		10	

UCCNHT0001278

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
4.0 Supersucker Dust Dust collected from rafters of plant in commercial vacuum cleaner.and dumped in piles throughout yard area.	Disposed of through Modern Disposal on 7/11/86.	Complete		7/11/86	1.5	
5.0 Fill in Lake Low area east of No. 6 Furnace room collected railfall and discharge from L-Tec Plant. Drain and level.	Area drained by L-Tech Reclaimation scheme discussed with R. Miller on 7/9/86. Dube Const. began work 7/14/86.	Finish grading. Document with photos.	7/25/86		2.5	
6.0 Remove Radioactive Waste Slag and contaminated soil from No. 30 Furnace (twenty 55-gallon drums). Radioactive samples.	Have S.C. Transportation Permit. UCC Purchasing working with Chem Nuclear to update contract.	Complete arrangement with Chem Nuclear for disposal in Barnwell, S.C.	9/30/86			

UCCNHT0001279

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
7.0 Remove Radioactive Source Previously used to calibrate X-ray equipment in VA1.	Found that source is Cs137 and only 5μCi. Does not require license.	None required.				
8.0 Reclaim Elkem Property Hold over from "Tiger" project. UCC agreed to remove clay and backfill when State released property for unrestricted use.	Phone call from L Cabasino, Dept. of Labor 7/15/86. Samples showed no radionuclides. Dube Construction contacted to bid on job.	If quote is satisfactory will arrange with Dube Const. to complete job.	9/18/86		20	
9.0 Terminate Licenses 9.1 210-0090 Technology sources.	Waiting for NY Dept. of Labor to act.					

UCCNHT0001280

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
9.0 Terminate Licenses (cont'd)						
9.2 950-0139 Processing Columbium Ores	On hold	When last of radioactive material is removed from property another request for license termination will be made.	12/31/86		0	
9.3 955-0139 Plant Sources	George Parker turned over files on 7/3/86. Waiting for NY Dept. of Labor to act.					
10.0 Patents Finish filings. Respond to Patent Examiners.	Completed application on burning Flexicoke with Norm Balmer on 7/8/86.	Respond to Patent Attorney re: objection of Patent Examiner to Flexicoke Leaching Patent (J.Goddard)	7/31/86		N B.	

UCCNHT0001281

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
11.0 Files						
11.1 Uranium to Gr. Jct.	Files catalogued and boxed.	Arrange for shipment to to J. Frost at Grand Junction.	7/25/86		1.0	
11.2 V & W Files	Personal files of former employees combined.	Organize and provide general index. Will not attempt to consolidate with Technology Files.	8/31/86		3.0	
11.3 Active Files to Gr.Jct.	Spoke to J. Frost on 7/1/86. He plans to visit Niagara Falls to discuss.	None required.				

UCCNHT0001282

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
12.0 Surplus Equipment	Technology Equipment sale in hands of Investment Recovery. No action. Automotible Return Form requested.	Arrange for automobile to be turned over to Investment Recovery.	7/31/86		$/M .0	$/M
13.0 Remove Stacks Two stacks at old Boiler Room in Niacet.	Arrange to have Scrufari Construction complete job.	Monitor	7/25/86		2.3	

UCCNHT0001283

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

DEC 24 1986

To [Name] Mr. K. E. Forrest
Umetco Minerals Corporation
Division Grand Junction, CO

Date December 19, 1986

Originating Dept

Location

Area

Area

Answering Letter Date

Subject Invoices from Advanced Environmental Systems Inc.

Copy to Messrs:
J. F. Frost
T. J. Kagetsu
H. M. Wilber
K. A. Wood

I am enclosing two (2) approved invoices from Advanced Environmental Systems Inc., No. 3687 for $104 and No. 3521 for $401.

The first (3687) was a flash point analysis on sand removed from below a leaking gasoline tank. Our responsibility for this charge is addressed under Section 3(k) of the Environmental Agreement (Niagara Falls) "Storage Tanks" which states in part:

"If in the future USV is required by law, to modify, repair or remove the underground gasoline ----- tank(s) due to evidence of leaking, Buyer and Seller agree to share the cost ------- based upon their respective period of occupancy of the Niagara Falls Facility --------."

In view of the short time involved for U. S. Vanadium, I suggest we pay the whole thing.

The second (3521) involves the clay cap used to cover an area on Elkem property from which radioactive soil had been removed. Note that this invoice dates back to August 1, 1986.

Donald J. Hansen

/mau
Enclosures

UCCNHT0001284

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

MONITORING AND SUPPORT LABORATORY

P O Box 165
Niagara Falls, N Y 14304
(716) 285 8883

SOLD TO
U.S. Vanadium
Accounts Payable
P.O. Box 66
Niagara Falls, New York 14302

TERMS Net 30 Days

DATE	INVOICE No	CUSTOMER ORDER No	OUR JOB No
10/30/86	3687	Verbal - Herb Wilber	BVR

PROFESSIONAL SERVICES:

Sampling and Analysis of Sand Bin For Flashpoint
October 24, 1986 Report

TOTAL AMOUNT DUE $104.00

RECEIVED
NOV - 3 1986
INVOICING DEPT.

Approved for payment
D J Hansen 12/19/86

- QUALITY ASSURANCE -

UCCNHT0001285

TRANS	COST CODE	PO	SUB CODE	TRANSMITTAL NO	VENDOR CODE	NAME	LOCATION
	0 4 0 C F		8 4 - 0 6 1 5				

615-31149

VENDOR'S REFERENCE NO	INV REC DATE	INVOICE DATE	T.C.	DUE DATE	NET AMOUNT	D/C	DISCOUNT AMOUNT	S/H

• • • LATE PROCESS REASON CODE
- [ ] 1 PURCHASE ORDER NEEDED
- [ ] 2 POCN NEEDED
- [x] 3 RECEIVING REPORT NEEDED
- [ ] 4 AUTHORIZATION NEEDED
- [ ] 5 INVOICE HELD FOR CAUSE
- [ ] 6 INVOICE RECEIVED LATE
- [ ] 7 USED MIT ACCOUNT

Umetco Minerals Corporation

P O Box 66 (137-47th Street)
Niagara Falls, NY 14302

HEREINAFTER CALLED BUYER

• ATTACHMENT NEEDED •
- [ ] 1 UMC DOCUMENT
- [ ] 2 SPECIAL VENDOR DOCMNT
- [ ] 3 CORRECTED VENDOR'S INVOICE

PAGE 1 OF 1

VENDOR

Advanced Environmental
P.O. Box 165
Niagara Falls, NY 14304

HEREINAFTER CALLED SELLER

MAIL INVOICES IN DUPLICATE TO

Umetco Minerals Corporation
P O Box 1029
Grand Junction, CO 81502

ADDRESS CORRESPONDENCE TO

P O BOX 66, NIAGARA FALLS, NEW YORK 14302

SHIP TO

U.S. Vanadium Corporation
137 - 47th Street
Niagara Falls, NY 14302

BUYER HEREBY ORDERS UPON THE TERMS HEREIN CONTAINED INCLUDING THE ADDITIONAL TERMS ON THE REVERSE SIDE HEREOF

TERMS OF PAYMENT						TRANSPORTATION TERMS								F O B POINT		
SHIP TO ARRIVE BY	NET 30	% DISC	10 DAYS	10TH PROX	OTHER	PREPAID ACCT OF BUYER 1	ACCT OF SELLER 2	OTHER 3	SHIP POINT 1	DEST 2	OTHER 3
7/31/86	X							N/A			N/A

SUBJECT TO STATE/LOCAL SALES USE TAX	TAX %	TEXAS SEE SPECIAL INSTRUCTIONS	TAX EXEMPTION NO	SHIP VIA	PARCEL POST	TRUCK	UPS	RAIL	AIR FRT	OTHER (SPECIFY ROUTING)	BUYER	COM CODE	VENDOR CODE	REC LOC
YES / NO X										N/A		0400F		615

ITEM NO	QUANTITY RECEIVED	X	C	A	QUANTITY ORDERED	U/M	DESCRIPTION	UNIT PRICE	STORES ACCOUNT	MATERIAL CODE ACCOUNT	SUB	FIRST NO	SECOND NO	SHOP ORDER
1	1 LOT	✓	✓		1	Lot	Perform sampling ignitability test and eptoxicity for heavy metals test of contaminated sand as instructed by Owner's Representative, H. M. Wilber	$435.00	740	14880	88	2501		

RECEIVED
NOV - 4 1986
INVOICING DEPT.

REQUISITIONER'S DESCRIPTION (17) CHARACTER LIMITATION

PURCHASING AGENT'S NAME (TYPE OR PRINT NAME)

X

LOT RR NO	DATE REC'D	COMP	REC'D BY	REC LOC	ORIG IN	OUT	LATE	TRANS PPL	TRANS LOC	TRANS NAME	CARRIER	DATE OF PRO	PRO NO	CAR NO	CONTAIN COUNT	PRODUCT WEIGHT	TOTAL WEIGHT	PRODUCT CLASS
1	8/22/86	✓	L Briggs		7/29/86 ✓	✓		✓		Katherine T.T.	T.T.	8/20/86	#3556					

5. RECEIVING DEPARTMENT TO INVOICE AUDITING

UCCNHT0001286

ATTN OF ① ROUTING ② LOCATION ③ LOCATION LOCATION

RETURN TO _____ DEPT LOCATION BY _____ DATE

VENDOR Advanced Environmental
P.O. Box 165
Niagara Falls, NY 14304

REQUISITIONER D. V. Gambolan

LOCATION OF MATERIAL

ORDER NUMBER 615-31149

R/R NUMBER

INVOICE DATE

INVOICE NUMBER

INVOICE AMOUNT

DIFFERENCE TO BE RECONCILED

ITEM	PURCHASE ORDER READS	RECEIVING REPORT READS	INVOICE READS

DISPOSITION OF DIFFERENCE

☐ RETURN OVERAGE
☐ ACCEPT OVERAGE
☐ CHANGE R/R TO READ _____
☐ ACCEPT SUBSTITUTE IN LIEU OF MATERIAL ORDERED
☐ RETURN FOR REPLACEMENT AS ORDERED
☐ RETAIN MATERIAL REQUEST SHIPMENT AS ORDERED
☐ OTHER _____

REMARKS

APPROVED FOR RECEIVING _____ DATE _____ REQUISITIONER S APPROVAL _____ DATE _____

PURCHASING DEPARTMENT DISPOSITION

☒ CHANGE PURCHASE ORDER AND PASS AS INVOICED
☐ RETURN INVOICE TO VENDOR FOR CORRECTION
☐ FORMAL PURCHASE ORDER CHANGE NOTICE WILL BE ISSUED
☐ ADD TO PURCHASE ORDER
☐ RETURN TO VENDOR FOR CREDIT

Please add: $104.00 for testing, authorized by H. M. Wilber 740-14880-88-2501

BUYER S. M. Davis 11/5/86 DATE

OTHER AUTHORIZED SIGNATURE _____ DATE

MM 67 107

ACCOUNTS PAYABLE CONTROL - IDENTIFER

INTERNAL CHANGE NOTICE/EXCEPTION ON DELIVERY SUPPLEMENTAL RECEIVING REPORT - SUPPLEMENTAL REQUISITION

UCCNHT0001287

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

MONITORING AND SUPPORT LABORATORY

P O Box 165
Niagara Falls, N Y 14304
(716) 285 8883

SOLD TO
Umetco Minerals Corporation
Accounts Payable
P.O. Box 66
Niagara Falls, New York 14302

TERMS Net 30 Days

DATE	INVOICE No	CUSTOMER ORDER No	OUR JOB No
7/30/86	3521	P O #615-31628 R	BSV

PROFESSIONAL SERVICES:

Sampling and Analysis of Clay Cap
For EP Toxicity Metals

July 28, 1986 Report

TOTAL AMOUNT DUE $401.00

RECEIVED
AUG - 1 1986
INVOICING DEPT.

Approved for payment
D J Hansen 12/19/86

QUALITY ASSURANCE

UCCNHT0001288

ATTN OF ① RECEIVING ② LOCATION ③ LOCATION LOCATION

RETURN TO DEPT LOCATION BY DATE

ORDER NUMBER 615-31628

R/R NUMBER

INVOICE DATE

INVOICE NUMBER

INVOICE AMOUNT

VENDOR Advanced Environmental Systems
4625 Royal Avenue
Niagara Falls, NY 14303

REQUISITIONER R. D. Legg

LOCATION OF MATERIAL

DIFFERENCE TO BE RECONCILED

ITEM	PURCHASE ORDER READS	RECEIVING REPORT READS	INVOICE READS

DISPOSITION OF DIFFERENCE

- ☐ RETURN OVERAGE
- ☐ ACCEPT OVERAGE
- ☐ CHANGE R/R TO READ _____
- ☐ ACCEPT SUBSTITUTE IN LIEU OF MATERIAL ORDERED
- ☐ RETURN FOR REPLACEMENT AS ORDERED
- ☐ RETAIN MATERIAL REQUEST SHIPMENT AS ORDERED
- ☐ OTHER _____

REMARKS

APPROVED FOR RECEIVING DATE REQUISITIONER'S APPROVAL DATE

PURCHASING DEPARTMENT DISPOSITION

- ☒ CHANGE PURCHASE ORDER AND PASS AS INVOICED
- ☐ RETURN INVOICE TO VENDOR FOR CORRECTION
- ☐ FORMAL PURCHASE ORDER CHANGE NOTICE WILL BE ISSUED
- ☐ ADD TO PURCHASE ORDER
- ☐ RETURN TO VENDOR FOR CREDIT

Please add the following

$401.00 for additional work authorized by D. Hansen Charge 34523-20301

BUYER S. M. Davis 11/6/86 DATE

OTHER AUTHORIZED SIGNATURE S M Davis 11/6/86 DATE

MM 67 107

ACCOUNTS PAYABLE CONTROL

INTERNAL CHANGE NOTICE/EXCEPTION

ON DELIVERY SUPPLEMENTAL RECEIVING REPORT SUPPLEMENTAL REQUISITION

UCCNHT0001289

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

August 6, 1984

Mr. John Oxaal
Elkem Metals Company
Niagara Falls, NY

Subject: Decontamination of Technology Property

Dear John·

We are decontaminating the south portion of the railroad tracks shown in Figure 2, "Location of Elevated Gamma-Ray Levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY", appended to Tiger Project letter in conjunction with closing June 30, 1981, signed by F. C. Kroft, Jr. Our purpose is to cancel New York State License No. 950-0139 which allows us to possess and process natural radioactive thorium-bearing pyrochlore ore used for the production of ferrocolumbium and meet NRC proposed regulations for delicensing and unrestricted land use.

To accomplish these ends we are backfilling the area excavated with clay because our experience at Marietta shows we must provide a covered area suitable for soil sampling Elkem's position is the backfilling with clay is inappropriate cover for access and full use of the loading pads in the area which they intend to use for bulk storage.

Accordingly, after our license has been cancelled and full and unrestricted use of the area is allowed, without reservations regarding ground cover or New York State imposed restrictions concerning future work, Union Carbide at its sole cost and expense will perform the following work:

(1) Reexcavate the area to a minimum depth of six inches, but not to the original depth of the excavation which ranges from nine inches to over two feet in some areas.

(2) Install a permeable liner over the remaining clay as a free draining support for crushed stone.

(3) Backfill the newly excavated area with gravel to a depth to be determined by your engineers but not exceeding six inches.

(4) Dispose of the approximately 300 yards of clay which is excavated

UCCNHT0001290

The work as outlined is contingent on Union Carbide receiving permission for unrestricted access without conditions imposed by New York State Department of Labor, Division of Safety and Health or the Federal Nuclear Regulatory Commission or the Federal Environmental Protection Agency.

If the foregoing correctly sets forth the understanding and agreement of the parties, kindly execute this letter agreement in the space provided below.

Very truly yours,

Union Carbide Corporation

By: _____

Title: _____

Agreed To and Accepted:

Elkem Metals Company

By: _____

Title: _____

cc: Mr. R. F. X. Fusaro
Mr. W. C. Thurber

Note to Fusaro and Thurber:

I made this agreement with Oxaal but it probably requires Thurber's signature.

UCCNHT0001291

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

MAY 19 1986

May 12, 1986

Dr. F. J. Bradley
Principal Radiophysicist
New York State Department of Labor
Division of Safety and Health
Radiological Health Unit
One Main Street - Room 813
Brooklyn, NY 11201

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr. Bradley:

I have reviewed an April 9, 1986 letter from Mr. Edward G. DeLaney of the Office of Nuclear Energy in the Department of Energy advising me of Umetco's elimination from consideration for inclusion in the Formerly Utilized Site Remedial Action Program. Mr. DeLaney references surveys and a report, both prepared for the Niagara Falls site in 1980, and states that, among other things, concentrations of thorium and uranium were found in soils at the site.

As you are aware, since 1982 we have been actively engaged in removing the residual radioactivity and to date have expended in excess of $500,000. In March of this year Mr. Robert Kelly of your department visited the site and obtained samples to verify that the cleanup was complete. We understand, pending the results of these analyses, the area in question will be restored to unrestricted use and our Radioactive Material License will be terminated. We wish to thank you for the assistance you have provided in this regard.

Very truly yours,

George P. Parker

George P. Parker
Manager
Employee Relationship
Safety, Health and Environmental
Affairs

cc: Mr. R. F. Kelly, DOL
Mr. W. Librizzi, USEPA
Mr. D. G. Millenbruch

Blind Copies:
Mr. R. G. Tisch
Mr. F. V. McMillen
Mr. C. T. Wentzel
Mr. D. J. Hansen

UCCNHT0001292

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

MAY 19 1986

May 15, 1986

Dr. F. J. Bradley
Principle Radiophysicist
New York State Department of Labor
Room 813
One Main Street
Brooklyn, NY 11202

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr. Bradley:

In our phone conversation of Tuesday, May 13 we discussed disposal of two low level radioactive materials that were discovered in a radiation survey of the Umetco property in Niagara Falls, NY. The first was illmenite sand (an iron titanium ore) that had been used to backfill a 10' x 10' concrete pit. The second was an isolated quantity of slag (calcium-aluminum oxide) from the furnacing of ferrovanadium. The illmenite sand was removed from the pit and currently is contained in 125 (one hundred twenty-five) 55-gallon drums. I would estimate total weight at approximately 40 to 50 tons. The slag is in lumps in a pile that I would estimate to contain 50 to 75 tons. Analyses of the materials are presented in the following Table 1.

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

	Analyses				
	URANIUM SERIES			THORIUM SERIES	
Description	Uranium µg/g	Th-230 pCi/g	Ra-226 pCi/g	Th-232 pCi/g	Th-228 pCi/g
Illmenite Sand - Top of Pit	28.9	12±2	19±2	16±2	17±2
Illmenite Sand - 7' in Pit	44.3	22±2	31±3	37±2	39±3
Dark Slag-Yard East of Fce. Bldg.	20.2	299±7	4.4±1.1	16±2	4±9
Light Slag-Yard East of Fce. Bldg.	18.6	466±9	7.0±1.4	37±3	14±2

Industrial Code Rule 38, Table 5 "Limits for Uncontrolled Areas" limits source material to 0.05 percent by weight (500 µg/g or 500 ppm). For Thorium 232 this converts to 55 pCi/g. The concentrations of Th-232 reported in picocurries in Table 1 were converted to µg/g and added to the weight of uranium to determine the total source material present. This is shown in Table 2.

UCCNHT0001293

The gamma radiation measured at the surface during excavation of the pit and within the slag pile is also reported in Table 2.

TABLE 2

Weight of Source Material

Sample	Uranium µg/g	Th-232 µg/g	Total Source Material µg/g	Gamma Radiation µR/hr*
Illmenite-Top of Pile	28.9	145.5	174.4	170
Illmenite-7' In Pit	44.3	336.4	380.7	150
Dark Slag	20.2	145.5	165.7	150
Light Slag	18.6	336.4	355.0	200

*Ludlum Model 19 Micro R Meter - Reading at Surface

As we discussed the total source material in both materials is less than 500 µg/g, the limit for uncontrolled areas and the radiation is less than 250 µR, the limit for fixed surface contamination.

Although technically the material was not sufficiently radioactive to be controlled you convinced me that it was not a good idea to use it to fill a low area in the yard. If this were done then a rider would have to be appended to the lease that would restrict future building. Since this is not an attractive option I propose to dispose of both the slag and illmenite in a local hazardous waste repository.

Unless I misunderstood, you did not voice an objection to this during our phone conversation. Therefore, I plan to immediately begin the paper work to initiate this course of action. However I will not remove anything from the property before June to allow you time to reconsider. I will not expect to hear from you unless you disapprove.

I enjoyed talking to you on Monday and I want to thank you again for the assistance you provided.

Sincerely

Donald J. Hansen

D. J. Hansen
Assistant Director - Technology

cc: Messrs:
R. F. Kelly
R. G. Beverly
F. V. McMillen

Blind Copies: Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch
R. L. Miller
W. D. Smith
C. T. Wentzel

UCCNHT0001294

Umetco Minerals Corporation

PO BOX 66 137 47th STREET • NIAGARA FALLS, NEW YORK 14302

March 2, 1987

Mr. P. K. Willmott
Umetco Minerals Corporation
Section P2615
30 Old Ridgebury Road
Danbury, CT 06817

Subject: Summary Report of the Withdrawal of Umetco from Niagara Falls

Dear Paul:

The accompanying report summarizes the activities that were associated with the closing of the Technology Department and the sale of the Niagara Plant to Stratcor. With the exception of getting together with Jack Frost to familiarize him with where and how the pertinent information is filed and perhaps one more day on surplus equipment I consider I have done all the damage I can. To say the least, it has been an interesting, if sometimes frustrating several months. However I am satisfied that Union Carbide obligations have been successfully accomplished.

If I can be of any help in the future please don't hesitate to call on me.

Let's hope we can get together on a social basis one of these days.

Sincerely,

D. J. Hansen

/mau
Attachment

cc: Messrs:
J. F. Frost
T. J. Kagetsu

UCCNHT0001295

SUMMARY REPORT

WITHDRAWAL OF UMETCO FROM NIAGARA FALLS

by

D. J. Hansen

February 1987

UCCNHT0001296

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2.6 "Super Sucker" Dust
2.7 Sample Cans
2.8 Yard Area - Ores and Slags
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2.10 Drain and Level Lake
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4.2 Asbestos Removal
5.0 CONCLUSION

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1.0 INTRODUCTION

The Technology Department of Umetco Minerals Corporation was disbanded on March 31, 1985. Many items associated with the closing extended well beyond that date. These included transfer and sale of equipment, disposal of chemicals, termination of radioactive material licenses, reorganizing files, and withdrawal from the Elkem premises.

When Union Carbide subsequently sold the Niagara Plant to Strategic Minerals Corporation an Environmental Agreement was signed on May 13, 1986 in which liabilities were defined and certain reclamation, restoration, and disposal obligations were innumerated.

This report briefly summarizes the work completed in both of these areas. Details are contained in separate files which are presently located in Niagara Falls.

2.0 ENVIRONMENTAL ISSUES (NIAGARA FALLS)

Article 3 "Other Environmental Matters" - sections (a) through (l) of the Environmental Agreement (Niagara Falls) between Union Carbide and Strategic Minerals Corporation lists the obligations of Umetco to U. S. Vanadium.

One of these, (Item j), concerns vanadium slags and remelts and is the responsibility of U. S. Vanadium. Item k, dealing with the underground storage tanks is ongoing. U. S. Vanadium has signed letters acknowledging that 7 of the 10 remaining items were completed to their satisfaction. I have been assured that sign-off on another two, Item (a) PCB Transformers and Item (e) Asbestos in Freight Elevator will take place soon. The last one, Item (b) Halide Scrubber will be signed off after the stack discharge permit has been obtained.

More specific information on each of the items follows.

2.1 PCB Transformers and Capacitors

Eight transformers and in excess of 100 capacitors that contained PCB's were disposed of in May 1986 under the direction of U. S. Vanadium personnel. At that time, six transformers belonging to U. S. Vanadium and three belonging to Linde Division were retrofilled by UNISON. One of the transformers of U. S. Vanadium is a spare and could not be placed in service for the 90-days required prior to analysis and reclassification. Another failed to come to the required 50°C temperature. Mr. Gary R. Pilcher, Regional Service Manager of UNISON, has written to C. T. Wentzel agreeing to assume responsibility for reclassification at no cost to U. S. Vanadium or Umetco. A letter requesting sign-off was sent to C. T. Wentzel on January 19, 1987. I spoke with him by phone on February 17 at which time he assured me that he saw no problem.

2.2 Halide Scrubber

Prior to the sale, returned vanadium halide cylinders were cleaned in the yard and discharged to a sewer. In October 1985 a scheme was proposed to discharge the cylinders to a trough containing water jets that would direct the fumes to an improved scrubber. The cost was estimated to be $70,000. In October 1986, the completed system in which costs had escalated to $95,000

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was found inadequate. It was necessary to extend a shed so that tanks could be discharged out of the wind. Additional capital was authorized by Mr. F. V. McMillen on October 10, 1986 with a stipulation that Umetco would not pay more than $118,500. Modifications were completed and the system operated successfully on January 7, 1987.

A letter requesting "sign-off" was written to C. T. Wentzel on January 14. He sent a letter to Messrs. DeAtley and Miller on February 13 informing them that applications for air permits had been mailed to New York State D.E.C. It is my understanding they will sign-off whens the permits are obtained.

2.3 Chrome Oxide

Fifty-one drums containing approximately 11 tons of vanadium bearing slag that had been contaminated with chrome oxide was disposed of by Chemical Waste Management (SCA Chemical Services) on April 10 and 11, 1986. A copy of the letter acknowledging that U. S. Vanadium was satisfied was mailed to F. V. McMillen on October 27, 1986.

2.4 High Antimony Tungsten

On April 2, 1986, approximately 50 tons of tungsten molybdenum oxide contaminated with antimony was disposed of by Chemical Waste Management (SCA Chemical Services). A copy of the letter acknowledging U. S. Vanadium "sign-off" was mailed to F. V. McMillen on October 27, 1986.

2.5 Asbestos in Freight Elevator

By the terms of the Environmental Agreement, UCC has "no indemnification obligation to Buyer with respect to --- (iii) any asbestos in the Niagara Falls Facility except as specifically enumerated in paragraph (e) of Article 3--". Paragraph (e) refers only to the removal of the asbestos lining in the Globar elevator. The Union Carbide Corporate Audit Team agreed that asbestos should also be removed from the Old Boiler House, pipelines outside the Old Boiler House, and Building 111 which were not part of the sale to Stratcor. This was an insurance against potential future liability.

The successful bidder was Niagara Insulations, Inc. at $61,800.

Removal of asbestos from the elevator turned out to be much more complex than anticipated. Niagara Insulations elected to use a high pressure water jet. Unfortunately it was only partially effective and also caused asbestos to be forced through the joints in the corrugated steel walls resulting in contamination outside the elevator. Not only did the job take longer than expected but Niagara Insulations personnel had to be brought back on three occasions because the job was not completed to our satisfaction. The water treatment also removed lubrication from the elevator cable and pullies and it was necessary to bring in Otis Elevator Company to correct this. However, on the plus side lubricating the cables also served to immobilize any fibers that may have been worked into the cable strands.

The atmosphere within the elevator was sampled by Asteco, Inc. on October 7, 1986 and again on December 11, 1986 to determine the extent of

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airborn fibers. On both dates the readings were below the .01 fibers per cubic ft. recommended as satisfactory after cleanup by EPA.(1)

A letter was sent to C. T. Wentzel December 16 requesting sign-off. However U. S. Vanadium was not satisfied and resampled on February 11, 1987. This time no fibers were found in the sample. C. T. Wentzel told me by phone on February 17 that U. S. Vanadium will sign-off when he receives the written report from Asteco Inc.

2.6 "Super Sucker" Dust

"Super Sucker" dust is the material collected by a commercial vacuum cleaner from the rafters at various locations within the Niagara Plant. The contents of the machines are discharged randomly in the yard east of No. 5 Furnace Room. Various piles of this material were sampled by George Parker of U. S. Vanadium and analyzed by Ecology and Environment Inc. in May 1986 for leachable toxic substances. None were found which technically let us off the hook. However, it was decided to remove these materials to a sanitary land fill to avoid any questions in the future. Modern Disposal Services took care of this on August 11, 1986. U. S. Vanadium's letter of acceptance was mailed to F. V. McMillen on October 27, 1986.

2.7 Sample Cans

Over the years samples of raw materials, slags and ferroalloys were collected, placed in one quart tins and stored in a caged area in Building 25. Disposal of these presented a problem since the contents had to be identified and then classified as toxic or non-toxic. In addition, numerous samples, notably those from pyrocholors and uranium ores were radioactive. The disposal was begun under the direction of George Parker of U. S. Vanadium and a shipment of non-hazardous material was removed by BFI Waste System in 1985. We assumed responsibility for the remaining 1200 samples in July 1986. There were classified as radioactive, non-hazardous, or toxic and were handled accordingly. The radioactive material was included in a shipment to Barnwell, South Carolina, September 19, 1986. The balance of the samples, after classification, were emptied into 50 gallon drums. The non-toxics were removed by BFI Waste Systems on October 10, 1986; the toxic material by SCA Chemical Services on November 24, 1986. The storage area was thoroughly cleaned and monitored to be assured no radioactive material remained. A letter of acceptance by U. S. Vanadium was mailed to P. K. Willmott on January 14, 1987.

2.8 Yard Area - Ores and Slags

A radiation survey and surface sampling were completed in the yard area east and north of the Niagara Plant. The purpose was to determine if hazardous waste was present in this area, in which case Umetco would assume the cost of reclamation, or if not, the surveys could serve as a benchmark for deciding reclamation costs at the termination of U. S. Vanadium operations at Niagara Falls.

(1) The Department of Labor (OSHA) as of June 20, 1986 will allow 0.2 fibers per cc but requires medical surveillance at 0.1 fibers per cc. The regulation for permissible airborn fibers in the workplace are an order of magnitude higher than that suggested by EPA after cleanup.

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Gamma radiation was measured at waist level and at surface contact on a grid laid out on 50-ft. centers. With the exception of one slag pile that was subsequently removed, no anomalities were observed. The survey was completed May 5 and 6, 1986 and reported to F. V. McMillen on May 15.

The surface sampling was completed on April 30, 1986. The area east and north of the Niagara Plant was surveyed and divided into eight parcels of approximately one acre each. Five samples from surface to six inches deep were taken and blended to form a composite sample for each one acre parcel. The samples were submitted to Advanced Environmental Systems Inc. for analyses of PCB's, EP Toxicity Metals and the 13 Priority Pollutant Metals. All samples were well below permissable levels for PCB's and EP Toxicity. Of the Priority Pollutants, chromium, nickel, zinc, and copper were detected. These have no significence unless the soil is to be removed.

U. S. Vanadium signed off on this item in October 1986.

2.9 Plant Buildings

A gamma radiation survey completed in February 1986 uncovered three areas within the plant that had radiation significantly above background. These were an area immediately adjacent to No. 30 Furnace in Building 29, a pit in Building 24 (VA1), and a slag pile east of Building 29. This discovery caused some concern because we had been actively trying to terminate our radioactive material licenses for over a year. Mr. R. Kelly of the State of New York - Department of Labor, was informed and later met with Bob Beverly and me to decide on the proper course of action.

We discovered that New York State is more lenient than NRC on defining allowable concentrations of natural occurring radioactivity (500 µg/g of combined U + Th and radiation less than 250 µR at surface). The contaminated illmenite in the pit in Building 24 and the slag in the yard area contained less than this limit. However, Dr. F. J. Bradley, Principle Radiophyscist of the New York Department of Labor suggested it would be wise to remove the material to a waste site to avoid riders on the lease of the property.

Subsequently, nineteen 55-gallon drums of radioactive soil and slag from No. 30 Furnace were shipped to Barnwell Waste Management Facility, SC by Chem Nuclear Systems on September 19, 1986. The 125 drums of low level radioactive illmenite from Building 24 and the 75 tons of low level radioactive slag were disposed of by Chemical Waste Management (SCA) on June 18, 19 and 20. The areas adjacent to No. 30 Furnace and the pit in Building 24 were backfilled with crushed stone by Dube Construction Company.

U. S. Vanadium signed the letter of acknowledgement in October 1986.

2.10 Drain and Level Lake

A low area east of the Niagara Plant on the property line between L-Tec and U. S. Vanadium collected rain water and discharge from L-Tec forming a sizeable artificial pond sometimes referred to as "Lake Linde". After consultation between personnel from Linde, L-Tec, and Umetco it was decided to take remedial action. The north end of the pond was drained by L-Tec in April 1986.

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The final draining and grading was completed by Dube Construction on August 22, 1986. Several truckloads of clay from Elkem property was used as fill. This material had been used as a temporary cap over an area that had been excavated to remove radioactive soil. Samples of the clay were obtained by Advanced Environmental Systems and analyzed for leachable EP Toxicity Metals. The samples were then forwarded to the Linde Division R&D Analytical Services for radio-assays. There were no leachable toxic metals and the radioactivity was barely above background.

Polaroid snapshots of the graded area were submitted as part of the record.

U. S. Vanadium signed off on this item in October 1986.

3.0 CLOSING OF THE TECHNOLOGY DEPARTMENT

3.1 Transfer and Sale of Equipment and Furniture

When the disbanding of the Technology Department was announced all the laboratory equipment at Niagara Falls (and Grand Junction) became surplus. The equipment lists that had been prepared for the "Tiger" project were circulated to the Niagara, Hot Springs and Bishop Plants. Equipment was shipped on request on a "first come - first served" basis. The Hot Springs Plant was the most aggressive receiving about 90% of the Grand Junction analytical laboratory equipment plus two large shipments from Niagara Falls.

The balance of the sale was placed in the hands of Investment Recovery. Their first order of priority was to offer surplus equipment to other divisions of Union Carbide. Roy Sommers visited the Technology facility and prepared a booklet listing those items he thought would move quickly. Closing Date for request was set as October 15, 1985.

The response within the Corporation was good. Eighteen locations made requests and equipment with an initial value of $139,852 was transferred.

Elkem Metals was given first choice when sales were opened up outside the Corporation. They purchased considerable equipment to which was assigned an $11,190 price tag.

The choice office furniture, i.e. that constructed of wood, both from R&D and Engineering went to the Linde Divisions located next door.

Most of the equipment and furniture remaining was moved to the vacant "Old Works Lab", (Building 111) prior to the termination of our lease with Elkem December 31, 1985. Some of the heavier pieces were stored in garages near the Engineering Building. Furniture and partitions from Engineering (Building 149) were also stored in Building 11 when that facility was turned over to Linde Division.

Investment Recovery invited several used equipment dealers to bid on what was left. Representatives from two firms, BoChem and J. Little Mercer sent representatives to view the equipment. BoChem submitted a bid of $1750 which was turned down.

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On February of 1986 an inventory of what was available, including the contents of the more than 241 cartons used in moving, was compiled and sent to Investment Recovery. They sent the list out again inviting bids for a "as is, where is" package. Polyscience, Inc. made an offer of $6800 which was accepted on May 19, 1986 by Investment Recovery. This offer was subsequently withdrawn.

J. Little Mercer Company made a revised bid of $10,000 in June 1986 but when they found out that Polyscience had dropped out of the bidding they withdrew their offer.

We then began to sell small orders of equipment to small local firms and some furniture to individuals. There were approximately 21 transactions with total sales amounting to $7,410.

The contents of the garage were sold for scrap in February 1987 because U. S. Vanadium wanted use of the area. Ownership of Building 111 remains with Union Carbide; Linde Gas Products will act as caretaker. To the best of my knowledge Investment Recovery will leave the equipment in Building 111 until it becomes necessary to dispose of it all.

3.2 Vacating Elkem Buildings

Building 169 housed the Carvan Shaft Furnace, the Rotolouvre Dryer (Asbestos Plant), the Pilot Heap Leach, as well as some small scale laboratory equipment. When the decision was made to retain the shaft furnace, Jack Zasler was hired as a consultant to supervise its dismantling and transfer to the Niagara Plant. The Asbestos Pilot Plant was dismantled and components sold or scrapped. Scrufari Construction Company performed the work under Jack's supervision. Asteco Inc. was retained to obtain air samples to assure that asbestos fibers was not rendered airborn during the disassembly. Building 169 was thoroughly cleaned to the satisfaction of Elkem personnel before vacating. The dismantling costs were estimated to be $15,000 plus $12,000 for Investment Recovery's role.

The equipment and furniture in Buildings 166 and 94 were moved to Building 111 in November and December of 1985 by Kuhns Moving and Storage Company. The total moving cost was about $16,000.

3.3 Disposal of Chemicals

It was customary for each laboratory within the Niagara Falls complex to have a stock of chemicals. To simplify disposal, the chemicals in each of the labs were collected in two central locations - one for inorganics and one for organics. They were then grouped according to element or compound and a comprehensive listing was prepared. There were in excess of 2500 items. A copy of the list was sent out to the Umetco Plants and to Elkem to see if they had use for any of these chemicals. Elkem, the only respondent, took about 100 items.

SCA Chemicals, with whom Union Carbide had a national contract, handled the packaging and disposal of the balance. Tracking down the composition of the numerous organic chemicals used in mineral dressing proved quite challenging. The disposal costs were approximately $15,000; probably a bargain considering the time SCA personnel had to spend on this job.

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In April of 1986 additional mineral dressing chemicals that were stored in Building 99 and had been overlooked were disposed of at an additional cost of $3,700.

3.4 Termination of Radioactive Material Licenses

The Niagara Complex had acquired three radioactive material licenses. License No. 955-0139 for a radioactive source for a density gauge and No. 950-0139 to allow processing of columbium ores were assigned to the plant. License No. 210-0090, assigned to Technology, was for several radioactive sources.

3.4.1 License No. 955-0139

This license was for one (1) 150 mCi Cs 137 source used in an Ohmart density gauge to measure the specific gravity of calcium hydroxide sludge in a pipe. It was granted in February 1965; it was amended 10 times, the most recent being October 1981. The source was sent back to the manufacturer by George Parker in August 1985. License termination was granted on September 4, 1986.

3.4.2 License No. 950-0139

The original license was issued to Olefins and Metals Division of UCC in January 1965. The license superseded U. S. Atomic Energy Commission License No. SUB-469 which was terminated when jurisdiction passed from federal to state control. It was issued to cover the processing of ores and the storage of slags containing thorium and uranium used or generated in the production of ferrocolumbium.

Production of ferrocolumbium was discontinued about 1972, a letter requesting termination of the license was written to New York State by Mr. D. Brosnahan on March 11, 1982. However an earlier survey by DOE/MED indicated areas of above background radiation on Metals Division property behind Building 166. A subsequent survey by R. Kelly of New York State Department of Labor in April 1982 showed four areas to be out of compliance. The contaminated soil was removed over a period of two years. Samples taken on March 20, 1986 were found to be free of contamination and termination of the license was granted on August 15, 1986.

3.4.3 License No. 210-0090

This license was issued to the Technology Department of Union Carbide Metals Company on November 28, 1962. It superseded AEC License No. 31-1069-2. At that time it covered four radioactive elements for use in radiochemical tracer studies. We have ten amendments on file, the last one dated May 11, 1982 which added a new Cobalt 57 Sealed Source.

A request was made to terminate this license on February 7, 1986. At that time the following sealed sources were included in the license 2 Cesium 137, 1 (ea.) Cd 109, Fe 55, Co 57, and Pu 238. In addition, at that time, the Lab had on hand an unknown radium source, an alphatron gauge, about 3-1/2 pounds of thorium chemicals, four fused thorium oxide

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crucibles, and an Alnor dewpointer. A table, which was included in the request for termination, indicating the details of disposal is reproduced below. The license was terminated on August 15, 1986.

DISPOSAL OF RADIOACTIVE MATERIALS

Radioactive Source	Disposal	Broker or Manufacturer	Packaged By	Carrier	Date
(2) CS 137	Nuclear Res. Warrington,PA	Accuray (Manufacturer)	C.Kolodjeski (Accuray)	Smith Transfer	10/17/85
Alnor Dewpointer	Alnor Inst.Co. Skokie, IL (Manufacturer)		A Gonas (Umetco)	U P.S.	12/6/85
Cd 109 Co 57 Fe 55 Pu 238	Amersham (Manufacturer)		F.Susterick (Amersham)	Federal Express	12/10/85
Thorium Oxide(1/2#) Nitrate(2#) Chloride(1#)	US Ecology Richland, WA	Chem Nuclear (Broker)	J. Bender (Chem.Nuclear)	Consolidated Freightways	12/31/85
(4) Thorium Crucibles - 3-1/2" x 1-3/4"					
Alphatron Gauge					
Radium Source					

3.5 Technology Files

At the time of the sale of the ferroalloy related business to Elkem in 1981 the Technology Files were split along product lines. The Metals Division continued to use the same file room and shared the part time services of Mrs. Florence Englander, an experienced file clerk. Unfortunately the files were not complete - primarily because incoming correspondence, reports, etc., were in most cases not forwarded for filing. Most of this information was buried in individual's personal files. Again, unfortunately, these were never sorted when personnel were retired, transferred or terminated.

The Technology Files, both from Niagara Falls and Grand Junction, together with numerous personal files that remained were physically transferred to the Niagara Plant prior to December 31, 1985. Over the next several months these were culled, sorted, and indexed. The uranium files (19 boxes) were shipped to Grand Junction on August 14, 1986.

The remaining files on vanadium, tungsten, and numerous other topics were sorted and turned over to U.S. Vanadium in October 1986. Copies of the Technology Files Index together with a letter listing the contents of the other files was mailed to appropriate Umetco personnel on October 30, 1986.

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The patent files, including the dockets dealing with uranium are located in the same room.

3.6 Decontamination and Restoration of Elkem Site

Personnel from ORNL and DOE surveyed the Technology Site in August of 1976 because this property had housed uranium metal production in 1942. Above background beta-gamma readings were found behind Building 166. Subsequent aerial radiological surveys in 1978 and 1979 showed no anomolies on the Union Carbide site. In September 1980, ORNL personnel conducted a follow-up radiological survey and found relatively high concentrations of the gamma-emitting radionuclides of the thorium 232 and uranium 238 decay chains in the surface soil around Building 166 and 163. It was concluded, based on U-238 and Ra-226 ratios, that the contamination was from thorium bearing ores and not uranium metal. It was recommended a more comprehensive survey be completed.

A preliminary radiation survey was conducted by Dave Brosnahan in October 1981 which showed high concentrations along the railroad tracks behind Building 166.

On December 7, 1981, UCC was cited for being in violation of the New York Radioactive Materials License 950-0139. Concentrations of source material exceeded limits specified for uncontrolled areas.

A comprehensive radiation survey was then undertaken by Lee Evans and Dave Brosnahan and a Design Memo "Radiological Survey, Cleanup Options and Cost Estimates" was released by Lee Evans on July 13, 1983. The decision was made to proceed with the most expensive option ($335M) which involved removal of soil and shipping it to a repository.

Excavation began in the summer of 1984 and shipments to both Uravan, Colorado for processing and Barnwell, South Carolina for burial continued until the end of the year.

The excavated area was backfilled with clay. [Elkem Metals objected to this step, complaining that the compacted clay would not yield a surface that would be satisfactory for storage or vehicle traffic.]

Analysis of samples, taken before excavation in July 1984, after excavation, and after backfilling in October 1984, at surface and depths of six and twelve inches, were forwarded to New York State in July 1985. The delay in analytical results was caused in part by the closing of the Grand Junction Analytical Lab. Later, samples had to be resubmitted when Alpha Nuclear in Dallas analyzed the incorrect thorium isotope.

Mr. Kelly, Department of Labor, obtained samples to verify cleanup on March 20, 1986. Notification that the license was terminated was received on August 15, 1986.

Dube Construction Company was awarded a contract ($18,500) to restore the Elkem property. This consisted of excavating about one foot of the clay cap and backfilling with crushed stone.

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Mr. Richard Crago, Site Manager of Elkem Metals, signed a letter on September 9, 1986 acknowledging that the restoration and delicensing was completed to their satisfaction. It was suggested a copy of this letter be placed in the Tiger Project Files. Polaroid snapshots of the job at completion are retained in the file here at Niagara Falls.

4.0 OTHER ACTIVITIES

4.1 Removal of Boiler Room Stacks

Union Carbide elected to retain the old boiler room complex as insurance when Occidental Petroleum began to provide steam to the Niagara Complex. This facility was retained when surrounding building were sold to Niacet in 1981. The age and condition of the boilers precluded further use and the two stacks presented a safety problem. The stacks were taken down by Scrufari Construction Company July 22 through July 24, 1986 at a cost of about $4400. This included an overrun of about $2000, the cost of bringing in a heavier crane which was necessary when the stacks were found to be double walled and filled with insulation. The double wall caused additional problems for the scrap dealer selected for the disposal. It became too expensive for him to cut the stacks into small enough sections for him to be able to mount the pieces on his trucks. To avoid the liability of stacks lying on Niacet property, Scrufari Construction was commissioned by us to assist in the removal. This was accomplished on February 11, 1987 . The cost was approximately $1000.

4.2 Asbesto Removal

The boilers and associated piping of the Old Boiler House were insulated with asbestos. The insulation on the six pipes that ran for approximately 800 feet on a pipe rack was in sad condition. In addition, asbestos insulation was found on steam lines within Building 111. The decision was made to remove this material for environmental and safety considerations. This work was included in the contract awarded to Niagara Insulation in August 1986.

5.0 CONCLUSION

This report contains an overview of the tasks involved when a major facility is closed and sold. It is meant only to be a summary which could lead somebody interested in more detail to the proper files.

UCCNHT0001307

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject Termination of Radioactive Materials License 950-0139

Dear Mr Kelly·

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No 950-0139

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed

The location of the radioactivity and the levels of radiation observed are shown in Table I

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg 29 (#6 Fce Rm)	5-10 µR/hr		
	- I-beam south of 30 Fce		200 µR/hr	20
	- Trunion support north of 30 Fce		420 µR/hr	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr		
	- Area below dust collector		170 µR/hr.	15
2/20/86	Yard East of #6 Fce. Rm	8-12 µR/hr		
	- 6' x 6' Areas near slag pile		200 µR/hr	20
2/20/86	Yard East of #6 Fce Rm			
	- 2' x 2' area near Bldg 191		210 µR/hr	20

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The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984. (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986).

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446.

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce. Rm #6)	5-10 µR/hr	Area next to Fce 30 above background
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr	Some sample cans >1mR/hr.
	32 (#2 Packing)	8-10 µR/hr	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr.	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr	Area below Dust Coll above background.
2/20/86	(Storage Shed N W. Corner of Umetco Property)	8-12 µR/hr.	OK
2/25/86	7 (Storeroom)	8-10 µR/hr.	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr.	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr	OK
2/27/861	13, 14 (Aux Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr	OK
3/14/86	111 (Eng. Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg)	7-8 µR/hr.	OK

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The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4 Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
R. G. Tisch
C. T Wentzel

UCCNHT0001310

X Pls F.J. Sibley
ew 10/28/81

OC
TJK
RJK
DJH
DRB

Elkem Metals Company
4625 Royal Avenue, PO Box 1344
Niagara Falls, New York 14302
(716) 286-7400

October 27, 1981

Mr. Stephen G. Moorhead
Sullivan & Worcester
200 Park Avenue
New York, NY 10166

Dear Mr. Moorhead:

You requested our comment on the following items mentioned in your letter of October 22, 1981.

Chain Link Fence

The fence has been erected. A small section is down at the moment, to satisfy a Linde maintenance project. Mr. Temple assures me this will be replaced.

Contrary to your parenthetical note, we, at Niagara, assume that the fence belongs to Union Carbide Corporation. Please let us know if we are mistaken.

Frame Garage

It has been demolished.

Building 163 and Surrounding Area

Mr. Brosnahan's letter of October 13 summarizes the current status. Messrs. C. R. Allenbach (Elkem) and D. J. Hansen (UCC) are cooperating on this item. We foresee no problem, but will have to await the final survey.

Building 169 (Asbestos Pilot Plant)

Our Dr. Allenbach sees no problem in this area and we believe it is time to sign off. Mr. Temple's note of July 24, 1981, and attached memo cover the situation.

Very truly yours,

W. Chynoweth
Manager - Administration
and Technical Services

WC:cjb
Attachment

CC: E. W. Kantz
J. G. Oxaal
F. T. Temple

UCCNHT0001311

cc to G.R.A. - 10-23

OCT 23 1981

SULLIVAN & WORCESTER
200 PARK AVENUE
NEW YORK, NEW YORK 10166
(212) 599-7910
TELECOPIER NO. 212-599-7922
TWX: 710-581-0322

IN BOSTON, MASSACHUSETTS
100 FEDERAL STREET
BOSTON, MASSACHUSETTS 02110
(617) 338-2800
TELECOPIER NO. 617-338-2880
TWX: 710-321-1976

IN WASHINGTON, D. C.
1025 CONNECTICUT AVENUE, N.W.
WASHINGTON, D. C. 20036
(202) 293-6170
TELECOPIER NO. 202-293-2275

October 22, 1981

FEDERAL EXPRESS

Mr. William Chynoweth
Manager, Administration and
Technical Services
Elkem Metals Company Technical Center
4625 Royal Avenue
Niagara Falls, NY 14302

Dear Bill:

As we discussed on the telephone yesterday, I am enclosing a copy of the agreement signed on the closing date, covering Plant Operations at Niagara Falls.

As you can see from the agreement, Union Carbide has agreed that according to item Number I on Page 1, within 120 dyas, or October 31, Union Carbide will:

No. - UCC - ?

1) erect a chain link fence (which shall belong to you) along the common boundary between the Technology Center and your Niagara Plant, including any necessary gates for access to Buildings 88 and 99 and we shall both have keys for such gates; and,

Done

2) demolish a frame garage which extends from the south-easterly corner of the Technology Center onto your plant property.

Done

In addition, according to item Number 2 on Page 2 of the enclosed agreement, Union Carbide has agreed to take such actions, within a reasonable time after June 30, 1981, as may be necessary in order to decontaminate:

1) Building 163 and the area shown on Figure 2 attached to the enclosed letter agreement of such radiation as may be reasonably practicable in order to meet acceptable levels under applicable Federal standards; and,

one more survey - some work may be needed

2) Building 169 of asbestos in order to meet current Occupational Safety and Health Administration standards.

should be no problem

I would appreciate it if you would send me a letter, detailing Union Carbide's progress in fulfilling its obligations.

Sincerely,

Stephen G. Moorhead/ee

Stephen G. Moorhead

SGM/ee
Enclosure

cc: Harry W. Fawcett, Esq. (w/encl.)

UNION CARBIDE CORPORATION
270 PARK AVENUE, NEW YORK, N.Y. 10017

June 30, 1981

Elkem Metals Company
19th Floor
270 Park Avenue
New York, New York 10017

Re: Tiger Project - Plant Operations
Niagara Falls, New York

Gentlemen:

In conjunction with the closing of even date herewith as to the sale by Union Carbide Corporation ("Union Carbide") to Elkem Metals Company ("Elkem") of Union Carbide's alloys business and in particular the execution of a Lease Agreement (the "Lease Agreement") for the Niagara Falls Technology Center ("Technology Center"), Union Carbide and Elkem agree as follows:

1. Within 120 days after the date hereof, at its sole cost and expense, Union Carbide shall (i) erect a chain link fence (which shall belong to it) along the common boundary between the Technology Center and Union Carbide's Niagara Plant, including any necessary gates for access to Buildings 88 and 99; and (ii) demolish a frame garage which extends from the southeasterly corner of the Technology Center onto Union Carbide's plant property. Union Carbide and Elkem shall both have keys to such gates, which shall be maintained in a closed and locked position except when they are in active use. In the event that Union Carbide fails to maintain and repair said fence, upon ten (10) days' prior written notice to Union Carbide, Elkem shall have the right to make any necessary repairs thereto at its sole cost and expense, provided that it assumes all risks attendant with such work; except that if the requirement for repair arises solely out of the actions of Union Carbide, then Union Carbide shall reimburse Elkem the reasonable cost of any necessary repairs.

2. Within a reasonable period after the date hereof, at its sole cost and expense, Union Carbide shall take such actions as may be necessary in order to decontaminate (i) Building 163 and the area shown on Figure 2 attached hereto of such radiation as may be reasonably practicable in order to meet acceptable levels under applicable Federal standards; and (ii) Building 169 of asbestos in order to meet current Occupational Safety and Health Administration standards.

3. Union Carbide hereby grants to Elkem a non-exclusive easement of access to Building 88 over that part of 47th Street located within plant boundaries for as long as the the Lease Agreement of even date herewith shall remain in effect. Such easement shall be for the sole purpose of permitting deliveries and shipments as to nickel boron production and any other ferroalloy products produced in Building 88. Elkem shall indemnify and hold harmless Union Carbide from all claims, damages, loss and liability, including reasonable attorneys' fees, due to any personal injury, death or property damage (including without limitation any damage to the subject land and property of Union Carbide), arising out of Elkem's exercise of such easement rights, except where such claims, damages, loss and liability arise out of the gross negligence of Union Carbide. Elkem shall be liable for the cost of any repairs to Union Carbide's 47th Street roadway and adjoining paved surfaces due to Elkem's exercise of these easement rights. In the event Elkem exercises its option to purchase the Technology Center, simultaneously with the conveyance thereof, Union Carbide shall deliver to Elkem a permanent non-exclusive roadway easement incorporating provisions of this Paragraph 3 and in the same form (to the extent applicable) as Schedule G of the said Lease Agreement.

4. Union Carbide has assigned to Elkem certain sewage rights from the City of Niagara Falls (the "City") applicable to the Technology Center. The City has indicated that it is willing, subject to City Council approval, to increase the total allocation to Union Carbide's Niagara Plant (including the Technology Center) up to 125 pounds per day of suspended solids (SS) and 93 pounds per day of chemical oxygen demand (COD). In the event of any such increased allocation as to SS and COD, if Elkem does not receive 70% of any additional SS or COD rights, Union Carbide shall make a further assignment in order that Elkem will receive 70% of the total SS and COD allocated to the Technology Center and the Niagara Plant. Elkem reserves the right to make any claims or demands against Union Carbide as to the transferred sewage rights due to any infiltration or related problems affecting the Technology Center.

5. Anything to the contrary contained in the Lease Agreement notwithstanding, (i) if Union Carbide vacates any part of the Licensed Space at the Technology Center in order to accommodate the removal of Elkem personnel from Building 149, Elkem shall accept the surrender of such space and the Lease Agreement shall be modified accordingly; (ii) at the request of Elkem and subject to availability and Union Carbide's prior written consent, which shall not be unreasonably withheld, and consistent with past practices over the last five (5) years, Union Carbide shall deliver to Elkem additional electricity (hydroelectric power only), in excess of the limitations as set forth in Schedule C of the Lease Agreement, for Elkem's use at the Technology Center.

If the foregoing correctly sets forth the understanding and agreement of the parties, kindly execute this letter agreement in the space provided below.

Very truly yours,

UNION CARBIDE CORPORATION

By _____

Title _____

AGREED TO AND ACCEPTED:

ELKEM METALS COMPANY
By ELKEM INVEST, INC.
A General Partner

By _____

Title _____

UCCNHT0001316

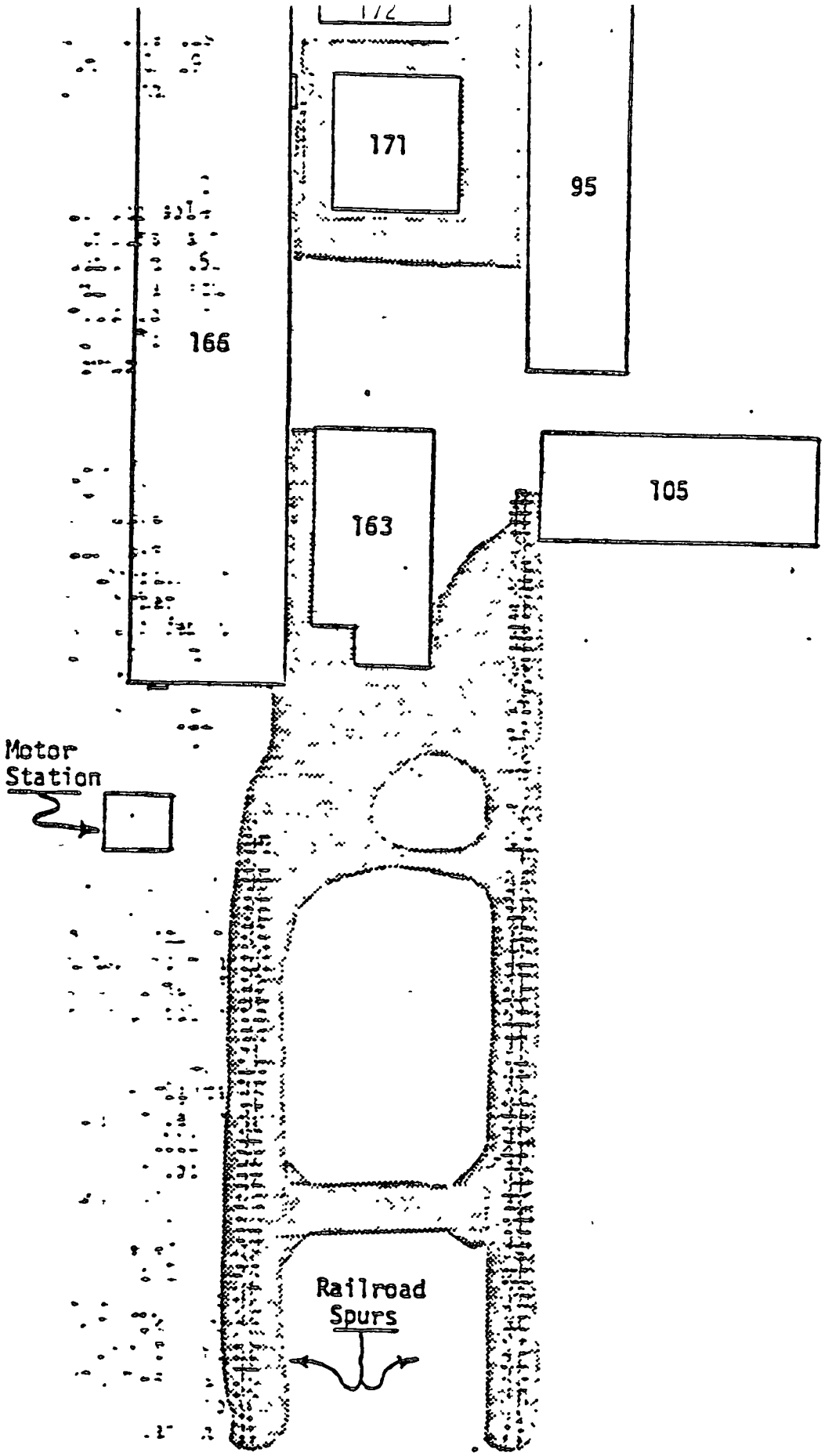

Fig. 2. Location of elevated surface gamma-ray levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY.

UCCNHT0001317

UNION CARBIDE

INTERNAL CORRESPONDENCE

C R Allenbach ✓

RECEIVED

OCT 1 0 1981

D. J. HANSEN

FILE

METALS DIVISION

P.O. BOX 579 - 4625 ROYAL AVE., NIAGARA FALLS, NEW YORK 1430

o (Name) Dr.D. J. Hansen
ivision Building 94
ocation NIAGARA

Date October 13, 1981

Originating Dept. Minerals Technology

Answering letter date

opy to Mr. H. J. O'Hear
Mr. R. G. Woolery

Subject Radiation Survey of Technology Area

RECEIVED

OCT 14 1981

SHEA DEPT.

The attached figure shows the results of a radiation survey performed on October 5, 1981 along the east side of Building 166 to 95 building and the "ball field" behind 166. The values were obtained with a Geiger-Müller type survey meter manufactured by Victoreen of Cleveland, Ohio and are estimates of millirems per hour measured at 1" from the surface. It was observed during the survey that the map is not precisely to scale. As a result, the readings along 166 were taken relative to the location of the buildings, though they do approximate 50' centers. The readings within the railroad tracks are spaced ∿30' apart east to west and ∿50' apart north to south. The readings outside the tracks are ∿50' from the nearest reading just inside the tracks.

In general, levels exceeding background occur on all but the western side of Building 171, between Buildings 166 and 163, and along the railroad tracks. Most of these values are only marginally above background, and all those in the regular grid are less than the 0.25 mrem/hr limit for uncontrolled areas applicable to property that remains subject to the jurisdiction of the State Labor Law and Part 38 of the Industrial Code Rule, Ionizing Radiation Protection. (The 0.25 mrem/hr is from Table 5, attached, of Part 38, and is for fixed alpha or beta-gamma emitters. Also given is a value of 0.05%, or 500 ppm, for the limit of concentrations of source material in soil). However, a previously known area yielding higher emissions was reexamined and an estimated 4 mrem/hr was observed. The attached spectrographic analysis indicates that ∿2.4% of uranium and thorium exists at the surface of this area, and ∿.24% Th is detected at a depth of 6".

Based on the above information, the following is recommended:

1. Remove the surface material of >500 ppm U+Th and >.25 mrem/hr in the area of the ∿4 mrem/hr reading.

2. Survey the ball field area thoroughly as the ∿4 mrem/hr would not have been detected by obtaining readings at 30-50' intervals.

3. Analyze the material at the 0.13 mrem/hr areas to check that it does not contain >500 ppm U+Th.

DRB/rmm
Attachments

UCCNHT0001318

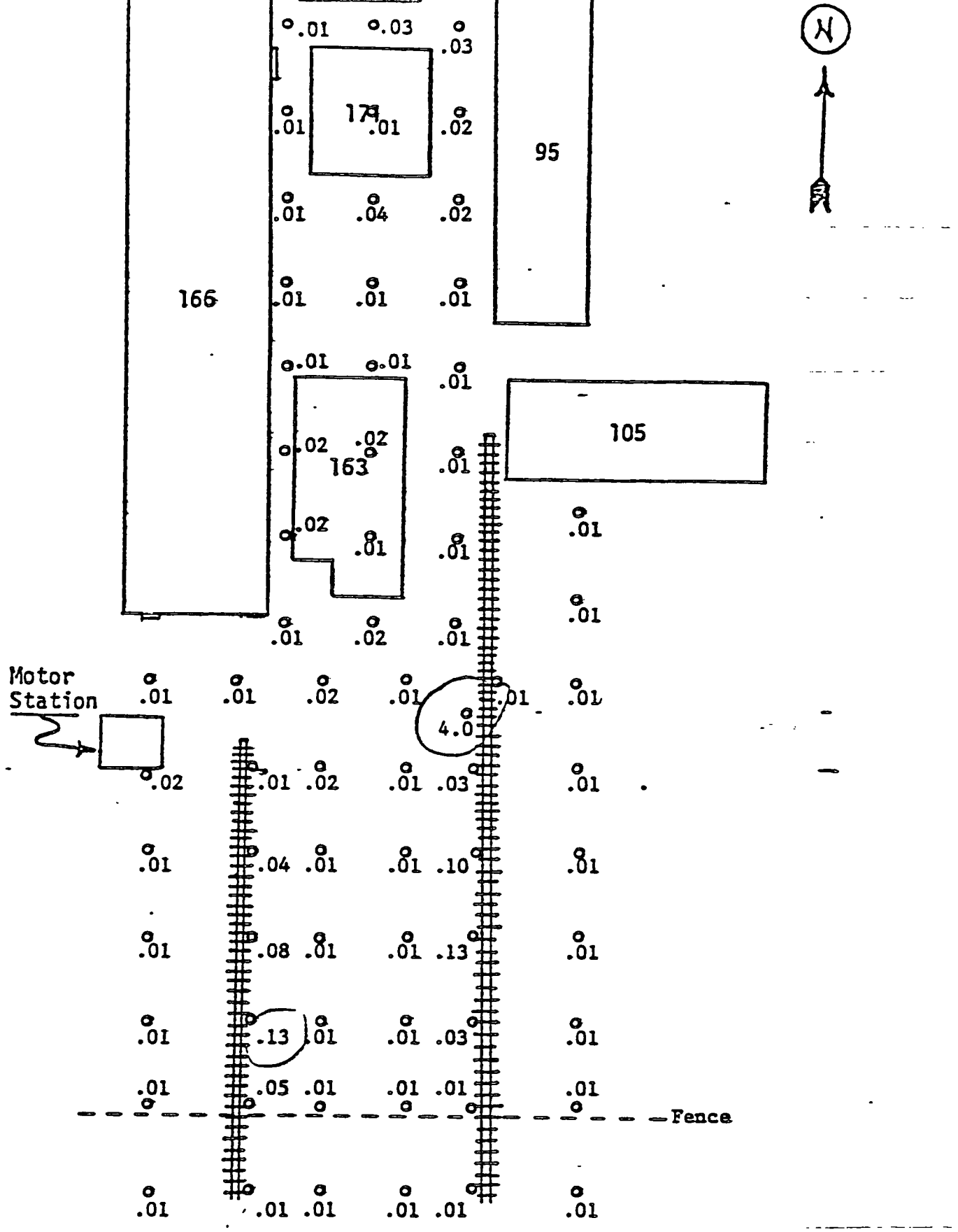

FIGURE 1. Radiation levels in mR/hr at the Technology Department noted during survey of 10/5/81. Natural background was ~.01 mR/hr.

UCCNHT0001319

ɜd)
ES)

	Microcuries
.....	100
.....	100
.....	10
.....	10
.....	10
.....	10
.....	10
.....	10
.....	10
.....	100
.....	10
.....	1,000
.....	100
.....	100
.....	100
.....	10
.....	10
.....	10
.....	100
.....	100
.....	10
.....	100
.....	1,000
.....	10
.....	10
.....	10
.....	0.1

re is present more than one
rived as follows:
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is Part (rule). The sum of such

100

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shall be derived as follows:

: present and the denominator
le). The sum of such quotients

1

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits.

(1) Alpha emitters.

(i) Removable:

$$\frac{15\ \text{pCi}}{100\ \text{cm}^2} = \frac{33\ \text{dpm}}{100\ \text{cm}^2}$$ average over any one surface

$$\frac{45\ \text{pCi}}{100\ \text{cm}^2} = \frac{100\ \text{dpm}}{100\ \text{cm}^2}$$ maximum

(ii) Total (fixed):

$$\frac{450\ \text{pCi}}{100\ \text{cm}^2} = \frac{1000\ \text{dpm}}{100\ \text{cm}^2}$$ average over any one surface

$$\frac{2250\ \text{pCi}}{100\ \text{cm}^2} = \frac{5000\ \text{dpm}}{100\ \text{cm}^2}$$ maximum

$$\frac{0.25\ \text{mrem at 1 cm}}{\text{hr}}$$

(2) Beta-Gamma emitters.

(i) Removable (all beta-gamma emitters except Hydrogen 3):

$$\frac{100\ \text{pCi}}{100\ \text{cm}^2}$$ average over any one surface

$$\frac{500\ \text{pCi}}{100\ \text{cm}^2}$$ maximum

Removable (Hydrogen 3):

$$\frac{1000\ \text{pCi}}{100\ \text{cm}^2}$$ average over any one surface

$$\frac{5000\ \text{pCi}}{100\ \text{cm}^2}$$ maximum

(ii) Total (fixed): $\frac{0.25\ \text{mrem}}{\text{hr}}$ at 1 cm from surface.

(b) Concentrations in air and water: Table 6, Schedule II.

(c) Concentrations in soil and other materials except water:

(1) Radioactive material except source material: Table 2, Column 2.

(2) Source material: 0 05 per cent by weight.

Note: Jurisdictional limits. The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule).

UCCNHT0001320

UCC METALS DIVISION
R&D DEPT. ANALYTICAL LABORATORY
REPORT OF SPECTROGRAPHIC ANALYSIS

Plate No. 5717
Date 9 Sept 80
By SPec

Submitted by W.R. Pioli Values in % On Sample Basis
W Chynometh, C.R. Allenbach
A.R. Brosna
537-70 SEP 9 1980

Sample No.	009433	009434			
Material	8610 @ #1 surface	8611 @ #2 [illegible]			
Ag	—	—			
Al	.2-2.	1-10			
As	—	—			
Au	—	—			
B	.004-.04	.003-.03			
Ba	.008-.08	.002-.02			
Be	.0008-.008	.0004-.004			
Bi	—	—			
Ca	.2-2.	.2-2.			
Cb	M	.2-2.			
Cd	—	—			
Co	.004-.04	.008-.08			
Cr	.04-.4	.3-3.			
Cu	.002-.02	.003-.03			
Fe	2-20	1-10			
Ga	—	—			
Ge	—	—			
Hf	.01-.1	—			
In	—	—			
Ir	—	—			
Mg	.04-.4	M			
Mn	.08-.8	.04-.4			
Mo	—	—			
Na	—	.04-.4			
Ni	.003-.03	.008-.08			
Os	—	—			
P	—	—			
Pb	.1-1.	.03-.3			
Pd	—	—			
Pt	—	—			
Rh	—	—			
Sb	—	—			
Si	.8-8.	M			
Sn	.3-3.	.2-2.			
Sr	.008-.08	—			
Ta	M	M			
Th	.8-8.	.08-.8			
Ti	M	.2-2.			
Tl	—	—			
U	.8-8.	—			
V	.008-.08	.008-.08			
W	.08-.8	—			
Zn	—	—			
Zr	.02-.2	.01-.1			
Yttrium	1-10	.2-2.			
Ytterbium	.08-.8	.02-.2			
Lanthanum	.08-.8	—			

UCCNHT0001321

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

To (Name) Mr. F. V. McMillen
Umetco Minerals Corporation
Division Danbury, CT

Location

Area

Copy to Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch

Date October 14, 1986

Originating Dept

Area

Answering Letter Date

Subject Environmental Issues
Niagara Falls, NY

Dear Frank:

I keep hoping that in one of these letters I can write that everything is complete. At this time all I can tell you is that we are almost there. Highlights for the past month are:

1. Removal of asbestos from the Globar freight elevator was completed on October 8, 1986. Sampling was conducted inside the elevator for six (6) hours on October 9. Fiber count was .005 per cc or less which is as low as can be recorded. A second sampling is scheduled in approximately 30-days. If that test shows no fibers present I will approve final payment to Niagara Insulation and U. S. Vanadium will sign off at that time.

2. Samples that contain priority pollutant metals have been dumped into ten (10) 55-gallon drums. The contents of each drum has been sampled and categorized. Presently we are in contact with SCA hazardous waste disposers who at the completion of the paper work and other red tape will remove the drums from the property. Also included for disposal are a couple of dozen samples or organic chemicals that must be handled specially.

The empty sample cans and numerous full cans containing non-hazardous material were disposed of last week. As you recall, radioactive samples were sent to Barnwell on September 19th. Depending on SCA's schedule, the last of the samples should be removed from the property before the end of October.

3. The retrofilled transformers were sampled October 5, 1986. The results have not been reported to U. S. Vanadium at this time. One transformer, No. 143, was not at temperature and may have to be resampled. Transformer No. 22 is not in use (a backup for furnace operations) therefore it has not had 60 days operation required for sampling. I have a tentative agreement with U. S. Vanadium that this will not holdup signing off on the PCB issue.

UCCNHT0001322

4. I have written six (6) letters requesting sign off by U. S. Vanadium. These are:

(1) "Super Sucker Dust", (2) Plant Building Radioactivity Decontamination, (3) Pond (Lake Linde) Remedial Action, (4) Chrome Oxide, (5) High Antimony Tungsten, and (6) Yard Area Radiation and Surface Sampling. Although I have not received the signed letters as yet I understand that the first three have been signed and the last three will be signed next week when Craig Wentzel meets with Rich Miller in Hot Springs.

5. U. S. Vanadium has had to remove a leaking gasoline storage tank. Contaminated soil was removed and is being sampled today to determine if the last traces of gasoline have evaporated. This item (Exhibit E-3-K) appears to be ongoing and would not require a sign off.

I am enclosing an update of the status of all the environmental issues.

Regards,

D. J. Hansen

/mau
Enclosure

UCCNHT0001323

10/14/86

PROJECT	STATUS	ACTION	COMPLETION DATE Est.	COMPLETION DATE Actual	BUDGET Est. $/M	BUDGET Actual $/M
1.0 Halide Scrubber						
1.1 Install Venturi Scrubber	1.1 Complete					
1.2 Install Trough to collect heels from returned cylinders	1.2 Complete					
1.3 Enclose trough and install a fume collection system	1.3 Accrued costs and new estimate. Sent to F. V. McMillen 10/3/86.		11/30/86		118	
2.0 Asbestos Removal						
Elevator shaft, Bldg. 111, storage room, boiler rooms (Niacet), six (6) pipes running 800' on pipe rack.	Asbestos removed from from UCAR freight elevator completed 10/8/86.	A second test of airborn fiber content to be made about November 15th.				61.8
3.0 Sample Cans						
Approximately ~~300~~ 1200 one quart cans containing different alloys, slags, and ores to be classified as toxic or non-toxic and disposed of.	10 55-gallon drums and 12 containers of organics to be removed by SCA Chemical Waste.		10/31/86		10	
4.0 "Super Sucker Dust"						
Dust collected from rafters of plant in commercial vacuum cleaner and dumped in piles throughout yard area.	Complete			7/11/86		

UCCNHT0001324

PROJECT	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est. $/M	Actual $/M
5.0 Fill in Lake						
Low area east of No. 5 Fce. Room collected rainfall and discharge from L-Tec Plant. Drain and level.	Complete			8/22/86		6.4
6.0 Remove Radioactive Waste						
Slag and contaminated soil from No. 30 Furnace (twenty 55-gallon drums). Radioactive samples.	Complete			9/19/86	125	
7.0 Remove Radioactive Source						
Previously used to calibrate X-ray equipment in VA1.	Complete					
8.0 Reclaim Elkem Property						
Hold over from "Tiger" project. UCC agreed to remove clay and backfill when State released property for unrestricted use.	Complete			8/15/86		18.3

UCCNHT0001325

PROJECT	STATUS	ACTION	COMPLETION DATE Est.	COMPLETION DATE Actual	BUDGET Est. $/M	BUDGET Actual $/M
9.0 Terminate Licenses						
9.1 210-0090						
Technology sources.	Complete			8/15/86		
9.2 950-0139						
Processing Columbium Ores.	Complete			8/15/86		
9.3 955-0139						
Plant Sources.	Complete			8/15/86		
10.0 Patents						
Finish filings. Respond to Patent Examiners.	Complete			9/5/86		
11.0 Files						
11.1 Uranium to Gr. Jct.	Complete			8/14/86		
11.2 V & W Files	Complete			10/10/86		
11.3 Active Files to Gr.Jct.		Jack Frost will visit Niagara Falls before shipping.				

UCCNHT0001326

PROJECT	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est. $/M	Actua $/M
12.0 Surplus Equipment	Sold approximately $3000 of equipment. Working in conjunction with Investment Recovery.	Processing of several small orders in progress.				
13.0 Remove Stacks						
Two stacks at old Boiler Room in Niacat.	Complete.			7/24/86		4.4

UCCNHT0001327

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

May 14, 1985

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139

Dear Mr. Kelly:

The following samples were taken from the railroad track area at Union Carbide's Royal Avenue Technology Center, in addition to the prior samples which were used to define the work:

Before Excavation, July 19, 1984

Seven surface samples.

Samples After Excavation

Eight sample locations at excavated surface, six inches deep and twelve inches deep, for a total of twenty-four analyses.

Samples After Backfill, October 16, 1984

Seven sample locations at surface, six inches, twelve inches, eighteen inches and twenty-four inches deep, for a total of thirty analyses.

The samples were sent to the Grand Junction laboratory. However, in the process of being surplused after the samples were received, they sent them to Alpha Nuclear in Dallas for analysis. I have initiated steps to receive the results; samples are indicated on the attached record sheets.

Very truly yours,

R. J. Klotzbach

cc: Mr. F. V. McMillen
Attachments

UCCNHT0001328

SOIL DECONTAMINATION - SOUTH OF BLDG. 166 - NIAGARA

Soil Samples To Be Analyzed — File No. 11309

1.) Samples 7-19-84

Material From West Area Before Excavation (Surface).

Sample	Location
S-1	South End
S-2	Center
S-3	Center
S-4	North End Center
S-5	North End and Edge of Concrete Pad

2.) Samples - After Excavation - Before Backfilling

Sample	Location
WA-1-S	West Area @Surface - Hole #1
WA-1-6	West Area @ 6" - Hole #1
WA-1-12	West Area @ 12" - Hole #1
WA-2-S	West Area @Surface - Hole #2
WA-2-6	West Area @ 6" - Hole #2
WA-2-12	West Area @ 12" - Hole #2
WA-3-S	West Area @Surface - Hole #3
WA-3-6	West Area @ 6" - Hole #3
WA-3-12	West Area @ 12" - Hole #3
WA-4-S	West Area @Surface - Hole #4
WA-4-6	West Area @ 6" - Hole #4
WA-4-12	West Area @ 12" - Hole #4
EA-1-S	East Area @Surface - Hole #1
EA-1-6	East Area @ 6" - Hole #1
EA-1-12	East Area @ 12" - Hole #1
EA-2-S	East Area @Surface - Hole #2
EA-2-6	East Area @ 6" - Hole #2
EA-2-12	East Area @ 12" - Hole #2
EA-3-S	East Area @Surface - Hole #3
EA-3-6	East Area @ 6" - Hole #3
EA-3-12	East Area @ 12" - Hole #3
EA-4-S	East Area @Surface - Hole #4
EA-4-6	East Area @ 6" - Hole #4
EA-4-12	East Area @ 12" - Hole #4
WL-1	Excavated Area Over Water Lines - West Area

3.) Samples After Backfilling With Clay - 10-16-84

Sample	Location
101 - A (Surface) B (@6") C (@12") D (@18") E (@24")	West Area - South

UCCNHT0001329

Soil Decontamination - South of Bldg. 166 - Niagara

Sample	Location
102 - A	West Area - Center
B	
C	
D	
E	
103 - A	West Area - North
B	
C	
D	
E	
104 - A	East Area - South
B	
C	
D	
E	
105 - A	East Area - Center
B	
C	
D	
E	
106 - A	East Area - North Center
B	
C	
D	
E	
107 - A	East Area - North
B	
C	
D	
E	

LY2

UCCNHT0001330

UNION CARBIDE CORPORATION
METALS DIVISION
4625 ROYAL AVE., P.O. BOX 579, NIAGARA FALLS, NEW YORK 14302
Tel. 7160278-3490

SAFETY, HEALTH AND
ENVIRONMENTAL AFFAIRS
DEPARTMENT

September 4, 1980

Dr. William E. Mott, Director
Environmental and Safety Engineering Division
Office of Environment
Department of Energy
Washington, DC 20545

SUBJ.: Survey of Electromet Site at Niagara Falls, NY Formerly Used by Manhattan Engineer District and/or Atomic Energy Commission

Dear Dr. Mott:

This is in response to your letter of August 5, 1980 on the subject to me.

The survey report is generally acceptable and I have attached a copy showing our suggested changes. Background information on disposal of materials from the demolished building was sent to Mr. A. F. Kluk of your office on April 20, 1979.

Mr. A. Abriss of your office called on August 28, 1980 and indicated that Oak Ridge National Laboratory personnel would visit us during the week of September 22, 1980 and conduct the survey recommended in the report. Since receipt of your letter, we have surveyed the site and will be able to quickly locate those areas with readings above background for the ORNL personnel.

If additional inspection of the old Union Carbide waste disposal area is planned, I suggest you contact the current owner and operator, CECOS International, Inc., P.O. Box 619, Niagara Falls, NY 14302, Attn. Mr. F. Nero, President.

Please let me know if you require additional information on this matter.

Very truly yours,

C. R. Allenbach

Manager of Environmental, Health
and Product Safety Affairs

CRAllenbach:fhr

bc: F.T. Temple + D.H. Hawkes*
R.J. Klotzbach + W. Chynoweth*
E.W. Kantz/File*
F.M. Charles*
W.R. Pioli
D.R. Brasnahan

*Attachment - August 5, 1980 letter from Dr. W.E. Mott to C.R. Allenbach

UCCNHT0001331

RECEIVED
AUG 7 1980
SHEA DEPT.

PRELIMINARY SURVEY OF ~~ELECTROMET CORPORATION~~ UNION CARBIDE METALS DIVISION NIAGARA FALLS, NEW YORK

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

March 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

UCCNHT0001332

~~ELECTROMET CORPORATION~~
UNION CARBIDE METALS DIVISION
NIAGARA FALLS, NEW YORK

At the request of the Department of Energy (DOE, then ERDA), a preliminary survey was performed at the ~~Electromet Division of the~~ Union Carbide Corporation Metals Division plant in Niagara Falls, New York (see Fig. 1), on August 24, 1976, to assess the radiological status of those facilities utilized under Manhattan Engineer District (MED) contract during the period 1943 through 1946. Robert D. Forgeng, Plant Manager, provided information about the contract operations and identified the former site of the one building (a cinder block and wood structure) utilized in the process. C. R. Allenbach and Don Hawkes also provided information as to the building location and project operations. Also, Bill Chyowith, an Chynoweth employee at the plant during the MED contract period, provided information about operational processes and assisted in identifying the location of the building which was demolished about 1958.

The project involved receiving Green Salt (UF_4) in drums from the Linde Air plant at Tonawanda, New York, ~~melting down~~ reacting the Green Salt in ~~induction~~ furnaces, converting it to metal, and then recasting it into ingots ~~of about 110 to 135 kg each.~~ The building was formerly located where Building 166 now stands and just west of Building 163 (see Figs. 2 and 3) which existed at the time of the project. The former process building was constructed of wood and cinder block and was about 18 x 46 m at one end and 14 x 46 m at the opposite end. Waste from the operation was disposed at the Lake Ontario Ordnance Works depot. Residues of dolomite slag liners (MgF_2 slag), uranium chips, and crucible dross associated with the process were shipped to other sites for uranium recovery.

Present Use of Facilities

The building utilized in the MED project was washed, vacuumed, and, in some locations, the concrete floor and some wood platforms were removed (see Report NO4600). Following the project (post-1946), the building was used for zirconium processing from 1947 to 1948, and later titanium was processed prior to demolition. Building 166 (see Fig. 4)

UCCNHT0001333

was constructed on the site of the former process building, and it is currently used by Union Carbide's Metals Division operations.

Results of Preliminary Survey

The preliminary survey was performed by H. W. Dickson of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office (then ERDA). Accompanying Dickson and Thornton during the survey was C. R. Allenbach, Don Hawkes, and Bill Chyowith. Measurements taken at this site included external gamma-ray exposure rates taken at 1 m in height and beta-gamma dose rate taken at 1 cm from the surface. Results of the survey measurements were within background levels with the exception of slightly elevated background with maximum beta-gamma dose-rate readings of 0.1 mrad/hr at a location between Buildings 163 and 166. Survey measurements in sections of the old Union Carbide dump (200 to 300 acres and now owned by ~~Niagara Recycling~~ CECOS International, Inc.) located to the north of Pine Avenue (see Figs. 5 and 6) resulted in radiation levels that were not significantly above background levels. It was believed that some of the waste from the process and rubble from the demolition of the old building may have been discarded at this dump.

Chynoweth

In view of the near background radiation measurements taken at this site, a comprehensive, formal survey will probably not be required. However, it is suggested as a precautionary measure to (1) obtain further measurements between Buildings 163 and 166 to define extent of elevated readings, (2) obtain a soil sample at location in (1) where maximum β-γ and external gamma measurements are observed, (3) drill core samples in the old Union Carbide dump to determine if any radioactive material has been deposited in this area.

A formal survey of this facility was performed as part of the dismantlement and decommissioning of Electromet by the Health and Safety Division of the AEC on August 11 and 14, 1953. The results of this survey are reported in the attached document.

→ Some of the rubble from demolition of the old building and ashes from the burning of combustible material were buried at this dump.

UCCNHT0001334

FILE 1309
1309

UNION CARBIDE CORPORATION
METALS DIVISION
P O BOX 579 1625 ROYAL AVE NIAGARA FALLS NEW YORK 14302

July 7, 1982

Mr R F Kelly
Occupational Safety and Health
65 Court Street
Buffalo, NY 14202

Dear Mr Kelly

We would appreciate an extention to the 90-day deadline we received with your Notice of Inspection Findings concerning concentrations of source material Our intention at this time is to decontaminate the areas and store the material on site until disposal alternatives are fully investigated I will be applying for a license amendment once we have determined details such as volume, storage site location, fencing, etc

Very truly yours,

D R Brosnahan
Radiation Safety Officer

DRB smn

cc Dr D J Hansen

UCCNHT0001335

UC 149 2

Copy FAR

11309

UNION CARBIDE INTERNAL CORRESPONDENCE

METALS DIVISION • P O BOX 579 4625 ROYAL AVE , NIAGARA FALLS, NEW YORK 14302

To (Name) Dr. D. J. Hansen
Division
Location NIAGARA

Date June 17, 1982

Originating Dept: Minerals Technology

Answering letter date

Copy to Messrs. R. G. Beverly
L. G. Evans
T. K. Kagetsu
R. J. Klotzbach
F. T. Temple
R. G. Woolery

Subject Technology Decontamination Requirements

FILE # 11309

In pursuing the State of New York for more of their radiological analyses, I have learned that in fact all nine areas sampled behind Bldg. 166 are out of compliance - not just the four cited The inspector had assumed that the source material was natural uranium, allowing a maximum activity of 200 pCi/g. The source material is thorium, which due to a lower activity per unit weight, must be reduced to 55 pCi/g to be in compliance with the <0.05% (<500 ppm) requirement.

The state's analyses are as follows:

Area	Gross Activity - Raw pCi's		pCi/g	
	Surface	2 - 2-1/2" Deep	Surface	2 - 2-1/2" Deep
1	5.8	9.5	31.4	132 0
2	2.6	41.7	25.4	107.5
3	6.3	9.5	101.1	136 8
4	47.0	15 2	215.9	108 5
5	37.4	6.0	176 3	45 9
6	1400 6	861.2	3413.3	4056 5
7	34.6	35.8	312 3	207.8
8	17.3	72 9	154.7	249 5
9	9.6	16.6	50 6	98 9

Chemical analyses of surface samples I removed from Areas 5 and 8 are as follows·

	% U_3O_8	% ThO_2
Area 5	0.021	0.23
Area 8	0.039	0.48

Spectrographic analyses of these two areas and Area 6 are attached. The Ta, Cb, and Th contents indicate that the contamination is a residue of ferrocolumbium production and not from the former Area Plant.

Listed below are four possible actions which may bring us into compliance with state regulations:

UCCNHT0001336

Case	Action
1	Decontaminate east track to permit track usage requested by Elkem. Relocate residue within west track and Area 6. Fence and post to control access.
2	Decontaminate along both tracks and Area 6. Relocate residue to neighboring UCC property. Fence and post.
3	Decontaminate as in 2. Ship residue to Barnwell, SC for burial.
4	Decontaminate as in 2. Ship residue to Uravan, CO for processing and disposal as tailings.

Case 1 is the least expensive, but also a short term arrangement due to the change in property ownership. Case 2 offers the following: 1) Intermediate term solution allowing time to fully investigate disposal alternatives, including the possibility of a dump in the Northeast necessary by 1986 when present dumps can ban waste from outside states. 2) Frees Technology property for change in ownership. 3) Any additional material, such as may be found during any follow-up surveys, can be handled. This case, however, is subject to approval by the State Department of Labor by amendment of our Radioactive Materials License No. 950-0139 - the license authorizing possession of 6000 lb of thorium obtained for ferrocolumbium production.

Cases 3 and 4 would result in a permanent solution, but would be very expensive.

To obtain preliminary cost information, Lee Evans was consulted. Based on an assumption of 2000 cubic feet of contaminated material, the ballpark costs for Case 2 would be on the order of $100,000. Cases 3 and 4 both would be roughly double this figure. The burial costs at Barnwell in Case 3 approximately equal the increased costs of transportation to Uravan for Case 4. Scrap such as railroad ties must go to Barnwell in any event. It must be emphasized that these values are dependent upon the volume to be relocated, which at present is unknown. A program to delineate the surface areas and depths of contamination is necessary for a realistic estimate.

The deadline for cleanup is July 2, 1982, though I was informed by the state inspector that we can request an extention at that time. A statement of our decontamination plan will be appropriate with such a request.

D. R. Brosnahan
Radiation Safety Officer

DRB:jk

Attach.

UCCNHT0001337

OPTICAL EMISSION SPECTROGRAPHIC ANALYSES OF SAMPLES

FROM SELECTED AREAS SOUTH OF BLDG 166 - %*

	Al	B	Ba	Be	Ca	Cb	Ce	Co	Cr	Cu	Fe	Ga	Hf	La	Mg	Mn	Mo
Area 5, Surface	2.4	.024	.03	.0024	2.4	.6	.9	.03	2.4	.03	3	.03	.024	.24	2.4	.3	.024
Area 6, Surface	.6	.012	.024	.0024	.6	M	1.2	.012	.12	.006	6	-	.03	.24	.12	.24	-
Area 6, 6" Deep	3	.009	.006	.0012	.6	.6	-	.024	.9	.009	3	-	-	-	M	.12	-
Area 8, Surface	2.4	.03	.06	.0024	2.4	2.4	2.4	.06	.24	.03	3	.06	.03	.24	.6	6	.012

	Na	Ni	P	Pb	Sc	Si	Sn	Sr	Ta	Th	Ti	U	V	W	Y	Yb	Zr
Area 5, Surface	.24	.06	.06	.06	-	M	.6	.03	3	.24	.6	-	.06	.9	.06	-	.24
Area 6, Surface	-	.009	-	.3	.24	2.4	.9	.024	M	2.4	M	2.4	.024	.24	3	.24	.06
Area 6, 6" Deep	.12	.024	-	.09	.024	M	.6	-	M	.24	.6	-	.024	-	.6	.06	.03
Area 8, Surface	.3	.06	.24	.024	-	M	.6	.024	3	.3	.6	-	.06	2.4	.06	-	.6

* The following elements were looked for but not detected: - Ag, As, Au, Bi, Cd, Ge, Hg, In, Ir, Li, Os, Pd, Pt, Re, Rh, Ru, Sb, Te, Tl, Zn.

To include probable error, divide by three for lower limit, and multiply lower limit by ten for upper limit.

Dash indicates none detected, M indicates >10%.

UCCNHT0001338

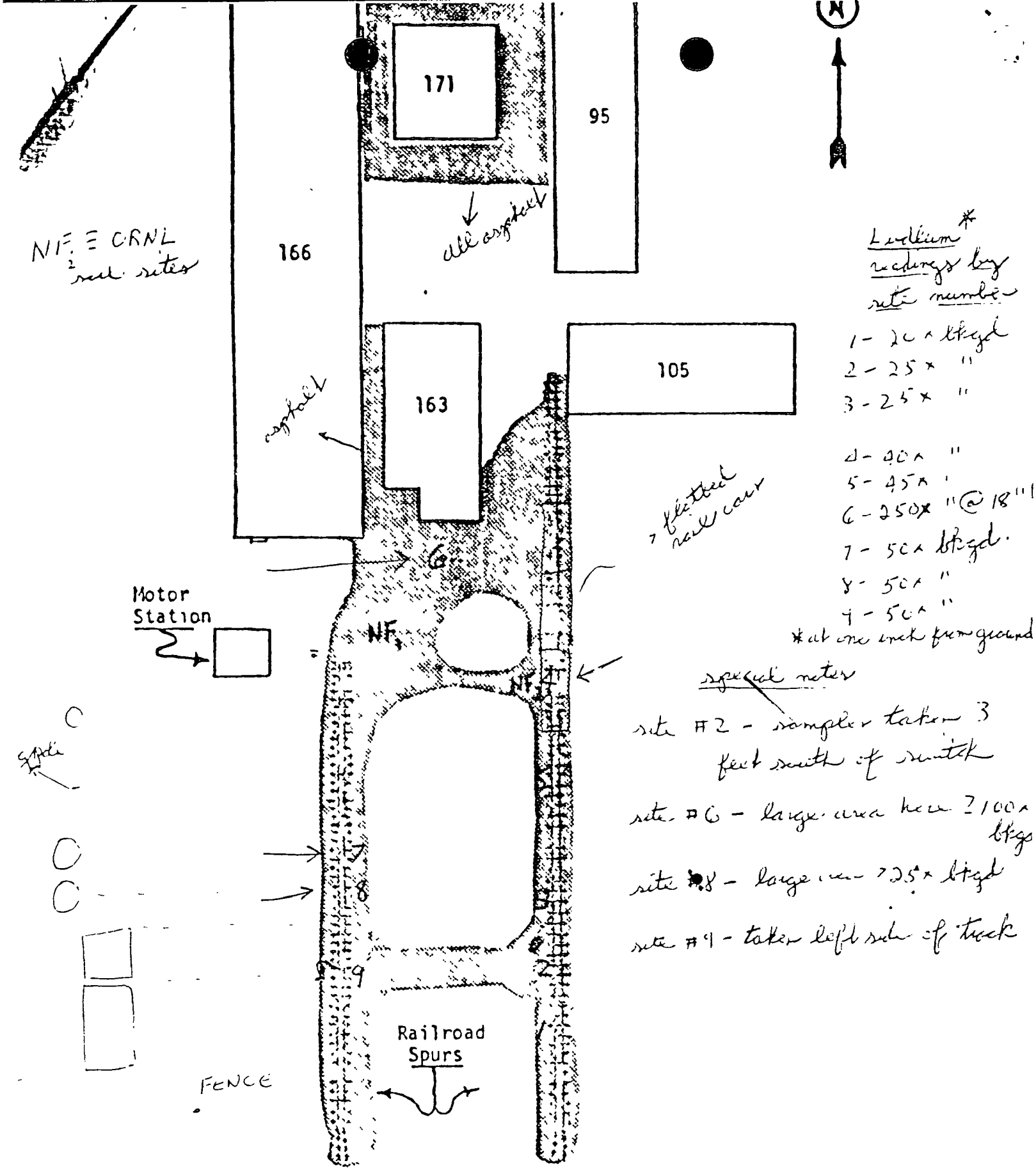

Fig. 2. Location of elevated surface gamma-ray levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY. (1)

UCCNHT0001339

FCE - 11309

August 11, 1982

To: Dr. T. J. Kagetsu
Mr. L. G. Evans

From: F. A. Rutledge

Subject: Contaminated Area South of Building 166 -
Letter D. R. Brosnahan to D. J. Hansen, 6/17/82

I met with Lee Evans and Dave Brosnahan on Tuesday afternoon, August 10, 1982, to review decontamination requirements for the subject area. The following was discussed and may be used as a basis for an action plan:

1. Develop a sampling plan to firmly establish the area of contamination; i.e., pattern of sample holes and depth to check, etc.

2. Establish degree of clean-up required:

   a. Comply with State of New York requirements--55 pCi/g?
   b. Comply with EPA regulations for unrestricted use--10 pCi/g?
   c. Something in between?

3. Determine volume of material to be disposed of based on degree of clean-up established--2a, 2b, or 2c.

4. Determine disposal location:

   a. Load and ship to approved repository?
   b. Load and ship to Uravan for processing?
   c. Load and move to another area of UCC Niagara Plant, and fence?
   d. Some other approved disposal method?

5. Develop cost estimate based on degree of clean-up required and method of disposal agreed upon.

6. Develop plan to dispose of scrap and remove railroad tracks that interfere with removal of residue. Check scrap for contamination prior to disposal, especially embedded railroad ties.

7. Award contract to excavate material to satisfy conditions of 2a, 2b, or 2c and ship or relocate as determined by 4a, 4b, 4c, or 4d.

8. Check area for compliance.

9. Replace railroad tracks.

I recommend that a meeting be held to reach an agreement on options outlined in Items 2 and 4 above and also to establsh a general time frame for the project.

FAR/cep

F. A. Rutledge

UCCNHT0001340

File # 11309

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET, P O BOX 97, NIAGARA FALLS, N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710 524 1664

TECHNOLOGY DEPARTMENT
— ENGINEERING

October 1, 1984

South Carolina Department
Health Environmental Control
2600 Bull Street
Columbia, SC 29201

ATTENTION: HEYWARD G. SHEALY, CHIEF
BUREAU OF RADIOLOGICAL HEALTH

Dear Sir:

This letter is in response to your letter of September 18, 1984, which requires our submittal of corrective measures being taken to eliminate the stated violation of section 1.2, Department Regulation 61-83, and compliance with all applicable requirements and regulations.

There is, of course, no excuse for the omission of the package label "Class A," but an explanation of the circumstances under which it happened will clarify the problem.

We were making simultaneous shipments to Chem-Nuclear at Barnwell, South Carolina, and our plant at Uravan, Colorado. The material being shipped to both locations is from the same cleanup activity. Clean soil with higher concentrations (0.13%) of uranium is being shipped to Uravan for processing while soil with debris and low uranium concentrations is being shipped to Barnwell. Our contractor mistakenly labeled the Uravan shipments "Class A" and omitted the label on the Barnwell shipment. All shipping to Uravan is completed. Therefore, a mix up like this will not happen again.

We apologize for the inconvenience and appreciate that no further enforcement action is anticipated. If additional information is required, please contact the writer.

Sincerely,

Lee G. Evans

Lee G. Evans
Project Engineer

lb

UCCNHT0001341

Copy TJK 5/10/84

File # 11309

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE. NIAGARA FALLS N Y 14302
METALS DIVISION

May 2, 1984

Rec'd to TJK / file
For

RECT MAY 3

Name of File Subject 11309

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139 - Status Report

Dear Mr. Kelly:

We have obtained burial allocation at Barnwell, SC for August 1984 in the amount of 1900 ft^3.

Based on our volume estimate of 7000 ft^3, it will take us all of 1984 and into 1985 to complete the burial because competition for space tends to intensify at the end of the year.

However, your verbal request to delay the work pending a New York State Department of Health survey, not scheduled by H. Michaels until the end of May, will seriously delay the project resulting in loss of allocated burial space. Future schedules depend on the rapidity with which you receive analytical results, make your judgements and issue approval to proceed.

We cannot commit any manpower or funding to a project which has not received the approval of your department. That is the nature of any endeavor involving a state or federal license where a clear cut approved end result is projected which must receive prior approval from the regulatory agency. I would be remiss in my accountability for our limited resources if I acted otherwise.

Up to this point we had your verbal approval as Health Department Representative to proceed with the action plan transmitted to you on April 4, 1984. Since this is not the case, when your department completes its investigation, written approval for the contemplated actions is necessary for the commitment of Union Carbide resources. I now doubt we can complete the work before July 31 and the schedule transmitted to you in my April 4 reply to your March 29, 1984 reissue of your notice of inspection findings, based on a previous New York State survey, is voided.

UCCNHT0001342

Since our meeting in the first week of April we have performed the following:

April 6	1	Hired agents at Barnwell, SC.
April 13	2	Applied for shipping permit
April 17	3.	Released $33,000 of engineering funds and started detail work
April 18	4	Began preparation of work descriptions and purchase orders
April 25	5.	Cleaned up the area for equipment access
April 25	6.	Received shipping permit.
May 1	7	Received partial burial space allocation

As you can see, in a period of three weeks we have actively pursued every phase of the project and acted in good faith by issuing documented status reports to you covering each of those items Nobody has raised any question until the request for "holdup of cleanup " If you issue written approval to proceed, as planned, we will not hold up anything pending your survey except the actual excavation which we must be prepared to begin by June 15.

We will await your advice and approval for this corrective action.

Very truly yours,

R. J. Klotzbach

R J Klotzbach
Director of Technology

/mau

cc: Messrs. W C Thurber
L. G. Evans
R. A. Crago/R E DeWeese - Elkem

UCCNHT0001343

UC 149 2

File # 11309

UNION CARBIDE

INTERNAL CORRESPONDENCE

UNION CARBIDE CORPORATION 137–47th Street, PO BOX 97, NIAGARA FALLS NY 14302
METALS DIVISION

To (Name) Mr. R. J. Klotzbach
Division
Location Umetco Minerals Corporation
Area Niagara Falls, NY

Date May 1, 1984

Originating Dept TECHNOLOGY DEPARTMENT — ENGINEERING

Area

Copy to Messrs. T. J. Kagetsu
F. T. Temple
G. E. Walck
File: 11309

Subject Soil Decontamination - South of Bldg. 166, Niagara

We have obtained a burial allocation at Barnwell, SC, for August 1984 of 1900 ft.^{3}. Competition for space tends to intensify toward the end of each year.

Based on our volume estimate of 7000 - 8000 ft.^{3}, it will take us all of 1984 and maybe into 1985 to complete the burial.

All of the soil, however, will be excavated and packaged by August 1 and stored in the Niagara Plant. I have contacted Frank Temple regarding a suitable storage site. This should bring us into compliance with our NYS Radioactive Material License (950-D139).

I'll keep you posted.

L G Evans

L. G. Evans

/dac8

UCCNHT0001344

cc TJK
FILE 11309

UNION CARBIDE CORPORATION P O BOX 579, 4625 ROYAL AVE, NIAGARA FALLS N Y 14302
METALS DIVISION

April 30, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139

Dear Mr. Kelly:

As you requested on this date I am forwarding the survey data we made to define our problem in the area contaminated by ore unloading operations.

You should have in your files the result of the New York State survey made in December 1981 which resulted in a citation for failure to meet licensing requirements. Your survey may be more accurate than ours.

In order to expedite this matter, I am attaching our internal design memo describing the problem and our alternates for solution. This memo should be considered Union Carbide confidential information released to your department in answer to questions which you have raised related to the citation.

The detailed cost estimates have been deleted from this copy but are summarized on Page 9. You can see we have adopted the permanent solution alternative requiring the highest expenditure of funds, contrary to the engineers' recommendation. In addition, our costs have escalated to $400,000 from the $335,000 estimate in the memo.

The information you require for the gamma probes is on Page 3. A drawing of the entire suspect area is enclosed with gamma survey readings on 10 foot centers.

Chemical analysis of "grab" samples were made and a table is displayed converting to pCi/gram. These samples were taken primarily to determine the extent and depth of both thorium and uranium contamination since, at the time, we did not know the source of the original spillage. The high thorium is a definite signature that the source was primarily columbium bearing ores.

UCCNHT0001345

Table III shows that sampling for chemical analysis was done at depth for the areas displaying the highest surface contamination. Activity decreases dramatically with depth so we are certain we have no long standing problem and a fix can be made.

We intend to do in-house monitoring while the work is in progress. We will not complete our efforts until (1) an independent survey is made, and (2) your department conducts it's own survey on the decontaminated area. Our independent surveyors have not as yet been hired but the paper work for purchase and work scope agreements is in preparation. We will keep you informed.

Please feel free to call me about our progress or any other details you require. I will continue to send you status reports.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber w/a
L. G. Evans
R. A. Crago/R. E. DeWeese - Elkem

UCCNHT0001346

Table III shows that sampling for chemical analysis was done at depth for the areas displaying the highest surface contamination. Activity decreases dramatically with depth so we are certain we have no long standing problem and a fix can be made.

We intend to do in-house monitoring while the work is in progress. We will not complete our efforts until (1) an independent survey is made, and (2) your department conducts it's own survey on the decontaminated area. Our independent surveyors have not as yet been hired but the paper work for purchase and work scope agreements is in preparation. We will keep you informed.

Please feel free to call me about our progress or any other details you require. I will continue to send you status reports.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber w/a
L. G. Evans
R. A. Crago/R. E. DeWeese - Elkem

UCCNHT0001347

cc TJK
FILE 11309

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE. NIAGARA FALLS, N Y 14302
METALS DIVISION

April 26, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139 - Status Report

Dear Mr. Kelly:

The area around the railroad tracks which contains low level radioactive ore contamination has been cleared permitting work to proceed. Clearance of railroad flat cars and other stored materials was completed on April 25, 1984.

Detailed engineering for contractor work has begun with the release of engineering funding to an active project on April 17, 1984.

Very truly yours,

R J Klotzbach

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber w/a
L. G. Evans
R. E. DeWeese - Elkem w/a

UCCNHT0001348

File # 11309

4-25-84

MEMO TO LEE EVANS;

WENT OUT TO SITE SOUTH OF BLDG 166 (1:30 - 2:30 PM)

MET KLOTZ & MURPHY — LATER DICK CRAGO.

ELKEM IS SEPARATING MATERIAL TO REMAIN IN STORAGE AND SCRAP.

THE SCRAP WILL BE DISPOSED OF SHORTLY — OTHER MATERIAL STORED ON SOUTH END OF MAIN CONCRETE PAD.

DON HANSEN KNOWS HISTORY OF MATERIALS, WHICH UMETCO NEEDS TO MOVE OR DISPOSE OF — SUCH AS K-R LOW CHROME PELLETS IN WOODEN SKIPS (POSSIBLE FOR USE AS BACKFILL). AND FERROPHOS, IN RUSTY STEEL DRUMS — CONDITION OF SKIPS & DRUMS MAKE MOVEMENT OF THE MATERIALS VERY DIFFICULT.

IT WAS AGREED WITH KLOTZ & MURPHY AND AGAIN LATER WITH CRAGO THAT THE TRACKS TO BE TAKEN UP ~~[illegible]~~ ARE NOT TO BE REPLACED — RAILS ARE ELKEM PROPERTY (per KLOTZ) AND ~~[illegible]~~ CAN BE CUT-UP AND STORED ON A PAD AND IF CLEAN BE SOLD BY ELKEM AS SCRAP, THE TIES CHECKED FOR RADIOACTIVITY AND ~~[illegible]~~ AFTER CLEANING FOUND TO BE CLEAN CAN BE GIVEN AWAY, IF NOT, SHIP OUT IN BOXES.

KLOTZ WOULD LIKE BOXES LINED WITH A SUITABLE LINER TO INSURE NO LEAKAGE.

MURPHY SUGGESTED A LINER SIMILAR TO WHAT THEY USE IN THEIR 4' SKIP BOXES (THESE ARE SIMILAR TO THE "BAGS" WE USED)

WE WILL NEED TO SEE HANSEN ABOUT MOVING "OUR" MATERIALS.

RAILROAD FLAT CARS HAVE BEEN MOVED TO A LOCATION NEAR BLDG 105 OUT OF OUR WAY.

BUILDING 105 NOT AVAILABLE FOR STORAGE.

COPY TO: T.J.K
FILE 11309.

GIL

UCCNHT0001349

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

M[illegible] 9 1986

May 15, 1986

Dr. F J Bradley
Principle Radiophysicist
New York State Department of Labor
Room 813
One Main Street
Brooklyn, NY 11202

Subject Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr Bradley

In our phone conversation of Tuesday, May 13 we discussed disposal of two low level radioactive materials that were discovered in a radiation survey of the Umetco property in Niagara Falls, NY The first was illmenite sand (an iron titanium ore) that had been used to backfill a 10' x 10' concrete pit The second was an isolated quantity of slag (calcium-aluminum oxide) from the furnacing of ferrovanadium The illmenite sand was removed from the pit and currently is contained in 125 (one hundred twenty-five) 55-gallon drums I would estimate total weight at approximately 40 to 50 tons The slag is in lumps in a pile that I would estimate to contain 50 to 75 tons Analyses of the materials are presented in the following Table 1.

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

	Analyses				
	URANIUM SERIES			THORIUM SERIES	
Description	Uranium µg/g	Th-230 pCi/g	Ra-226 pCi/g	Th-232 pCi/g	Th-228 pCi/g
Illmenite Sand - Top of Pit	28 9	12±2	19±2	16±2	17±2
Illmenite Sand - 7' in Pit	44 3	22±2	31±3	37±2	39±3
Dark Slag-Yard East of Fce Bldg	20 2	299±7	4.4±1 1	16±2	4±9
Light Slag-Yard East of Fce. Bldg	18.6	466±9	7 0±1 4	37±3	14±2

Industrial Code Rule 38, Table 5 "Limits for Uncontrolled Areas" limits source material to 0.05 percent by weight (500 µg/g or 500 ppm) For Thorium 232 this converts to 55 pCi/g. The concentrations of Th-232 reported in picocurries in Table 1 were converted to µg/g and added to the weight of uranium to determine the total source material present This is shown in Table 2

UCCNHT0001350

The gamma radiation measured at the surface during excavation of the pit and within the slag pile is also reported in Table 2

TABLE 2

Weight of Source Material

Sample	Uranium µg/g	Th-232 µg/g	Total Source Material µg/g	Gamma Radiation µR/hr*
Illmenite-Top of Pile	28 9	145 5	174 4	170
Illmenite-7' In Pit	44 3	336 4	380 7	150
Dark Slag	20 2	145 5	165 7	150
Light Slag	18 6	336.4	355 0	200

*Ludlum Model 19 Micro R Meter - Reading at Surface

As we discussed the total source material in both materials is less than 500 µg/g, the limit for uncontrolled areas and the radiation is less than 250 µR, the limit for fixed surface contamination

Although technically the material was not sufficiently radioactive to be controlled you convinced me that it was not a good idea to use it to fill a low area in the yard If this were done then a rider would have to be appended to the lease that would restrict future building Since this is not an attractive option I propose to dispose of both the slag and illmenite in a local hazardous waste repository

Unless I misunderstood, you did not voice an objection to this during our phone conversation Therefore, I plan to immediately begin the paper work to initiate this course of action. However I will not remove anything from the property before June to allow you time to reconsider. I will not expect to hear from you unless you disapprove

I enjoyed talking to you on Monday and I want to thank you again for the assistance you provided

Sincerely

Donald J Hansen

D. J Hansen
Assistant Director - Technology

cc: Messrs
R. F. Kelly
R G Beverly
F. V McMillen

Blind Copies: Messrs
J. F Frost
T J. Kagetsu
D G Millenbruch
R L. Miller
W D Smith
C T. Wentzel

UCCNHT0001351

JUN 23 1986

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

June 19, 1986

Chief
Bureau of Radiological Health
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, SC 29201

Dear Sir:

Enclosed you will find two completed copies of an "Application for Radioactive Waste Transport Permit" together with the required Certificate of Insurance and a check for $500 to cover the required fee.

Umetco has just completed the sale of its Niagara Falls Facilities and we are obligated to remove the subject radioactive material from the site. Anything you might be able to do to hasten our procurement of a Transport Permit will be greatly appreciated.

Very truly yours,

D. J. Hansen
Assistant Director - Technology

mau/
Enclosures
bcc: J. F. Frost
T. J. Kagetsu
D. G. Millenbruch

UCCNHT0001352

Umetco Minerals Corporation

FIRST NATIONAL BANK
Grand Junction Colorado

No 58848

Grand Junction Colorado June 11, 1986

PAY EXACTLY $500 and 00/100

$500.00

82 39/1021

Operating Account

TO THE ORDER OF
South Carolina Dept. of Health and
Environmental Control
2600 Bull St.
Columbia, S.C. 29201

SIGNED

COUNTERSIGNED

CASH PROMPTLY, NOT VALID AFTER 60 DAYS

⑈00058848⑈ ⑆102100390⑆ 088 141 2⑈

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

APPLICATION FOR RADIOACTIVE WASTE TRANSPORT PERMIT

Applicability: Pursuant to Section 13-7-140, 1976 S.C. Code of Laws (as amended) and Department Regulation 61-83, a Radioactive Waste Transport Permit is required to be obtained by all generators who transport or have radioactive waste transported into or within the State of South Carolina. Persons whose activities result in the generation of radioactive waste have the primary responsibility to obtain a permit.

Instructions: Complete Items 1 through 19. Submit original and one copy to Chief, Bureau of Radiological Health, S.C. Dept. of Health and Environmental Control, 2600 Bull Street, Columbia, S.C. 29201. All items must be completed, required certificate of insurance or bond attached, and signed and dated by an authorized person. If an item is not applicable, indicate "N/A". Incomplete forms and failure to provide an insurance certificate will result in delays or denial of the permit. Additional sheets may be used if necessary. Upon approval, the Department will return one copy with the transport permit. All permit fees shall be remitted and made payable to the S.C. Department of Health and Environmental Control, Bureau of Finance, 2600 Bull Street, Columbia, S.C. 29201. Please NOTE on remittance - "FOR RADIOACTIVE WASTE TRANSPORT PERMIT."

NOTE: Radioactive Waste Transport Permits may be purchased for more than one facility or location of a company, corporation, etc. However, an application shall be submitted for each facility to include the additional fee and the required certificate of insurance or bond.

1. Name and Address of Applicant (Shipper/Generator)
   Umetco Minerals Corporation
   137 - 47th Street
   Niagara Falls, NY 14302

2. Person responsible for Radioactive Waste Shipments:
   a) Name: D. J. Hansen
   b) Title: Assistant Director - Technology
   c) Address: P. O. Box 579, Niagara Falls, NY 14302
   d) Telephone: 716/278-3573

3. Shipment Location(s):
   a) Niagara Falls, NY
   b)
   c)

4. NRC or Agreement State Radioactive Material License No. for each facility:
   a) 950-0139
   b)
   c)

5. Total Estimated Annual Cubic Footage: 160

6. Type of Permit and Amount of Fee Remittal

		[X]	[Y]	[Z]	
Renewal	[X]	[X]	[Y]	[Z]	
New	[ ]	[X]	[Y]	[Z]	($ 500.00)

7. Complete Waste Descriptions:
   a) Mixture of Slag & Soil
   b) Metallurgical Samples
   c)
   d)
   e)

8. Physical & Chemical Form
   a) Solid/Metal Oxides
   b) Solids/Slag, Ore, Ferroalloys
   c)
   d)
   e)

9. Waste Class and Stability
   a) A Unstable
   b) A Unstable
   c)
   d)
   e)

10. List Prominent Radionuclides:
    Uranium 228 & Thorium 232

11. Total Estimated Radioactivity (Curies):
    .0025 Ci

12. Does Waste Contain Any of the Following?
    [ ] EPA Classified Hazardous Materials
    [ ] Chelating Agents
    [ ] Pyrophoric Materials
    [X] None of the Above

13. If "Yes" to Item 12, Identify and Quantify.
    N/A

14. Type Solidification Agents:
    [ ] Bitumen
    [ ] Cement
    [ ] Vinyl Ester Styrene
    [ ] Other _____. None

15. Has Each Solidification Process Received NRC Topical Report Approval and Meet Stability Requirements
    [ ] Yes [ ] No
    N/A

DHEC-800 (Rev. 10/84) **(Complete Reverse Side)**

UCCNHT0001354

Transport Permit Application continued

16. Name and Address of Broker, if used:	17. Name and Address of Carrier.
Chem Nuclear 220 Stone Ridge Drive Columbia, SC 29210	Chem Nuclear P. O. Box 726 Barnwell, SC 29812

Information to Be Submitted as Attachment

18. A Certificate of Liability Insurance issued to the generator shall be submitted as evidence of financial ability to protect the State of South Carolina and the public at large from possible radiological injury or damage due to packaging, transportation, disposal, storage, or delivery of radioactive waste. For those applicants not maintaining liability insurance, they must deposit and maintain with the Department a cash or corporate surety bond in the amount of Five Hundred Thousand Dollars ($500,000.00) Failure to submit a current certificate or bond will result in processing delays.

CERTIFICATE

19 In compliance with Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act, and Department Regulation 61-83, I hereby certify on behalf of the named applicant (shipper/generator) to the South Carolina Department of Health and Environmental Control that. (A) the named applicant (shipper/generator) will comply fully with all applicable laws and administrative rules and regulations, both State and Federal, and any disposal facility radioactive material license requirements and criteria regarding the packaging, transportation, storage, disposal, and delivery of such wastes; (B) the named applicant (shipper/generator) will hold the State of South Carolina harmless for all claims, actions, proceedings in law or equity arising out of radiological injury or damages to persons or property occuring during the transportation of its radioactive waste into or within the State including all costs defending same, provided, however, that nothing contained herein shall be construed as a waiver of the State's sovereign immunity, (C) the named applicant (shipper/generator) has current copies of the Regulations for the Transportation of Radioactive Waste Into or Within the State of South Carolina, DOT Regulations 49 CFR Parts 171-179, and when applicable, the disposal site radioactive material license and the disposal site waste acceptance criteria, (D) the named applicant (shipper/generator) has prepared this application to conform with South Carolina Department of Health and Environmental Control's Regulations for Transportation of Radioactive Waste Into or Within South Carolina, and that all information contained herein, including any required supplements attached hereto, is true and correct to the best of my knowledge and belief.

Date 6/19/86

Donald J. Hansen
Signature

D. J. Hansen, Assistant Director - Technology
Type Name and Title of Applicant's Authorized Representative

DHEC-800 (Rev. 10/84)

UCCNHT0001355

acord CERTIFICATE OF INSURANCE

ISSUE DATE (MM/DD/YY): 6/13/86

PRODUCER

Marsh & McLennan
1221 Avenue of the Americas
New York, NY 10020

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER THIS CERTIFICATE DOES NOT AMEND EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW

COMPANIES AFFORDING COVERAGE

COMPANY LETTER A	Continental Insurance Co.
COMPANY LETTER B	
COMPANY LETTER C	
COMPANY LETTER D	
COMPANY LETTER E	

INSURED

Union Carbide Corporation
39 Old Ridgebury Road
Danbury, Connecticut
06817-0001

COVERAGES

THIS IS TO CERTIFY THAT POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED NOTWITHSTANDING ANY REQUIREMENT TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS EXCLUSIONS AND CONDITIONS OF SUCH POLICIES

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIABILITY LIMITS IN THOUSANDS	EACH OCCURRENCE	AGGREGATE
A	GENERAL LIABILITY X COMPREHENSIVE FORM X PREMISES/OPERATIONS X UNDERGROUND EXPLOSION & COLLAPSE HAZARD X PRODUCTS/COMPLETED OPERATIONS X CONTRACTUAL X INDEPENDENT CONTRACTORS X BROAD FORM PROPERTY DAMAGE X PERSONAL INJURY	SRL 334 7439 SRL 334 7436 *	1/1/86	1/1/87	BODILY INJURY	$	$
					PROPERTY DAMAGE	$	$
					BI & PD COMBINED	$ 1,000	$ 1,000
					PERSONAL INJURY		$
A	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS (PRIV PASS) ALL OWNED AUTOS (OTHER THAN PRIV PASS) HIRED AUTOS NON OWNED AUTOS GARAGE LIABILITY	SRB 335 1869 SRL 335 1869 *	1/1/86	1/1/87	BODILY INJURY (PER PERSON)	$	
					BODILY INJURY (PER ACCID.)	$	
					PROPERTY DAMAGE	$	
					BI & PD COMBINED	$ 1,000	
	EXCESS LIABILITY UMBRELLA FORM OTHER THAN UMBRELLA FORM				B & PD COMBINED	$	$
A	WORKERS COMPENSATION AND EMPLOYERS LIABILITY	SRW 317 4908 SRW 317 4915 *	1/1/86	1/1/87	STATUTOR		
						$ 1,000 (EACH ACCIDENT)	
						$ (DISEASE POLICY LIMIT)	
						$ (DISEASE EACH EMPLOYEE)	
	OTHER						

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

Operation anywhere in USA.
*All operations in Texas covered under this policy.

CERTIFICATE HOLDER

SOUTH CAROLINA DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL, BUREAU OF HAZARDOUS WASTE MANAGEMENT
2600 BULL STREET
COLUMBIA, SC 29201

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES

AUTHORIZED REPRESENTATIVE R. C. Madden

© IRI/ACORD CORPORATION 1984

UC 149 2

UNION CARBIDE INTERNAL CORRESPONDENCE

METALS DIVISION

P O BOX 579 4625 ROYAL AVE, NIAGARA FALLS, NEW YORK 14302

To (Name) Dr.D. J. Hansen
Division Building 94
Location NIAGARA

Date October 13, 1981
Originating Dept Minerals Technology
Answering letter date

Copy to Mr. H. J. O'Hear
Mr. R. G. Woolery

Subject Radiation Survey of Technology Area

The attached figure shows the results of a radiation survey performed on October 5, 1981 along the east side of Building 166 to 95 building and the "ball field" behind 166. The values were obtained with a Geiger-Müller type survey meter manufactured by Victoreen of Cleveland, Ohio and are estimates of millirems per hour measured at 1" from the surface. It was observed during the survey that the map is not precisely to scale. As a result, the readings along 166 were taken relative to the location of the buildings, though they do approximate 50' centers. The readings within the railroad tracks are spaced ∿30' apart east to west and ∿50' apart north to south. The readings outside the tracks are ∿50' from the nearest reading just inside the tracks.

In general, levels exceeding background occur on all but the western side of Building 171, between Buildings 166 and 163, and along the railroad tracks. Most of these values are only marginally above background, and all those in the regular grid are less than the 0.25 mrem/hr limit for uncontrolled areas applicable to property that remains subject to the jurisdiction of the State Labor Law and Part 38 of the Industrial Code Rule, Ionizing Radiation Protection. (The 0.25 mrem/hr is from Table 5, attached, of Part 38, and is for fixed alpha or beta-gamma emitters. Also given is a value of 0.05%, or 500 ppm, for the limit of concentrations of source material in soil). However, a previously known area yielding higher emissions was reexamined and an estimated 4 mrem/hr was observed. The attached spectrographic analysis indicates that ∿2.4% of uranium and thorium exists at the surface of this area, and ∿.24% Th is detected at a depth of 6".

Based on the above information, the following is recommended:

1. Remove the surface material of >500 ppm U+Th and >.25 mrem/hr in the area of the ∿4 mrem/hr reading.

2. Survey the ball field area thoroughly as the ∿4 mrem/hr would not have been detected by obtaining readings at 30-50' intervals.

3. Analyze the material at the 0.13 mrem/hr areas to check that it does not contain >500 ppm U+Th.

DRB/rmm
Attachments

D. R. Brosnahan - Radiation Safety Officer

UCCNHT0001357

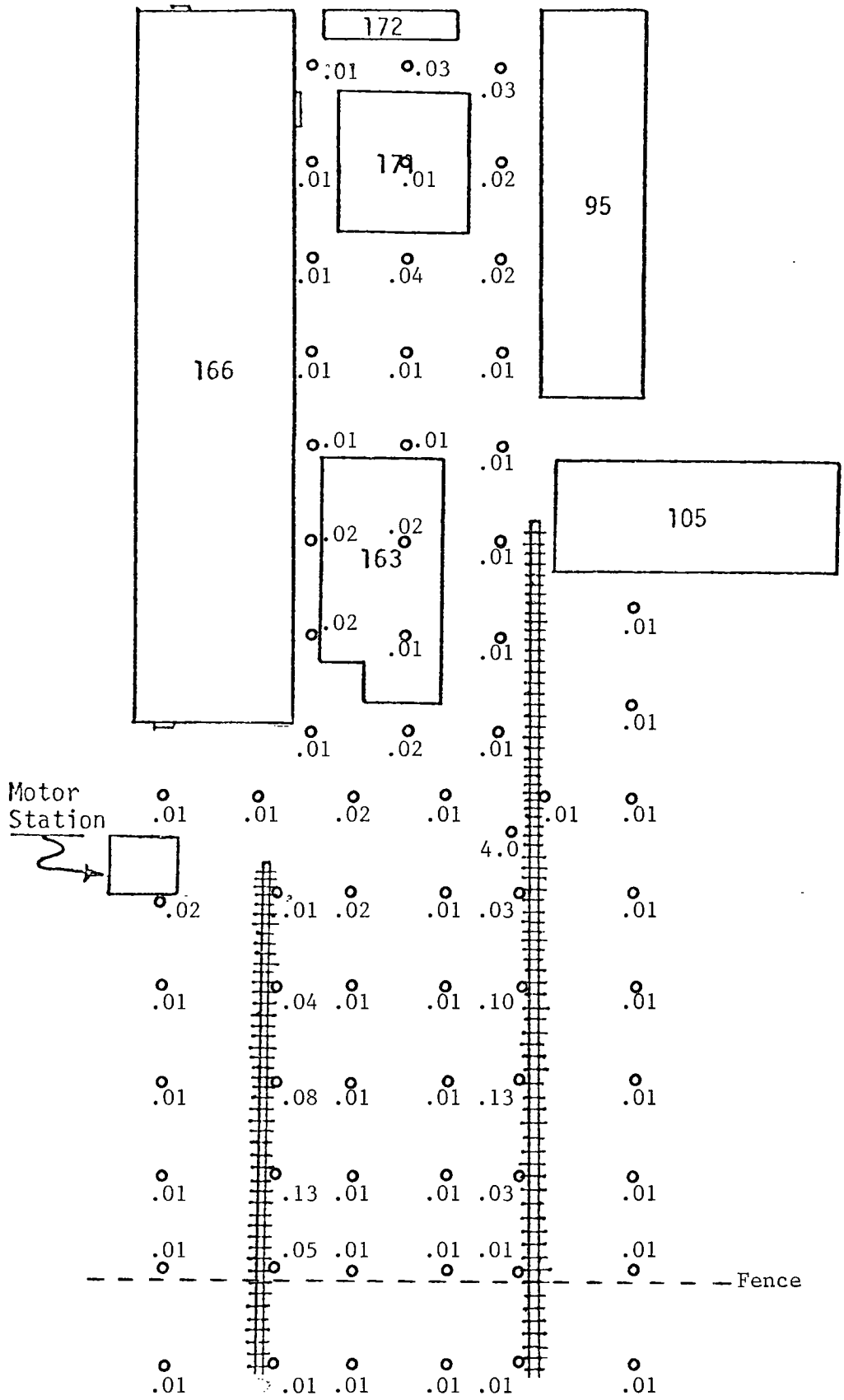

FIGURE 1. Radiation levels in mR/hr at the Technology Department noted during survey of 10/5/81. Natural background was ~.01 mR/hr.

UCCNHT0001358

:ontinued)
.NTITIES)

	Microcuries
	100
	100
	10
	10
	10
	10
	10
	10
	10
	100
	10
	1,000
	100
	100
	100
	10
	10
	10
	100
	100
	10
	100
	1,000
	10
	10
	10
:lpha-emitting	0 1

:ule) where there is present more than one
.rity shall be derived as follows
llowing quotient
of the radionuclide present and the denom-
in Table 4 of this Part (rule) The sum of such

resent +
.lide A

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:lide B

ion 28 of this Part (rule) where more than one
age quantity limit shall be derived as follows
ollowing quotient
f the radionuclide present and the denominator
4 of this Part (rule) The sum of such quotients

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le A

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de B

2

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits

(1) Alpha emitters

(i) Removable	$\frac{15\ pCi}{100\ cm^2}$	=	$\frac{33\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{45\ pCi}{100\ cm^2}$	=	$\frac{100\ dpm}{100\ cm^2}$	maximum
(ii) Total (fixed)	$\frac{450\ pCi}{100\ cm^2}$	=	$\frac{1000\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{2250\ pCi}{100\ cm^2}$	=	$\frac{5000\ dpm}{100\ cm^2}$	maximum
	0 25 $\frac{mrem}{hr}$ at 1 cm			

(2) Beta-Gamma emitters

(i) Removable (all beta-gamma emitters except Hydrogen 3)	$\frac{100\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{500\ pCi}{100\ cm^2}$	maximum
Removable (Hydrogen 3)	$\frac{1000\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{5000\ pCi}{100\ cm^2}$	maximum
(ii) Total (fixed)	0 25 $\frac{mrem}{hr}$ at 1 cm from surface	–

(b) Concentrations in air and water Table 6, Schedule II —

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

UCCNHT0001359

UCC METALS DIVISION
R&D DEPT. ANALYTICAL LABORATORY
REPORT OF SPECTROGRAPHIC ANALYSIS

Plate No. 5717
Date 9 Sept 80
By JPL

Submitted by W.R. Pioli Values in % On Sample Basis
W chrometh, C.R Allenbach
A.R. Broznahan
537-70
SEP 9 1980

Sample No.	009433	009434			
Material	8610 @ #1 Surface	8611 @ #2 6" Dep			
Ag	—	—			
Al	.2-2.	1-10			
As	—	—			
Au	—	—			
B	.004-.04	.003-.03			
Ba	.006-.06	.002-.02			
Be	.0001-.001	.0004-.004			
Bi	—	—			
Ca	.2-2.	.2-2.			
Cb	M	.2-2.			
Cd	—	—			
Co	.004-.04	.006-.06			
Cr	.04-.4	.3-3.			
Cu	.002-.02	.003-.03			
Fe	2-20	1-10			
Ga	—	—			
Ge	—	—			
Hf	.01-.1	—			
In	—	—			
Ir	—	—			
Mg	.04-.4	M			
Mn	.006-.6	.04-.4			
Mo	—	—			
Na	—	.04-.4			
Ni	.003-.03	.0006-.006			
Os	—	—			
P	—	—			
Pb	.1-1.	.03-.3			
Pd	—	—			
Pt	—	—			
Rh	—	—			
Sb	—	—			
Si	.6-6.	M			
Sn	3-3	.2-2.			
Sr	.006-.06	—			
Ta	M	M			
Th	.6-6.	.06-.6			
Ti	M	.2-2.			
Tl	—	—			
U	.6-6.	—			
V	.006-.06	.006-.06			
W	.006-.6	—			
Zn	—	—			
Zr	.02-.2	.01-.1			
Yttrium	1-10	.2-2			
Ytterbium	.006-.6	.002-.2			
Lanthanum	.006-.6	—			
Scandium	.006-.6	.006-.06			
Cerium	.7-7.	—			

UCCNHT0001360

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

MAY 12 1986

May 9, 1986

Mr. Robert F. Kelly
Associate Radiophysicist
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Umetco Minerals Corporation, Niagara Falls, NY

Dear Mr. Kelly

Thank you for taking the time on Wednesday, May 7, 1986 to discuss with Bob Beverly and me our plans to complete the cleanup of radioactive material found in the Niagara Plant. After my letter of March 25 to you, we obtained samples of the areas in question and submitted these to EDA Instruments Inc in Colorado for radiochemical analyses. That results shown in Table 1 were the basis for our discussion

I was concerned that we may have been misinterpreting Industrial Code Rule 38 but you kindly gave us a copy of an Inter-Office memo from Dr. Bradley to you dated March 26, 1982 which specified the limits for source material. This memo is appended

Below I have summarized the topics we discussed and outlined the actions we plan to take

A Material from Pit in Building 24

A gamma radiation level of 170 µR/hr prompted us to remove the illmenite sand that had been used to backfill a 9'-6" x 10' concrete pit in Building 24. The pit was much deeper than anticipated and we filled one hundred twenty-five 55-gallon drums before reaching a depth of 9 feet Subsequently when we received the results of the analyses (Samples 40-6 and 40-7) it was evident that the material contained less than 500 parts per million of combined uranium and thorium This, coupled with a gamma radiation level well below 250 µR/hr, led to the conclusion that this material did not exceed the "Limits for Uncontrolled Areas" as specified in Table 5 of Code Rule 38 You concurred with this conclusion

As we discussed, I plan to use this material as partial fill for a low area in the yard east of No 6 Furnace Building The pit will be backfilled with fresh soil or sand However, as agreed, I will not proceed with this plan until after May 15 to allow you time to think more about it and possibly confer with Dr Bradley

UCCNHT0001361

B. Slag East of No 6 Furnace Building

This is what you refer to as the "rock area" in your Investigative Report of March 26 (appended). Since that date we were able to move the slag pile and found that it was the slag itself and not the ground that was radioactive. As we discussed I was puzzled at the relatively high reading of Th-230 in Samples 40-3 and 40-4. Because the Th-230 is in the decay chain of U-238 I would have expected the uranium analyses to be appreciably higher The explanation is probably that some uranium oxide impurity was inadvertently introduced to a few vanadium aluminum furnace heats and the uranium passed on to the metal and the thorium went with the slag

As Bob Beverly discussed, although the Th-230 analyses were 299 and 466 ρCi/g, these represent very small quantities of the pure nuclide (1.53×10^{-8} and 2.39×10^{-8} grams of Th-230 per gram of slag). The calculations are included as Appendix 3

Again, since this material contains much less than .05% source material and the radiation is less than 250 µR/hr it need not be controlled I also plan to dispose of it as fill in the yard east of Furnace Room 6

C Slag and Soil Contamination South of Furnace No. 30

Sample 40-5 was taken from the slag that had been splattered south of Furnace No. 30. Years ago this furnace had been used to prepare ferrocolumbium As can be seen, the uranium at 389 µg/g is approaching the 500 µg/g limit and the Th-232 at 241 pCi/g is well above the 55 ρCi/g limit. Seventeen (17) 55-gallon drums of material were removed from around the furnace. Samples 41-2 and 41-3 taken after the cleanup are well within the uncontrolled limits

D. Sample from North of Furnace No. 30

As can be seen from the analyses of Sample 41-1 (Th-232 at 139 ρCi/g) the cleanup was not complete in this area. An additional three 55-gallon drums of material were removed and the gamma radiation dropped from 120 µR/hr to about about 35 to 40 µR/hr I am convinced we have successfully reduced the radiation to limits for uncontrolled areas I will defer backfilling until you, as a representative for the Department of Labor, take confirmation samples

I plan to immediately begin the paper work to secure space and a permit for burial, either at Barnwell, SC or Richland, WA. We will dispose of the material removed from the area surrounding Furnace No. 30 as well as the samples in cans that you refer to in your report of March 1986.

UCCNHT0001362

As you know, we are quite anxious to obtain the results of the wipe tests and soil samples taken on Elkem property that hopefully will allow termination of License 210-0090 and License 950-0139. I was pleased to hear that you will have them designated as top priority and will communicate the results to me as soon as you obtain them.

Again I want to thank you for a very pleasant and helpful meeting

Very truly yours,

Donald J. Hansen

cc: Mr. R. G. Beverly
Mr. F. V. McMillen

mau/369h
Attachments

BLIND COPIES: Messrs:
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch
R. L. Miller
W. D. Smith
C. T. Wentzel

UCCNHT0001363

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

Sample No.		Description	Analyses: URANIUM SERIES Uranium µg/g	URANIUM SERIES Th-230 pCi/g	THORIUM SERIES Th-232 pCi/g	THORIUM SERIES Th-228 pCi/g	Gamma Radiation µR/hr*
Book 2446		Code Rule 38 Limit	[500]	**	[55]	***	[250]
A	40-6	Bldg. 24 (VA1) Top of Pit	28.9	12±2	16±2	17±2	170
	40-7	Bldg. 24 7' Depth in Pit	44.3	22±2	37±2	39±3	150
B	40-3	Dark Slag-Yard East of Fce. Bldg.	20.2	299±7	16±2	40±9	150
	40-4	Light Slag-Yard East of Fce. Bldg.	18 6	466±9	37±3	14±2	200
C	40-5	Slag Before Digging South of Furnace 30	389	186±6	241±7	241±7	200-420
	41-2	Sample in Front of Fce. 30 After Cleanup	68.4	19±2	35±3	35±3	40
	41-3	Sample from Southwest of Furnace 30 After Cleanup	24.9	6.2±1.1 5.9±1.1	9 6±1.3 8.5±1.3	9.5±1.3 9.2±1.33	30
D	41-1	Sample from North Support of Fce. 30 After Cleanup	122	76±4	139±5	145±5	120
		Area of North Support of Fce. 30 After Second Cleanup	-	-	-	-	35-40

*Ludlum Model 19 Micro R Meter - Reading at surface of location where sample was taken
**pCi/g equivalent to .05% (500 ppm) calculated to be $9\ 7 \times 10^{6}$
***pCi/g equivalent to 05% (500 ppm) calculated to be 4.1×10^{11}

UCCNHT0001364

APPENDIX 1

NEW YORK STATE DEPARTMENT OF LABOR

INTER-OFFICE MEMORANDUM

To R. Kelly Date March 26, 1982
Office RHU

From F.J. Bradley Office RHU

Subject Union Carbide/Niagara Falls

Based on your survey of December 1, 1981 and the attached results, issue supplemental Notice of Inspection Findings and include our survey results. Require clean up to Table 5 limits within a specified time span. Contact Radiation Safety Officer to arrive at mutually agreable clean up time schedule.

Union Carbide's internal memo dated October 31, 1981 confirms our results and that they are aware of their responsibilities. All we need now is a clean up schedule.

Code Rule 38, Table 5 limits are as follows:

U-nat: 200pCi, $\frac{\text{U-nat}}{\text{gram of soil}}$

Th-nat: 55 pCi, $\frac{\text{Th-nat}}{\text{gram of soil}}$

and external surface dose levels
250 $\frac{\mu R}{hr}$ on surface.

We need to rely on their results with mixed U/Th contamination. I circled soil contamination values above 200 pCi/g (assuming all U-nat).

F.J. Bradley, Ph.D.
Principal Radiophysicist

FJB:bd

UCCNHT0001365

APPENDIX 2

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING
65 COURT STREET
BUFFALO N Y 14202

RAMONA L GALLAGHER
Assistant Commissioner of Labor

INVESTIGATIVE REPORT

Umetco - 47th and Royal Avenues, Niagara Falls

Report prepared by Robert F. Kelly on 25 MAR 86.

Report reviewed by _____ on _____.

On 20 MAR 86 after obtaining soil samples on the Umetco property, Dr. Richard Hanson related to me possible "problem" areas when he performed an external radiation survey of the plant facilities a short time ago.

There are four possible problem areas; all seem minor since external readings almost at contact showed levels at about 3-5 times background.

These are described below:

A) "Rock area" outside Building 24 -- This area shows some potential for a bigger problem; rocks on frozen grounds showed the readings mentioned above. Warmer weather will let facility determine what is under these piles.

B) Number 6 Furnace Room in Building 77 - Area shows slight contamination; its mainly on surface and doesn't seem to be a big problem.

C) Building 24 -- dust near furnace. Again doesn't seem to be a big hazard.

D) Samples in cans -- Now located in caged area in Building 25, they will be shipped as radioactive waste.

As related to Dr. Hansen, samples are to be analyzed in all three areas listed above and results sent to the Department. If within the limits, the Department will resurvey premises to insure compliance with Coderule 38.

Robert Kelly
Associate Radiophysicist

UCCNHT0001366

APPENDIX 3

Conversion of pCi to g

$$\text{Specific Activity} = \frac{1.13 \times 10^{13}}{TA} \quad \text{curries per gram of pure nuclide}$$

Where T = half life in seconds
A = mass number

For Th-230

$T = 8\ 0 \times 10^4$ years $= 8.0 \times 10^4 \times 3.15 \times 10^7 = 2.52 \times 10^{12}$ seconds

$A = 230$

$$\text{Specific Activity per Gram of Th-230} = \frac{1.13 \times 10^{13}}{2.52 \times 10^{12} \times 230} = .0195 \text{ Ci}$$

$$= .0195 \times 10^{12} = 1.95 \times 10^{10} \text{ pCi}$$

Sample 40-3 299 pCi/g:

$$\frac{299 \text{ pCi/g}}{1.95 \times 10^{10} \text{ pCi/g Th-230}} = 1.53 \times 10^{-8} \text{g Th-230/g}$$

Sample 40-4 466 pCi/g:

$$\frac{466 \text{ pCi/g}}{1.95 \times 10^{10} \text{ pCi/g Th-230}} = 2.39 \times 10^{-8} \text{g Th-230/g}$$

UCCNHT0001367

Send all "SIT-1" Kits to

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp, Metals Div

Address PO Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Pu-238, Co-57, Fe-55 Cd-109 ACTIVITY 30 mCi, 1 mCi, 20 mCi, 3 mCi

IDENT./SERIAL NO. 7222/3 C-633 23 A-962 LEAK TEST DATE 6/16/83

SMEAR TAKEN BY D R Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage under our Texas Radioactive Material License No. 11-871 (copy available upon request)

ALPHA	BETA-GAMMA
<.0005	<.0005

Our findings show the leakage to be uCi. (Wet)

Certified by [signature] Date 6/18/83

(~~Todd~~ Health Physics Representative)

SUNTRAC SERVICES, INC.

TSC-RT-36
Rev. 4
5/2/80

UCCNHT0001368

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research & Technical Division SIT-1 Kit is designed for use with all alpha or beta-gamma emitting sources. It may also be used for testing large gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc , may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research & Technical Division SIT-1 Kit" in your application to your State, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away, work with your arms extended.
4. Conduct a dry-run on all sources in excess of 1 mCi to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 cc of water, which renews its effectiveness for testing

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening
4. Replace the source back into its shielded container
5. Place the plastic envelope, along with the completed "Leak Test Inventory and Report Form" in the supplied self-addressed envelope and mail to Todd Research & Technical Division
6. Upon receipt of your completed data sheet and smears from your test kit, Todd Research & Technical Division will perform the necessary assay and evaluation and will issue a certification of the results. The certificate should be retained for review by your licensing authority upon request

UCCNHT0001369

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research & Technical Division SIT-1 Kit is designed for use with all alpha or beta-gamma emitting sources. It may also be used for testing large gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

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For license approval of our service, please refer to "Todd Research & Technical Division SIT-1 Kit" in your application to your State, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all sources in excess of 1 mCi to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Replace the source back into its shielded container.
5. Place the plastic envelope, along with the completed "Leak Test Inventory and Report Form" in the supplied self-addressed envelope and mail to Todd Research & Technical Division.
6. Upon receipt of your completed data sheet and smears from your test kit, Todd Research & Technical Division will perform the necessary assay and evaluation and will issue a certification of the results. The certificate should be retained for review by your licensing authority upon request.

UCCNHT0001370

Send all "SIT-1" Kits to:

TODD RESEARCH & TECHNICAL DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div

Address P.O Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Cs 137 ACTIVITY 50 mCi

IDENT./SERIAL NO. CS-2225 (stack furnace) LEAK TEST DATE 5/23/83

SMEAR TAKEN BY D R Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage under our Texas Radioactive Material License No. 11-871 (copy available upon request).

Our findings show the leakage to be

ALPHA	BETA-GAMMA
—	<.0005

uCi. (Wet)

Certified by C. E. Winters, Jr. Date 5/27/83

([redacted] Health Physics Representative)

SUNTRAC SERVICES, INC.

TSC-RT-36
Rev. 4

UCCNHT0001371

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research & Technical Division SIT-1 Kit is designed for use with all alpha or beta-gamma emitting sources. It may also be used for testing large gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research & Technical Division SIT-1 Kit" in your application to your State, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all sources in excess of 1 mCi to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Replace the source back into its shielded container.
5. Place the plastic envelope, along with the completed "Leak Test Inventory and Report Form" in the supplied self-addressed envelope and mail to Todd Research & Technical Division.
6. Upon receipt of your completed data sheet and smears from your test kit, Todd Research & Technical Division will perform the necessary assay and evaluation and will issue a certification of the results. The certificate should be retained for review by your licensing authority upon request.

UCCNHT0001372

Send all "SIT-1" Kits to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

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LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Pu 238, Co 57, Fe 55, Cd 109 ACTIVITY 30mCi, 1mCi, 20mCi, 3mCi

IDENT./SERIAL NO. 7222/3, C-633, 23, A-962 LEAK TEST DATE 12/16/82

SMEAR TAKEN BY D.R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage under our Texas Radioactive Material License No. 11-871 (copy available upon request).

ALPHA	BETA-GAMMA
<.0005	<.0005

Our findings show the leakage to be uCi. (Wet)

Certified by C.E. Minton Jr. Date 12/20/82

(Health Physics Representative)

SONTRAC SERVICES, INC

TSC-RT-36
Rev. 4

UCCNHT0001373

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research & Technical Division SIT-1 Kit is designed for use with all alpha or beta-gamma emitting sources. It may also be used for testing large gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research & Technical Division SIT-1 Kit" in your application to your State, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all sources in excess of 1 mCi to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Replace the source back into its shielded container.
5. Place the plastic envelope, along with the completed "Leak Test Inventory and Report Form" in the supplied self-addressed envelope and mail to Todd Research & Technical Division.
6. Upon receipt of your completed data sheet and smears from your test kit, Todd Research & Technical Division will perform the necessary assay and evaluation and will issue a certification of the results. The certificate should be retained for review by your licensing authority upon request.

UCCNHT0001374

Send all "SIT-1" Kits to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Pu 238, Co 57, Fe 55, Cd 109 ACTIVITY 30mCi, 1mCi, 20mCi, 3mCi

IDENT./SERIAL NO. 7222/3, C-633, 23, A-962 LEAK TEST DATE 6/16/82

SMEAR TAKEN BY D. R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage under our Texas Radioactive Material License No. 11-871 (copy available upon request).

Our findings show the leakage to be

ALPHA	BETA-GAMMA
<.0005	<.0005

uCi. (Wet)

Certified by [signature] Date 6/20/82

(~~Todd~~ Health Physics Representative)

SUNTRAC SERVICES, INC

TSC-RT-36
Rev. 4

UCCNHT0001375

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research & Technical Division SIT-1 Kit is designed for use with all alpha or beta-gamma emitting sources. It may also be used for testing large gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research & Technical Division SIT-1 Kit" in your application to your State, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all sources in excess of 1 mCi to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Replace the source back into its shielded container.
5. Place the plastic envelope, along with the completed "Leak Test Inventory and Report Form" in the supplied self-addressed envelope and mail to Todd Research & Technical Division.
6. Upon receipt of your completed data sheet and smears from your test kit, Todd Research & Technical Division will perform the necessary assay and evaluation and will issue a certification of the results. The certificate should be retained for review by your licensing authority upon request.

UCCNHT0001376

Send all "SIT-1" Kits to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Cd 109 ACTIVITY 3 mCi

IDENT./SERIAL NO. A-962 LEAK TEST DATE 12/16/81

SMEAR TAKEN BY D. R Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage under our Texas Radioactive Material License No. 11-871 (copy available upon request).

ALPHA	BETA-GAMMA
—	<.0005

Our findings show the leakage to be ____ uCi. (Wet)

Certified by C. E. Manton Jr Date 12/21/81

(~~Todd~~ Health Physics Representative)

SONTRAC SERVICES, INC.

TSC-RT-36
Rev. 4

UCCNHT0001377

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research & Technical Division SIT-1 Kit is designed for use with all alpha or beta-gamma emitting sources. It may also be used for testing large gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research & Technical Division SIT-1 Kit" in your application to your State, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all sources in excess of 1 mCi to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Replace the source back into its shielded container.
5. Place the plastic envelope, along with the completed "Leak Test Inventory and Report Form" in the supplied self-addressed envelope and mail to Todd Research & Technical Division.
6. Upon receipt of your completed data sheet and smears from your test kit, Todd Research & Technical Division will perform the necessary assay and evaluation and will issue a certification of the results. The certificate should be retained for review by your licensing authority upon request.

UCCNHT0001378

Send all "SIT-1" Kits to:

TODD RESEARCH & TECHNICAL DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Fe 55 ACTIVITY 20 mCi

IDENT./SERIAL NO. 23 LEAK TEST DATE 12/16/81

SMEAR TAKEN BY D.R Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage under our Texas Radioactive Material License No. 11-871 (copy available upon request).

Our findings show the leakage to be

ALPHA	BETA-GAMMA
—	<.0005

uCi. (Wet)

Certified by C. E. Montana Jr. Date 12/21/81

(~~Todd~~ Health Physics Representative)

Santrac Services, Inc.

TSC-RT-36
Rev. 4

UCCNHT0001379

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001380

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION. Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals D.V.

Address P.O Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Co 57 ACTIVITY 1 mC.

IDENT./SERIAL NO. C-633 LEAK TEST DATE 12/16/81

SMEAR TAKEN BY D R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
—	< .0005

Our findings show the leakage to be uCi. (Wet)

Certified by C.E. Winters Jr Date 12-21-81

(~~Todd~~ Health Physics Representative)

Suntrac Serv. Inc

TSC-RT-36

UCCNHT0001381

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

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For license approval of our service, please refer to "Todd Research & Technical Division SIT-1 Kit" in your application to your State, Division of Licensing, or the NRC Division of Licensing.

CAUTION

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2. Rubber gloves should be worn, especially when handling beta sources.
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4. Conduct a dry-run on all sources in excess of 1 mCi to assure that shielding is sufficient to limit the exposure of personnel doing the test.
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TO PERFORM TEST

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2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Replace the source back into its shielded container.
5. Place the plastic envelope, along with the completed "Leak Test Inventory and Report Form" in the supplied self-addressed envelope and mail to Todd Research & Technical Division.
6. Upon receipt of your completed data sheet and smears from your test kit, Todd Research & Technical Division will perform the necessary assay and evaluation and will issue a certification of the results. The certificate should be retained for review by your licensing authority upon request.

UCCNHT0001382

Send all "SIT-1" Kits to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp, Metals Div

Address P.O. Box 579 City Niagara Falls State NY Zip 14302

ISOTOPE Pu 238 ACTIVITY 30 mCi

IDENT./SERIAL NO. 7222/3 LEAK TEST DATE 12/16/81

SMEAR TAKEN BY D.R Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage under our Texas Radioactive Material License No. 11-871 (copy available upon request).

ALPHA	BETA-GAMMA
<.0005	<.0005

Our findings show the leakage to be uCi. (Wet)

Certified by C. E. Montana Jr Date 12/21/81

(~~Todd~~ Health Physics Representative)

SONTRAC Servs. Inc

TSC-RT-36
Rev. 4

UCCNHT0001383

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

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CAUTION

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2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001384

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave City Niagara Falls State NY Zip 14302

ISOTOPE Cal 109 ACTIVITY 3 m Ci

IDENT./SERIAL NO. A-962 LEAK TEST DATE ~~12/7~~ 6/16/81

SMEAR TAKEN BY D.R. Brasseler

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
	Less Than .0005

Our findings show the leakage to be uCi. (Wet)

Certified by Thelma L. Hunter Date 6/24/81

(Todd Health Physics Representative)

TSC-RT-36
Rev. 4

UCCNHT0001385

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001386

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

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LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

ISOTOPE Fe 55 ACTIVITY 20 mCi

IDENT./SERIAL NO. 23 LEAK TEST DATE 6/16/81

SMEAR TAKEN BY D.R. Broshahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
———	less than .0005

Our findings show the leakage to be uCi. (Wet)

Certified by Thelma L. Hunter Date 24 June '81

(Todd Health Physics Representative)

UCCNHT0001387

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001388

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN. RAD-CON

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LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

ISOTOPE Pu 238 ACTIVITY 30 m Ci

IDENT./SERIAL NO. 7222/3 LEAK TEST DATE 6/16/81

SMEAR TAKEN BY D.R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
less than .0005	less than .0005

Our findings show the leakage to be uCi. (Wet)

Certified by J.L. Hunter Date 6/24/81

(Todd Health Physics Representative)

TSC-RT-36

UCCNHT0001389

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001390

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

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LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

ISOTOPE Co 57 ACTIVITY 1 mCi

IDENT./SERIAL NO. C-633 LEAK TEST DATE 6/16/81

SMEAR TAKEN BY D.R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
—	less than 2.0005

Our findings show the leakage to be uCi. (Wet)

Certified by Thelma L. Hunter Date 24 June '81
(Todd Health Physics Representative)

TSC-RT-36

UCCNHT0001391

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001392

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

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LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

ISOTOPE Cd 109 ACTIVITY 3 mC.

IDENT./SERIAL NO. A-962 LEAK TEST DATE 12/16/80

SMEAR TAKEN BY D.R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
<.0005	<.0005

Our findings show the leakage to be uCi. (Wet)

Certified by J. Labrie Date 12/19/80
(Todd Health Physics Representative)

TSC-RT-36

UCCNHT0001393

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001394

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

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LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

ISOTOPE Co 57 ACTIVITY 1 mCi

IDENT./SERIAL NO. C-633 LEAK TEST DATE 12/16/80

SMEAR TAKEN BY D. R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
2.0005	< .0005

Our findings show the leakage to be uCi. (Wet)

Certified by V LaBarre Date 12/19/80
(Todd Health Physics Representative)

TSC-RT-36

UCCNHT0001395

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001396

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

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LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O.Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

ISOTOPE Pu 238 ACTIVITY 30 mCi

IDENT./SERIAL NO. 7222/3 LEAK TEST DATE 12/16/80

SMEAR TAKEN BY D. R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
<.0005	<.0005

Our findings show the leakage to be uCi. (Wet)

Certified by V. LaBare Date 12/19/80
(Todd Health Physics Representative)

TSC-RT-36

UCCNHT0001397

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001398

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

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LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave City Niagara Falls State NY Zip 14302

ISOTOPE Fe 55 ACTIVITY 20 mCi

IDENT./SERIAL NO. 23 LEAK TEST DATE 12/16/80

SMEAR TAKEN BY P.R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
<.0005	<.0005

Our findings show the leakage to be uCi. (Wet)

Certified by J. LaBrie Date 12/19/80
(Todd Health Physics Representative)

TSC-RT-36

UCCNHT0001399

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, ets., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instrments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on 60 Co up to 40 mCi and 173 Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 c.c. of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

The cost of this service is based on the number of kits returned for assay at any one time. The price for 1 to 5 kits is $9.00 each, this cost being possible by your remittance of payment with the leak test request, thereby eliminating billing cost. For larger quantities, a leak test price list is available upon request. Kits received that are not prepaid will cause a $25.00 billing fee to be charged to all customers unless previous arrangements have been made i.e. purchase orders and etc.

UCCNHT0001400

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0 5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

Isotope Cd 109 Activity 3 mC.

Ident./Serial No. A-962 Leak Test Date 6/16/80

Smear Taken By D.R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
	<.0005

Our findings show the leakage to be ____ µCi. (wet)

Certified by _____ Date 7-7-80
(Todd Health Physics Representative)

TSC-RT-36
Rev. 3
2/14/75

UCCNHT0001401

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, ets., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instrments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on 60 Co up to 40 mCi and 173 Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 c.c. of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

The cost of this service is based on the number of kits returned for assay at any one time. The price for 1 to 5 kits is $9.00 each, this cost being possible by your remittance of payment with the leak test request, thereby eliminating billing cost. For larger quantities, a leak test price list is available upon request. Kits received that are not prepaid will cause a $25.00 billing fee to be charged to all customers unless previous arrangements have been made i.e. purchase orders and etc.

UCCNHT0001402

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN · RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0 5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

Isotope Pu 238 Activity 30 mCi

Ident./Serial No. 722213 Leak Test Date 6/16/80

Smear Taken By D. R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

	ALPHA	BETA-GAMMA
Our findings show the leakage to be	<.0005	<.0005

μCi. (wet)

Certified by J Rudd (Todd Health Physics Representative) Date

TSC-RT-36
Rev. 3
2/14/75

455-00029

UCCNHT0001403

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

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In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instrments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on 60 Co up to 40 mCi and 173 Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 c.c. of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

The cost of this service is based on the number of kits returned for assay at any one time. The price for 1 to 5 kits is $9.00 each, this cost being possible by your remittance of payment with the leak test request, thereby eliminating billing cost. For larger quantities, a leak test price list is available upon request. Kits received that are not prepaid will cause a $25.00 billing fee to be charged to all customers unless previous arrangements have been made i.e. purchase orders and etc.

UCCNHT0001404

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp., Metals Div.

Address P.O. Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

Isotope Co 57 Activity 1 mCi

Ident./Serial No. C-633 Leak Test Date 6/16/80

Smear Taken By D.R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
	<.0005

Our findings show the leakage to be ____ µCi. (wet)

Certified by _____ Date 7-7-80
(Todd Health Physics Representative)

TSC-RT-36
Rev 3
2/14/75

455-00029

UCCNHT0001405

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

The Todd Research and Technical Division SIT-1 Kit is designed for use with alpha or beta-gamma emitting sources or for low level gamma sources. It may also be used for testing large radiography gamma sources, where due to the potential radiation hazard, a smear is taken of the inside surface of the source housing, cable, etc., rather than the source capsule itself.

In special cases where a source is permanently fixed into a system, the closest and most accessible surface such as conical port, source housings, etc., may be taken as the smear area. The kit consists of one piece of filter cloth in a plastic zip-lip envelope, wet with our decontamination solution.

For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

1. Portable survey instruments should be used during all smear testing.
2. Rubber gloves should be worn, especially when handling beta sources.
3. Always use tweezers, tongs, forceps or handles to keep all sources at least one foot away; work with your arms extended.
4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on ^{60}Co up to 40 mCi and ^{137}Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding ½ cc of water, which renews its effectiveness for testing.

TO PERFORM TEST

1. Remove the source from its container and place it in a shielded area. (In those cases where it is impractical to remove a permanently fixed source from a special container, it is acceptable to make the smear on an accessible area adjacent to the source, for example, inside a conical beaming port. The source should be kept shielded while smearing the area.)
2. Remove the wet filter cloth from its envelope (by using the zip-lip opening) and thoroughly smear the source or the area of the source container which contacts the source.
3. Replace this smear in the plastic envelope marked "WET SMEAR ONLY" and reseal the zip-lip opening.
4. Place the plastic envelope, along with the "Leak Test Request and Report Form" in the supplied self-addressed envelope and mail to Todd Research and Technical Division.
5. Upon receipt of your completed data sheet and smears from your test, Todd Research and Technical Division will perform the necessary evaluation and will issue a certification of the results. The certificate should be retained for review by the Texas State Compliance Division upon request.

UCCNHT0001406

Send all requests to:

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN: RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp, Metals Div.

Address P.O.Box 579 4625 Royal Ave. City Niagara Falls State NY Zip 14302

ISOTOPE Fe 55 ACTIVITY 20 mCi

IDENT./SERIAL NO. 23 LEAK TEST DATE 6/16/80

SMEAR TAKEN BY D. R. Brosnahan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
	<.0005

Our findings show the leakage to be : uCi. (Wet)

Certified by _____ Date 7-7-80
(Todd Health Physics Representative)

TSC-RT-36

UCCNHT0001407

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

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For license approval of our service, please refer to "Todd Research and Technical Division SIT-1 Kit" in your application to State of Texas, Division of Licensing, or the NRC Division of Licensing.

CAUTION

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2. Rubber gloves should be worn, especially when handling beta sources.
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4. Conduct a dry-run on all beta sources in excess of 1 mCi, gamma sources on 60 Co up to 40 mCi and 173 Cs up to 150 mCi, to assure that shielding is sufficient to limit the exposure of personnel doing the test.
5. If the "wet" patch dries out, it should be moistened by adding 1/2 c.c. of water, which renews its effectiveness for testing.

TO PERFORM TEST

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UCCNHT0001408

Send all requests to

TODD RESEARCH & TECHNICAL
DIVISION
P.O. BOX 1600
GALVESTON, TEXAS 77553
PHONE - 713 - 744-7141

ATTN · RAD-CON

CAUTION: Conduct a survey of the outside of each package placed in the U.S. Mails. Any reading over 0.5 mr/hr at contact with envelope or package shall not be mailed

LEAK TEST INVENTORY/REPORT FORM

Company Name Union Carbide Corp, Metals Div

Address P.O. Box 579 4625 Royal Ave City Niagara Falls State NY Zip 14302

Isotope Cs - 137 Activity 50 mCi

Ident./Serial No. CS - 2225 (stack) Leak Test Date 5/23/80

Smear Taken By D.R Brosnehan

Do Not Write Below This Line

This is to certify that the above described smear has been assayed at our facilities for indication of source leakage.

ALPHA	BETA-GAMMA
—	< .0005

Our findings show the leakage to be ____ µCi. (wet)

Certified by F A Morgan Date 6-3-80
(Todd Health Physics Representative)

TSC-RT-36
Rev. 3
2/14/75

455-00029

UCCNHT0001409

TODD SHIPYARDS CORPORATION RESEARCH & TECHNICAL DIVISION

SEALED SOURCE INTEGRITY TEST SERVICES

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UCCNHT0001410

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

APR 17 1986

To (Name) Mr. D. G. Millenbruch
Division Umetco Minerals Corporation
Location Danbury, CT
Area

Date April 15, 1986
Originating Dept TECHNOLOGY
Area
Answering Letter Date

Subject Niagara Plant Radioactive Material License 950-0139

Copy to Messrs:
R. G Beverly/R.Jones
L G Evans
T. J. Kagetsu
F. V. McMillen
W. D. Smith

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background.

For your convenience, I am appending my letter of March 25, 1986 to Mr R. F Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed

In cleaning up the area around No. 30 furnace we filled seventeen 55-gallon drums. We had Mr William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada. The activity suggested the cleanup was not complete

The radiation in Building 24 (V-Al) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite. This pit seemed endless; we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet. In addition, the pit was found to extend beneath the floor of the V-Al operation.

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself. The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons. Even this amount presents problems in packaging for disposal.

UCCNHT0001411

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time. The gamma radiation increases from 200 μR/hr at the surface to about 600 μR/hr at a depth of one foot.

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses. The sample identification and results are reported in the attached Table 1. Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license. Section 38.11, 38.29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One.

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified; all radioactive material must be shipped to an approved recipient; the premises must be decontaminated and surveyed to show decontamination took place; and the survey must be verified by the State. Source material (uranium and thorium) must be reduced to 0.05 percent by weight to meet decontamination. (This is 500 ppm or 500 μg/g.) For non-source material for which we are not licensed, the levels are specific for each element e.g. for radium the exempt concentration is 0.1 pico currie per gram.

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in μg/g). 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm). Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination. Looking at samples from each of the areas:

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance. We have made no attempt to determine the amount of soil that is contaminated.

Slag Pile East of No. 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226. The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally). This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag. This falls into the category of non-licensed material and possibly we need a ruling on it.

Furnace No. 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area. As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium.

Sample 41-1 tells us we have more cleanup to do around the north furnace support. This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports.

UCCNHT0001412

TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY: EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No.	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34.7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33.8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No. 6 Furnace Building	4.4±1.1	20.2	16±2	299±7	4.0±.9	17±2
2446-40-4	Light Slag - East of No. 6 Furnace Building	7.0±1.4	18.6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No. 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No. 24, V-A1	19±2	28.9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No. 24, V-A1	31±3	44.3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No. 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No. 30 After Cleanup	42±3	68.4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No. 30 After Cleanup	43±3	24.9	9.6±1.3 8.5±1.3	6.2±1.1 5.9±1.0	9.5±1.3 9.2±1.3**	

*Th229 (not positively identified)
**Duplicate Analyses

UCCNHT0001413

Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access.

Pit in Building No. 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium. However gamma radiation next to a drum will read 150 μR/hr. I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard. The pit is still not completely clean with radiation of about 50 μR/hr above the pit and about 150 μR/hr. at the surface 9 feet down. Background is about 9μR/hr.

? how low - below what -

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State. Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use. I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation.

We are faced with the decision on how to proceed. (1) Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc. and would be unable to sell the property, (2) Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination. If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R. F. Kelly.

Hopefully we can tackle this on your planned visit next week.

Sincerely,

D. J. Hansen

mau/357h
Attachments

UCCNHT0001414

Umetco Minerals Corporation

PO BOX 579, 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK 14302

March 25, 1986

Mr. Robert F. Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject: Termination of Radioactive Materials License 950-0139

Dear Mr. Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation. The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No. 950-0139.

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site. We found four areas with radiation significantly above background. In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed.

The location of the radioactivity and the levels of radiation observed are shown in Table I.

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce. Rm)	5-10 µR/hr.		
	- I-beam south of 30 Fce.		200 µR/hr.	20
	- Trunion support north of 30 Fce.		420 µR/hr.	42
2/18/86	Bldg. 24 (V-Al)	8-13 µR/hr.		
	- Area below dust collector		170 µR/hr.	15
2/20/86	Yard East of #6 Fce. Rm.	8-12 µR/hr.		
	- 6' x 6' Areas near slag pile		200 µR/hr.	20
2/20/86	Yard East of #6 Fce. Rm.			
	- 2' x 2' Area near Bldg. 191		210 µR/hr.	20

UCCNHT0001415

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984. (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986).

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II. More detailed information is contained in Laboratory Notebook 2446.

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce. Rm. #6)	5-10 µR/hr.	Area next to Fce. 30 above background.
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr.	Some sample cans >1mR/hr.
	32 (#2 Packing)	8-10 µR/hr.	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr.	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr.	Area below Dust Coll. above background.
2/20/86	(Storage Shed N.W. Corner of Umetco Property)	8-12 µR/hr.	OK
2/25/86	7 (Storeroom)	8-10 µR/hr.	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr.	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr.	OK
2/27/861	13, 14 (Aux. Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr	OK
3/14/86	111 (Eng. Annex-Works Lab)	15-17 µR/hr.	OK
3/14/86	3 (Compressor Bldg.)	7-8 µR/hr.	OK

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The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers.

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory.

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No. 30 (contaminated slag and soil were being placed into 55-gallon drums). This has been completed and we are now working on cleaning up the area in Building 24.

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981. However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor. I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority.

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above.

Very truly yours,

D. J. Hansen

mau/349h

cc: Messrs:
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
R. G. Tisch
C. T. Wentzel

UCCNHT0001417

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38.11]

38 11 Duration of licenses. Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38.12 Renewal of licenses. An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38.13 Amendment of licenses. A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38.14 Suspension or revocation. The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38.15 Additional requirements. Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

UCCNHT0001418

timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38.27 Enclosed controlled areas. Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38 28 Eating, drinking or smoking. No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38.29 Vacating installations and property. (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferee or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment. Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

UCCNHT0001419

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits		
(1) Alpha emitters		
(i) Removable	$\frac{15\ pCi}{100\ cm^2} = \frac{33\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{45\ pCi}{100\ cm^2} = \frac{100\ dpm}{100\ cm^2}$	maximum
(ii) Total (fixed)	$\frac{450\ pCi}{100\ cm^2} = \frac{1000\ dpm}{100\ cm^2}$	average over any one surface
	$\frac{2250\ pCi}{100\ cm^2} = \frac{5000\ dpm}{100\ cm^2}$	maximum
	$\frac{0.25\ mrem\ at\ 1\ cm}{hr}$	
(2) Beta-Gamma emitters		
(i) Removable (all beta-gamma emitters except Hydrogen 3)	$\frac{100\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{500\ pCi}{100\ cm^2}$	maximum
Removable (Hydrogen 3)	$\frac{1000\ pCi}{100\ cm^2}$	average over any one surface
	$\frac{5000\ pCi}{100\ cm^2}$	maximum
(ii) Total (fixed)	$\frac{0.25\ mrem\ at\ 1\ cm\ from\ surface}{hr}$	

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2, Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

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TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

UCCNHT0001421

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 (T ½ = 9 2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0001422

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

UCCNHT0001423

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

UCCNHT0001424

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

**μc/gm for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2, the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41, Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides, the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed "one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \cdots < 1$$

UCCNHT0001425

UCCNHT0001426

Umetco Minerals Corporation

MAY 19 1986

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

May 15, 1986

Dr. F. J Bradley
Principle Radiophysicist
New York State Department of Labor
Room 813
One Main Street
Brooklyn, NY 11202

Subject Umetco Minerals Corporation, Niagara Falls, NY

Dear Dr Bradley

In our phone conversation of Tuesday, May 13 we discussed disposal of two low level radioactive materials that were discovered in a radiation survey of the Umetco property in Niagara Falls, NY The first was illmenite sand (an iron titanium ore) that had been used to backfill a 10' x 10' concrete pit The second was an isolated quantity of slag (calcium-aluminum oxide) from the furnacing of ferrovanadium The illmenite sand was removed from the pit and currently is contained in 125 (one hundred twenty-five) 55-gallon drums I would estimate total weight at approximately 40 to 50 tons The slag is in lumps in a pile that I would estimate to contain 50 to 75 tons Analyses of the materials are presented in the following Table 1

TABLE 1

Radiochemical Analyses of Samples From the Niagara Plant

	Analyses				
	URANIUM SERIES			THORIUM SERIES	
Description	Uranium µg/g	Th-230 pCi/g	Ra-226 pCi/g	Th-232 pCi/g	Th-228 pCi/g
Illmenite Sand - Top of Pit	28 9	12±2	19±2	16±2	17±2
Illmenite Sand - 7' in Pit	44 3	22±2	31±3	37±2	39±3
Dark Slag-Yard East of Fce Bldg	20 2	299±7	4 4±1 1	16±2	4±9
Light Slag-Yard East of Fce Bldg	18 6	466±9	7 0±1 4	37±3	14±2

Industrial Code Rule 38, Table 5 "Limits for Uncontrolled Areas" limits source material to 0.05 percent by weight (500 µg/g or 500 ppm) For Thorium 232 this converts to 55 pCi/g. The concentrations of Th-232 reported in picocurries in Table 1 were converted to µg/g and added to the weight of uranium to determine the total source material present This is shown in Table 2

UCCNHT0001427

The gamma radiation measured at the surface during excavation of the pit and within the slag pile is also reported in Table 2.

TABLE 2

Weight of Source Material

Sample	Uranium µg/g	Th-232 µg/g	Total Source Material µg/g	Gamma Radiation µR/hr*
Illmenite-Top of Pile	28.9	145.5	174 4	170
Illmenite-7' In Pit	44 3	336 4	380 7	150
Dark Slag	20.2	145 5	165 7	150
Light Slag	18.6	336 4	355.0	200

*Ludlum Model 19 Micro R Meter - Reading at Surface

As we discussed the total source material in both materials is less than 500 µg/g, the limit for uncontrolled areas and the radiation is less than 250 µR, the limit for fixed surface contamination

Although technically the material was not sufficiently radioactive to be controlled you convinced me that it was not a good idea to use it to fill a low area in the yard If this were done then a rider would have to be appended to the lease that would restrict future building. Since this is not an attractive option I propose to dispose of both the slag and illmenite in a local hazardous waste repository

Unless I misunderstood, you did not voice an objection to this during our phone conversation Therefore, I plan to immediately begin the paper work to initiate this course of action. However I will not remove anything from the property before June to allow you time to reconsider. I will not expect to hear from you unless you disapprove.

I enjoyed talking to you on Monday and I want to thank you again for the assistance you provided

Sincerely

Donald J Hansen

D. J Hansen
Assistant Director - Technology

cc: Messrs.
R F. Kelly
R G. Beverly
F. V McMillen

Blind Copies Messrs
J F Frost
T. J. Kagetsu
D G. Millenbruch
R. L. Miller
W D. Smith
C T. Wentzel

UCCNHT0001428

NIAGARA FALLS

LONG RANGE PLAN

UMETCO MINERALS CORPORATION

UCCNHT0001429

NIAGARA FALLS, NY

LONG RANGE PLAN

UMETCO MINERALS CORPORATION

1996

UCCNHT0001430

NIAGARA FALLS
LONG RANGE PLAN
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UCCNHT0001431

NIAGARA FALLS, NY
LONG RANGE PLAN

SITE HISTORY

Union Carbide Corporation (UCC)/Umetco Minerals Corporation (Umetco) conducted metals processing operations at a facility located in Niagara Falls, NY from 1919 to 1986 On April 23, 1986, U S Vanadium Corporation (USV) acquired the facility pursuant to a purchase agreement UCC/Umetco assumed certain liabilities for the site pursuant to an associated environmental agreement dated May 13, 1986 USV/Strategic Minerals Corporation (Stratcor) is believed to be currently operating the site facilities in a similar manner and producing similar products as UCC/Umetco had previously

The approximate 25-acre site is situated as follows (see Figure 1)

- bound to the north by former Simmons Avenue (abandoned by the City of Niagara Falls on December 10, 1928, and reverted to UCC),
- bound to the west by Elkem Metals Company and UCC Linde Division (now Praxair?) properties, and by 47th Street,
- bound to the south by UCC Linde Division and Hooker Energy Corporation properties, and
- bound to the east by L-Tec property

In 1986, there were approximately forty buildings/structures, as depicted in Figure 1, on the property

Processing operations previously conducted at the site are not well known at this time, however, it included metals work with elements ranging from atomic number 13 (aluminum) to 92 (uranium) Some of the materials used and disposed of exhibited elevated radioactivity

UCCNHT0001432

General Plan of Niagara Plant

615-20227 Rev. 0 3-6-86

Scale 1" ≅ 150'

Umetco Niagara Falls Site

By: gwDavis 4-25-96

UCC LINDE DIVISION

'A' Stee

Royal Ave.

47th Street

Simmons Ave.

Hooker Energy Corp

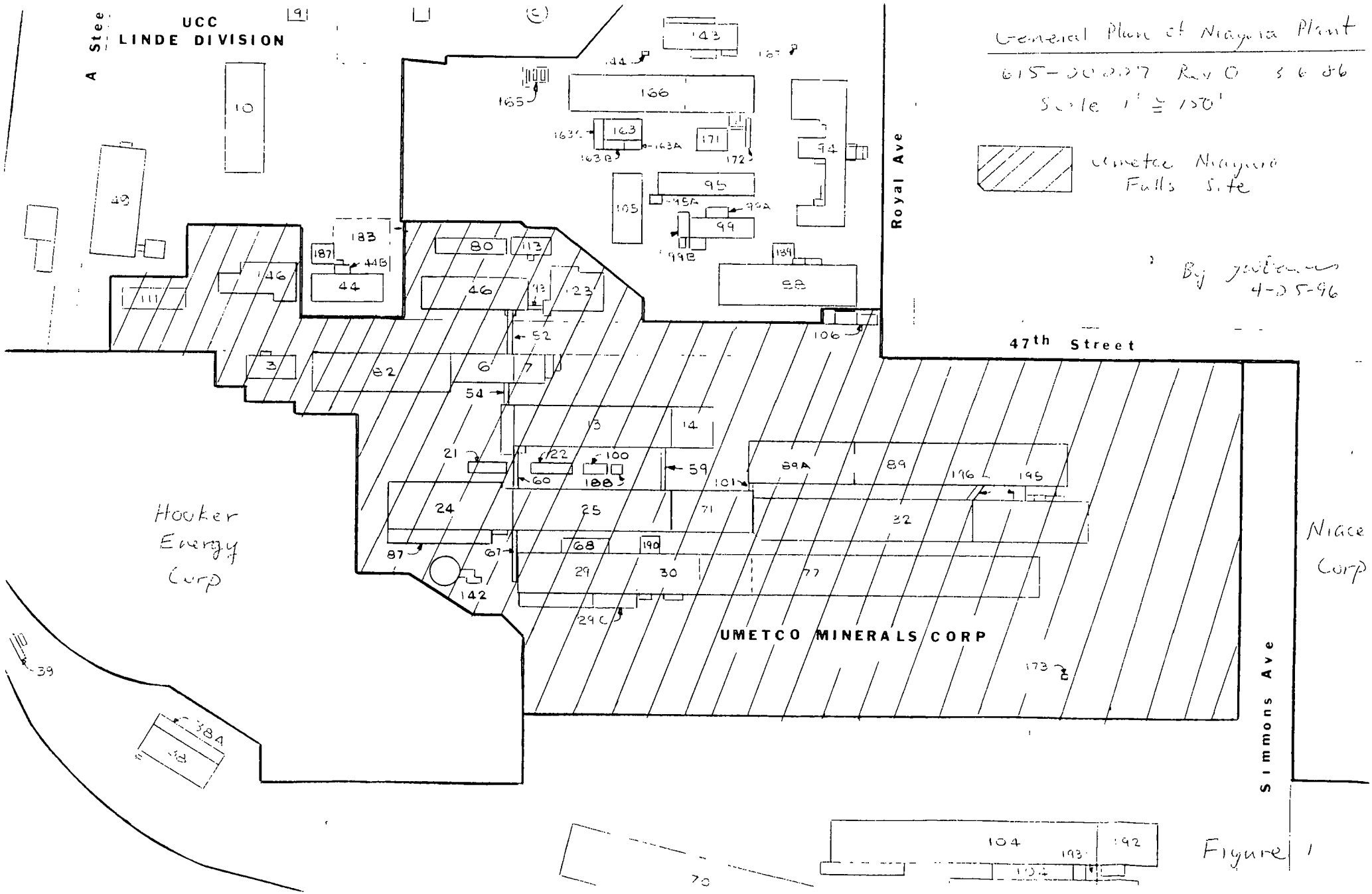
Niacet Corp

UMETCO MINERALS CORP.

9 (C) 143 144 167 165 166 163C 163 163A 163B 171 172 94 95 95A 99A 99 99B 105 10 49 183 187 44B 44 80 113 46 93 123 189 88 106 111 146 52 3 82 6 7 54 13 14 21 122 100 188 59 60 101 89A 89 196 195 24 25 71 32 87 67 68 190 29 30 77 142 29C 39 38A 38 173 70 104 193 192 194

Figure 1.C.1

UCCNHT0001433



UCCNHT0001434

SITE CONTROLS

The site controls in-place at the Niagara Falls site are generally unknown at this time The purchase agreement dated April 23, 1986, among UCC, Umetco, and Stratcor, and the associated environmental agreement of May 13, 1986, discuss certain environmental obligations The environmental agreement of May 13, 1986, between UCC, Umetco and Stratcor contains provisions including

- Requires UCC/Umetco to transfer to USV all of the environmental permits, licenses, and approvals as identified in the purchase agreement
- Holds UCC/Umetco liable, and USV/Stratcor harmless, for any and all claims resulting from UCC/Umetco's business operations at the site prior to the sale of the property to USV/Stratcor
- Holds USV liable, and UCC/Umetco harmless, for any and all claims resulting from USV's business operations at the site from and after May 13, 1986
- Requires UCC/Umetco to perform reclamation work as presented in Table 1
- Subsequent to the accepted completion of the work in Table 1, holds UCC/Umetco to no further indemnification of USV for these obligations
- Excepting the PCB and asbestos remedial work in Table 1, UCC/Umetco has no associated indemnification obligation to USV/Stratcor at the facility
- Upon termination of production at the site, UCC/Umetco and USV/Stratcor agree to share remedial costs, with USV/Stratcor's share capped
- UCC/Umetco's indemnification obligation does not cease in the event of site listing under CERCLA

UCCNHT0001435

SITE PROJECTS

There is not, at this time, sufficient information available to identify known, probable, and worst-case scenario reclamation projects Accordingly, the site projects proposed at this time are directed at obtaining sufficient information to subsequently identify, and then plan, known, probable and worst-case scenario reclamation projects

The existing environmental agreement between UCC/Umetco and USV/Stratcor identifies both specific and general environmental restoration/reclamation liabilities The scope of the currently proposed site projects will revolve around identifying and then quantifying these liabilities

- **Phase I Environmental Assesssment**

  Umetco will perform a Phase I Environmental Assessment (EA) of the subject site pursuant to standard practices (ASTM, 1994) with the primary goal of identifying and documenting the presence or likely presence of any hazardous substances or petroleum products on the subject property under conditions that indicate an existing release, a past release, or a material threat of a release of such substances or products to the environment (EPA, 1995)

  The EA will also include the assessment of UCC/Umetco's completion and USV's acceptance of the five work tasks presented in Table 1 for which there is inadequate documentation

  Cost

Phase I EA	$20,900 00

  Schedule

  Complete Phase I EA in 1997

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Critical Assumptions

1 Competent firm can be found in the site area to perform the Phase I EA

2 One site visit by one Umetco person will be required in 1997

Uncertainty Analysis

None

- **Phase II Environmental Assessment**

Given the age of the site and the nature of the technological processes conducted thereon, it is expected that releases and/or potential releases of hazardous and/or petroleum substances will be identified during the Phase I EA If such is found, a Phase II EA will be conducted Until the Phase I EA is completed, the cost of the Phase II EA cannot be guessed or estimated

Cost

Unknown

Schedule

1998

Critical Assumptions

1 Phase I EA will identify present, past, or material threat of releases of hazardous/petroleum substances

UCCNHT0001437

Uncertainty Analysis

None

UNIQUE SITE ISSUES

There is not sufficient information available about the site to identify unique site issues Based on Umetco's experience, it is expected that the prior presence of radioactive materials at the site indicates the probable need for future work Radiological remedial actions conducted in years past frequently require additional work upon re-examination

UCCNHT0001438

Table 1
Specific UCC/Umetco Reclamation Requirements
Niagara Falls, NY Site
(per May 13, 1986 Environmental Agreement)

Environmental Agreement Article No.	Work Description	Environmental Agreement Scheduled Completion	Actual Completion	USV Acceptance Available	Remarks
3(a)	Remedy specific PCBs	8/86	1-19-87	No	Work incomplete
3(b)	Complete halide scrubber	8/86	1-14-87	No	
3(c)	Dispose of chrome oxide	6/86	10-27-86	Yes	
3(d)	Dispose of high antimony tungsten	10/86	10-27-86	Yes	
3(e)	Remedy globar elevator asbestos	8/86	12-16-86	No	
3(f)	Characterize and dispose as necessary, RCRA "Super Sucker" dust	10/86	10-6-86	Yes	
3(g)	Dispose of sample cans	10/86	11-26-86	Yes	
3(h)	Yard area radiation and RCRA characterization with RCRA disposal as necessary	3/87	10-27-86	Yes	
3(i)	Radioactive decontamination of 3 plant areas	6/87	10-2-86	Yes	
3(j)	Disposal, if required, of miscellaneous slags, remelts, drums, and miscellaneous materials on the plant site	NF	NF	No	
3(k)	Share UST remedial costs	NF	NF	No	
3(l)	Remedy Lake Linde	6/87	10-27-86	Yes	

Notes

NF = not found
UST = underground storage tank
RCRA = Resource Conservation and Recovery Act
PCBs = polychlorinated biphenyls

UCCNHT00014439

RECLAMATION COST ESTIMATE AND SCHEDULE

UCCNHT0001440

UMETCO MINERALS CORPORATION
PROJECT SUMMARY SHEET

REVISION # 0

LOCATION Niagara Falls, NY

PROJECT # _____

PROJECT TITLE Niagara Falls, NY

PROJECT REQUIRED BY _____

STATUS OF PLAN _____

BASIS OF ESTIMATE _____

LEVEL OF ESTIMATE 1

SCHEDULE

YEAR	DOLLARS *
1996	
1997	20,900.00
1998	
1999	
2000	
2001	
2002	
2003	
2004	
2005	
Post 2005	
TOTAL	20,900.00

* All costs should be stated in current year (1996) dollars

COMMENTS None

PREPARED BY Steven Davis

DATE April 29, 1996

APPROVED BY

(1)_____ Manager of Engineering

(2)_____ Manager of Environmental

(3)_____ Operations Manager

(4)_____ Manager of Accounting

(5)_____ General Manager

Niagara Falls, NY
Cost Estimate
Phase I EA

Labor			
Project Manager	80 hrs x $75/hr		$6,000 00
Technicians	180 hrs x $50/hr		9,000 00
Clerical	40 hrs x $30/hr		1,200 00
		Subtotal	$16,200 00
Other Direct Costs (lump estimates)			
Mileage			$200 00
Copying			100 00
Photos			2,000 00
Postage			200 00
Telephone			200 00
Air fare			1,400 00
Per diem			400 00
Car rental			200 00
		Subtotal	$4,700 00
		Total	$20,900 00

J W Davis
4-29-96

References

"Environmental Agreement (Niagara Falls)", between UCC/Umetco (Seller) and USV/Stratcor (Buyer), May 13, 1986

"Standard Practice for Environmental Site Assessments for Commercial Real Estate", E1527-94 and E1528-93, second edition, June, 1994

U S Environmental Protection Agency, *Title 40, Code of Federal Regulations,* 1995

ENVIRONMENTAL AGREEMENT (Niagara Falls)

AGREEMENT made as of this 13th day of May, 1986, by and among Union Carbide Corporation, a New York corporation having an office at 39 Old Ridgebury Road, Danbury, Connecticut 06817-0001 ("Union Carbide"), Umetco Minerals Corporation, a Delaware corporation having an office at 39 Old Ridgebury Road, Danbury, Connecticut 06817-0001 ("Umetco") (Union Carbide and Umetco being hereafter collectively called "Seller") and U. S. Vanadium Corporation, a Delaware corporation, with a mailing address c/o Strategic Minerals Corporation, 30 Main Street, Danbury, Connecticut 06810 ("USV") and Strategic Minerals Corporation, a Connecticut corporation having an office at 30 Main Street, Danbury, Connecticut 06810 ("Stratcor") (USV and Stratcor being hereafter collectively called "Buyer").

WITNESSETH:

WHEREAS, USV has acquired substantially all the assets of Umetco's U.S. vanadium business pursuant to a Purchase Agreement among Union Carbide, Umetco and Stratcor dated as of April 23, 1986 (the "Purchase Agreement"); and

WHEREAS, the parties desire to provide for certain services to be rendered, work to be done and liabilities to be assumed with respect to Umetco's vanadium and tungsten products processing facility located at Niagara Falls, New York (the "Niagara Falls Facility"), and

UCCNHT0001444

WHEREAS, pursuant to the Purchase Agreement, Seller will be transferring to USV all of the environmental permits, licenses and approvals ("Environmental Permits") as identified in Schedule 9 of Exhibit Q to the Purchase Agreement; and

WHEREAS, Seller and Buyer acknowledge that USV will require a reasonable amount of time after the closing of the Purchase Agreement in order to accomplish a prompt transfer of the Environmental Permits,

NOW, THEREFORE, the parties hereto hereby agree as follows

1. Indemnification.

(a) Subject to the provisions of Articles 3 and 7 below, Seller hereby assumes and will be liable for, and shall indemnify Buyer against and hold Buyer harmless from, any and all costs, claims, damages, lawsuits, attorneys' fees, losses, deficiencies, judgments, actions, liabilities and obligations of any kind or description (collectively called "Claims") asserted against, incurred or required to be paid by Buyer (regardless of when asserted or by whom), resulting from Seller's business operations at the Niagara Falls Facility prior to the date of this Agreement. Seller's obligation hereunder is limited to the Claims and Seller shall have no liability whatsoever for incidental or consequential damages to USV.

(b) USV hereby assumes and will be liable for, and shall indemnify Seller against and hold Seller harmless

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from any and all Claims asserted against, incurred or required to be paid by Seller (regardless of when asserted or by whom), resulting from USV's business operations at the Niagara Falls Facility from and after the date of this Agreement. USV's obligation hereunder is limited to the Claims and USV shall have no liability whatsoever for incidental or consequential damages to Seller.

(c) Notwithstanding the provisions of paragraph (a) above, but subject to the provisions of paragraph (f) below, Buyer agrees that Seller shall have no further indemnification obligation to Buyer with respect to the reclamation, restoration, testing and/or disposal activities and obligations as set forth in paragraphs (a), (b), (c), (d), (e), (f), (g), (h) and (i) of Article 3, but only upon completion of such reclamation, restoration, testing and/or disposal activities or satisfaction of such obligations by Umetco. Upon request from Seller, Buyer will deliver to Seller a written release confirming the cessation and termination of indemnification contemplated in this Article 1, such release to be in form and substance satisfactory to Seller's counsel.

(d) Buyer further agrees that Seller shall have no indemnification obligation to Buyer with respect to

(i) any PCBs in oil filled switches in the Niagara Falls Facility.

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(ii) PCBs in capacitors, transformers, oil supplies or in any other areas of the Niagara Falls Facility, except as specifically enumerated in paragraph (a) of Article 3 below.

(iii) any asbestos in the Niagara Falls Facility except as specifically enumerated in paragraph (e) of Article 3 below.

(e) Upon termination of production of products at the Niagara Falls Facility, Buyer and Seller agree to share any final restoration, reclamation or remediation costs required by applicable laws relating to the plant site (provided that any saleable/salvageable assets in the plant will be sold and the proceeds applied to total reclamation liabilities) and any other areas not specifically enumerated in this agreement in proportion to their respective periods of occupancy of the Niagara Falls Facility. Buyer's share of such costs (including costs referred to in paragraph (h) of Article 3 below) shall in no event exceed its period of occupancy of the Niagara Falls Facility (expressed as a percentage) multiplied by $1,000,000. (The parties acknowledge that Seller conducted operations at the Niagara Falls Facility from 1919 to 1986.)

(f) Buyer and Seller agree to assert no claims of any kind against each other as a result of Seller's, its contractors' or consultants', or Buyer's performance of or supervision of the Work (as hereinafter defined) except in the

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event of the gross negligence or willful misconduct of the other party.

(g) Notwithstanding the provisions of paragraph (c) above, Seller's indemnification obligation set forth in paragraph (a) above shall not cease and terminate in the event the Niagara Falls Facility is listed as a "Superfund" site pursuant to the Comprehensive Environmental Response, Compensation and Liability Act.

2. Indemnification Procedure; Right to Contest Reclamation Requirements.

(a) Buyer shall notify Seller within 45 days from the assertion of any Claim or discovery of any fact upon which Buyer intends to base a claim for indemnification hereunder. Buyer's failure to so notify Seller shall relieve Seller from any liability under this Agreement to Buyer with respect to such Claim. Seller shall have the right at its own expense to participate jointly with Buyer in the defense of any claim, demand, lawsuit or other proceeding in connection with which Buyer claims indemnification hereunder and, with respect to any issue involved in such claim, demand, lawsuit or other proceeding as to which Seller shall have acknowledged the obligation to indemnify Buyer hereunder, Seller shall have the sole right to settle or otherwise dispose of such claim, demand, lawsuit or other proceeding on such terms as Seller, in its sole discretion, shall deem appropriate.

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(b) Seller shall notify Buyer within 45 days from the assertion of any Claim or discovery of any fact upon which Seller intends to base a claim for indemnification hereunder. Seller's failure to so notify Buyer shall relieve Buyer from any liability under this Agreement to Seller with respect to such Claim. Buyer shall have the right at its own expense to participate jointly with Seller in the defense of any claim, demand, lawsuit or other proceeding in connection with which Seller claims indemnification hereunder and, with respect to any issue involved in such claim, demand, lawsuit or other proceeding as to which Buyer shall have acknowledged the obligation to indemnify Seller hereunder, Buyer shall have the sole right to settle or otherwise dispose of such claim, demand, lawsuit or other proceeding on such terms as Buyer, in its sole discretion, shall deem appropriate.

(c) Seller and Buyer shall each retain the right to contest any restoration, reclamation or remediation requirements imposed by State or other environmental authorities having jurisdiction over the Niagara Falls Facility.

3. Other Environmental Matters.

(a) PCB Transformers and Capacitors. Umetco agrees to assume the cost of retrofilling, replacing or disposing of the following capacitors and transformers as promptly as feasible

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Item	Action
Transformers 5, 21, 22, 33, 34, 35, 110, 111, 143	Retrofill
Transformers 4, 23, 24, 122, 159, 160 and 161	Dispose
Transformer 119	Dispose & Replace
86 Capacitors for #32 furnace	Dispose
27 Miscellaneous Capacitors	Dispose
Shaft Furnace Capacitors	Dispose

Umetco further agrees to assume the cost of cleanup and disposal of PCB contaminated sludges, oils, waste material currently on site or that will be accumulated when the above equipment is retrofilled or removed. Specifically, Umetco assumes the cost of cleanup and disposal of PCB contaminated soil under the "Owl" transformers, i.e., Nos. 159, 160, and 161, if necessary. ("Retrofilling" is defined as replacing, flushing, etc., of PCB contaminated oils, which when refilled and after the required test runs under power, test at less than 50 ppm PCBS.)

(b) Halide Scrubber. Umetco further agrees to assume the cost of completing installation after the date of this agreement of the halide scrubber now being installed and any corrective modifications to insure compliance with applicable regulations. Once completed and operating as now designed, USV

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accepts responsibility for obtaining necessary permits for the system.

(c) Chrome Oxide. Umetco further agrees to assume the cost of disposal of 64 drums of chrome oxide now located at the Niagara Falls Facility.

(d) High Antimony Tungsten. Umetco further agrees to assume the cost of disposal of approximately 100,000 pounds of high antimony tungsten molybdenum oxide now located at the Niagara Falls Facility.

(e) Asbestos in Freight Elevator. Umetco further agrees to assume the cost of removal of the asbestos lining in the globar elevator.

(f) "Super Sucker" Dust. Umetco further agrees to test the various waste piles of plant dust deposited by the "Super Sucker" industrial cleaning firm in the plant yard to determine whether such piles are Hazardous Waste (as defined in the Resource Conservation Recovery Act or comparable state law). If any such piles are determined to be Hazardous Waste, under applicable laws, Umetco agrees to assume the cost of removal and disposal of such piles.

(g) Sample Cans. Umetco further agrees to assume the cost of removal and disposal of the numerous small sample cans in the globar area.

(h) Yard Area Ores and Slags. Umetco further agrees to conduct a radiation survey and surface sampling program of

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the plant yard area to determine whether or not Hazardous Waste is present in the yard area. If Hazardous Waste is found, Umetco agrees to assume the cost of reclamation or remediation of the plant site or disposal of such Hazardous Waste, as required by applicable law. At termination of USV's operations at the Niagara Falls Facility, Buyer and Seller agree to share the cost of reclamation of the plant yard area in the same proportions and with the limitation on Buyer's obligation specified in paragraph (e) of Article 1 above, unless USV's operations at said facility have created a materially more expensive reclamation problem (when compared with reclamation based upon an assumed continuation of operations as conducted in the past by Seller and using the results of the radiation survey and surface sampling program as a benchmark), in which event the excess plant yard reclamation costs will be borne by Buyer.

(i) Plant Buildings. Umetco further agrees to assume the cost of decontaminating the three areas of the plant which have been determined to be radioactive based upon Umetco's radiation survey of the plant.

(j) Miscellaneous Slags and Re-Melts in Yard Area. Buyer agrees to assume the cost of disposal, if required, of 20,000 pounds of vanadium aluminum remelts, 4,000 tons of miscellaneous slags from various furnace operations, piles of

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lime, etc. in the plant yard area, and empty drums around the plant and all other miscellaneous materials currently on the plant site and not specifically enumerated in paragraphs (a) through (i) above.

(k) Storage Tanks. If in the future USV is required by law to modify, repair or remove the underground gasoline and/or waste oil storage tanks due to evidence of leaking, Seller and Buyer agree to share the cost of modification, repair or removal based upon their respective periods of occupancy of the Niagara Falls Facility, except if such modification, repair or removal is due solely to the business operations of USV, in which event USV shall solely bear such cost.

(l) Appropriate remedial action will be taken with respect to the pond on the eastern boundary of the Niagara Falls Facility.

4. Environmental Work and Access to Premises.

Seller and Buyer have agreed upon a program of work affecting the environment, including, but not limited to, reclamation, restoration, remediation and cleanup, as described in Articles 1 and 3 above, to be performed at the Niagara Falls Facility (hereafter the "Work") by and under the supervision of Seller and at Seller's sole cost and expense. A plan for the Work, including estimated costs of performing various aspects

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thereof and estimated time schedules for completing the Work, is attached hereto as Schedule A. Seller agrees to supervise the performance of the Work and covenants that the Work will be performed in a good and workmanlike manner, and in compliance with applicable laws (or, in the absence of such laws, in accordance with generally accepted environmental engineering standards). USV hereby grants to Seller, its contractors and consultants, the right and license to enter the Niagara Falls Facility for the purpose of supervising and performing the Work. Seller agrees, for itself, its contractors and consultants, to exercise such right and license so as to minimize any interference with or disruption of USV's normal commercial operations at the Niagara Falls Facility.

5. Coordination Committee, USV Performance of the Work.

(a) USV and Umetco will each designate two (2) representatives to serve on a Coordination Committee which will oversee the performance of the Work with the goal of assuring completion of the Work in a timely and cost-effective manner, with minimal interference with USV's normal commercial operations at the Niagara Falls Facility.

(b) Upon Umetco's reasonable request, USV will perform all or any portion of the Work described in Schedule A, in a good and workmanlike manner. Umetco shall pay USV monthly

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upon receipt of invoice for USV's actual costs of performing the Work (or otherwise agreed contract price).

6. Cost Verification.

USV's books and records will be open to inspection by Umetco upon reasonable notice and during normal business hours, but not more than once every six (6) months, for the purpose of verifying USV's costs of performing the Work.

7. Bridging of Environmental Permits.

(a) To the extent that applicable federal, state or local statute, law, regulation, rule or order requires action to be taken by or on the part of Seller in order for USV to obtain a Transfer of the Environmental Permits, Seller shall take or cause to be taken all such action, and Seller otherwise shall cooperate with USV in obtaining such Transfer. As used in this Article 7, a "Transfer" of Environmental Permits shall mean and include, as applicable, the substitution of USV's name on, and a transfer, reissuance or new issuance to USV of, such Environmental Permits, without any continuing obligation or liability of Seller whatsoever, including, without limitation, as a guarantor or surety thereof.

(b) From and after the closing of the Purchase Agreement, Seller shall maintain, at Buyer's sole cost and expense pursuant to Paragraph (c) below, each of the

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Environmental Permits, including all bonds, guarantees or other financial sureties relating thereto or required thereby ("Sureties") until the earlier of (i) expiration of each such Environmental Permit (it being acknowledged that Seller shall have no obligation to renew any Environmental Permit hereunder) or (ii) Transfer of each such Environmental Permit; provided, that during such time USV diligently shall use its best efforts to obtain a Transfer of the Environmental Permits and to obtain any Sureties related to or required by such Environmental Permits. In connection therewith, USV, as promptly as possible, but in no event later than one (1) month after the date of this agreement, shall submit to or file with the appropriate governmental or regulatory authorities, in a complete fashion, all applications and other documents required to be so submitted or filed by USV in order to obtain a Transfer of the Environmental Permits; provided, that such time limitation shall be extended with respect to each applicable Environmental Permit by such period of time that any failure by USV to comply therewith is attributable to action or inaction by or on the part of Seller. Upon either expiration or Transfer of each Environmental Permit as described in subparagraphs (b)(i) or (b)(ii) above, USV's obligation to reimburse Seller for such maintenance of that Environmental Permit shall cease and Seller shall have the right to cancel such Environmental Permit and/or Surety, to the extent such

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cancellation is permitted by law. USV promptly shall notify Seller of the Transfer of each Environmental Permit and Seller promptly shall notify USV of any change in the previously scheduled expiration of any Environmental Permit and of any change in the provisions of each Environmental Permit.

(c) Except with respect to any net income taxes payable by Union Carbide, the maintenance of the Environmental Permits and/or Sureties as described in Paragraph (b) above shall be absolutely net to Seller, and Buyer shall reimburse Seller for all direct costs and expenses incurred by Seller in connection with such maintenance; provided, that Seller shall provide USV with such documentation as USV reasonably may request in order to verify the amount of such maintenance costs and expenses. Seller shall invoice USV for all amounts payable hereunder and payment shall be due net thirty (30) days from the date of invoice. If USV fails to make any payment to Seller hereunder when due with respect to any such Environmental Permit, then Seller shall have the right to terminate this agreement with respect to such Environmental Permit if USV does not cure such default within twenty (20) days after notice thereof from Seller.

(d) Prior to Transfer of the Environmental Permits, Buyer shall cooperate with Seller and provide whatever information is needed and perform whatever actions are

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necessary to comply with the Environmental Permits in a manner consistent with Seller's past policies and in compliance with the terms and conditions of the Environmental Permits. If USV shall fail to comply with any material term or condition of any Environmental Permit or breach any commitment, agreement or obligation under this agreement, then Seller shall have the right to terminate this agreement with respect to such Environmental Permit if USV does not cease and, if necessary, cure any such noncompliance or breach as soon as practicable but in no event later than twenty (20) days after notice thereof from Seller or within any shorter time period as required by any governmental or regulatory authority, provided, however, that if in Seller's sole good faith judgment any such noncompliance or breach creates, contributes to, or results in, or is likely to create, contribute to, or result in, an emergency situation, Seller may immediately suspend USV's operations under applicable Environmental Permits until such emergency situation or potential emergency situation has ceased, and, if necessary, has been cured. Notwithstanding anything to the contrary contained in the foregoing, Seller shall not terminate this agreement or suspend USV's operations under any Environmental Permit based solely upon (i) noncompliance with the transfer provisions of any Environmental Permit or (ii) any breach of this agreement based solely upon

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noncompliance with such transfer provisions unless an applicable federal, state or local government or regulatory authority issues an order or notice of violation that USV's operations under such Environmental Permit is in violation of its transfer provisions and indicates that it will or may take remedial action against Seller as a result thereof. Seller shall promptly notify USV of the termination or suspension of USV's operations under any Environmental Permit under this Paragraph (d) and the reasons therefor.

(e) Buyer shall indemnify Seller against and hold Seller harmless from all claims, damages, losses, liabilities, demands, assessments, fines, penalties, administrative orders, notices of violation, suits, actions or proceedings, costs, expenses and obligations, including interest, penalties and reasonable attorneys' fees (collectively, "Claims"), which arise out of or in connection with (i) USV's failure during the applicable period set forth in paragraph (b) above to comply with the terms and conditions of any Environmental Permit, or the statutes, laws, regulations, rules, orders or codes pertaining thereto or (ii) any breach of any commitment, agreement or obligation by USV under this agreement; provided, however, that USV shall not be obligated to indemnify Seller against any Claims arising solely out of or in connection with any failure by Seller to comply with applicable transfer

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provisions of the Environmental Permits. These indemnification provisions relate to this Agreement and shall be in addition to, and not in derogation of, the respective rights, obligations, liabilities and indemnifications of Seller and Stratcor pursuant to the Purchase Agreement.

8. Headings.

Article headings are not to be considered a part of this Agreement, are included solely for convenience, and are not intended to be full of accurate descriptions of the contents thereof.

9. Governing Law.

This Agreement shall be construed in accordance with and governed by the laws of the State of Connecticut.

10. Notices.

Any notice or other communication required or permitted hereunder shall be in writing, and shall be deemed to have been given if placed in the United States mail, registered or certified, postage prepaid, addressed as follows:

If to Seller, addressed c/o Union Carbide as follows:

39 Old Ridgebury Road
Danbury, Connecticut 06817
Attention: President, Umetco Minerals Corporation

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If to Buyer:

Strategic Minerals Corporation
30 Main Street
Danbury, Connecticut 06810

with a copy to:

Gager, Henry & Narkis
30 Main Street
Danbury, Connecticut 06810
Attention: David R. Chipman, Esq.

Each of the foregoing shall be entitled to specify a different address by giving notice as aforesaid to the others.

11. Disputes. Any dispute that the parties are unable to resolve may be submitted to any court having jurisdiction over such dispute.

12. Entire Agreement, Survival, No Waiver.

This Agreement and the other documents and instruments contemplated hereby or thereby constitute the entire agreement between the parties pertaining to the subject matter hereof, and supersede all prior and contemporaneous agreements, understandings, negotiations and discussions, whether oral or written, of the parties, and there are no warranties, representations or other agreements between the parties in connection with the subject matter hereof, except as specifically set forth herein. No supplement, modification, waiver or termination of this Agreement shall be binding unless executed in writing by the party to be bound thereby. No

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waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provision hereof (whether or not similar), nor shall such waiver constitute a continuing waiver unless otherwise expressly provided herein.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be entered into and executed by their officers thereunto duly authorized as of the date and year hereinabove set forth.

UNION CARBIDE CORPORATION

By: _____

Title: _____

UMETCO MINERALS CORPORATION

By: _____

Title: _____

STRATEGIC MINERALS CORPORATION

By: _____

Title: _____

U.S. VANADIUM CORPORATION

By: _____

Title: _____

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Schedule A

Niagara Falls, New York

Description of Work

	Work to be Done	Established Completion Date
A.	Replace, retrofill or dispose of PCB containing transformers, capacitors and dispose of cleanup materials.	8/86
B	Complete halide scrubber.	8/86
C.	Dispose of chrome oxide	6/86
D.	Remove globar elevator asbestos.	8/86
E	Dispose of high antimony tungsten.	10/86
F.	Dispose of sample cans.	10/86
G.	Sample, test and dispose of, if necessary, "Super-sucker" dust.	10/86
H.	Yard area sampling and cleanup, if necessary.	3/87
I.	Drain and fill "Lake Linde"	6/87
J.	Clean up radioactive areas of plant.	6/87

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EXHIBIT K

JJS 9961J 4/28/86

LEASE AGREEMENT

THIS AGREEMENT, made as of the ___ day of _____, 1986, between UNION CARBIDE CORPORATION, a New York corporation having an office at 39 Old Ridgebury Road, Danbury, Connecticut 06817-0001 (hereinafter called "Landlord"), and U.S. VANADIUM CORPORATION, a Delaware corporation having a mailing address c/o Strategic Minerals Corporation, 30 Main Street, Danbury, Connecticut 06810 (hereinafter called "Tenant"),

W I T N E S S E T H:

WHEREAS, Landlord owns certain land, together with the buildings and improvements located thereon, consisting of approximately 29.5 acres situated along 47th Street, in the City of Niagara Falls, County of Niagara and State of New York, as more particularly described and shown on Exhibit A attached hereto (hereinafter called the "Vanadium Plant");

WHEREAS, pursuant to the Lease Agreement dated June 30, 1981, as amended by letter agreement dated June 30, 1981 and by Amendment of Lease dated August 8, 1984 and recorded in Book 1929, Page 15 of the Niagara County Clerk's Office (said lease, as amended, being hereinafter called the "Elkem Lease") between Landlord and Elkem Metals Company (hereinafter called "Elkem"), Landlord has reserved the occupation, use and possession of Building 99 (including Buildings 99A and 99B) and certain adjoining outdoor storage space (hereinafter collectively called the "Excepted Space"), subject to certain use rights of

Elkem, all as more particularly identified in Article 1 of the Elkem Lease and as approximately shown on Exhibit B attached hereto, from the real property so leased to Elkem (hereinafter called the "Elkem Premises") which adjoins the westerly boundary of the Vanadium Plant;

WHEREAS, Landlord owns certain other property consisting of improvements, fixtures, machinery and equipment, as more particularly identified in Exhibit B-1 attached hereto (hereinafter called the "Equipment"), which is located upon the Vanadium Plant and the Excepted Space and which Tenant wishes to use in conjunction with its occupation and use of the Vanadium Plant and the Excepted Space;

WHEREAS, Tenant wishes to lease the Vanadium Plant, the Excepted Space and the Equipment (hereinafter collectively called the "Premises"), which are presently controlled by Umetco Minerals Corporation, a wholly-owned subsidiary of Landlord (hereinafter called "Umetco"), in order to conduct Tenant's vanadium and tungsten milling and processing business thereon which it is purchasing from Umetco simultaneously herewith and for other purposes as set forth in Article 4.1;

WHEREAS, by Lease Agreement dated as of June 28, 1985, as amended by letter agreement dated June 28, 1985 and by Amendment of Lease dated July 16, 1985 (said lease, as amended, being hereinafter called the "L-Tec Lease"), Landlord has leased to L-Tec Company (hereinafter called "L-Tec"), certain

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real property adjoining the easterly boundary of the Vanadium Plant (hereinafter called the "L-Tec Premises");

WHEREAS, Landlord retains ownership and possession of certain real property adjoining the westerly and southerly boundary of the Vanadium Plant on which it operates an industrial gases plant and related facilities (hereinafter called the "Industrial Gases Plant");

WHEREAS, the Vanadium Plant, the Excepted Space, the Utility Systems, the Elkem Premises, the L-Tec Premises and the Industrial Gases Plant comprise a contiguous assemblage of real property (hereinafter called the "Niagara Falls Complex"); and

WHEREAS, by Steam Service Agreement dated as of March 23, 1978, as amended (hereinafter called the "Steam Agreement"), with Hooker Energy Corporation, its successors and assigns (hereinafter called "Hooker"), Landlord receives steam for heat and other energy uses at the Industrial Gases Plant, the Vanadium Plant and the Elkem Premises;

NOW, THEREFORE, in consideration of the rents reserved hereunder and the mutual undertakings hereinafter set forth, Landlord and Tenant hereby covenant and agree as follows:

ARTICLE 1 - LEASED PREMISES

1.1 Landlord hereby leases to Tenant and Tenant hereby takes and hires from Landlord, upon and subject to the terms, covenants, conditions and provisions of this Agreement, the

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Premises, together with the non-exclusive right to use railroad tracks, in common with Landlord and L-Tec and their successors and assigns, which are located upon the L-Tec Premises, for rail access to the Premises, subject, however, to the provisions of the L-Tec Lease.

1.2 Tenant's rights to the possession, occupation and use of the Premises and the use of the aforesaid railroad tracks across the L-Tec Premises shall be subject to those easements, covenants, restrictions, encumbrances and third-party rights, if any, now existing, including without limitation the rights of Elkem as set forth in Articles 1.4 and 26.1 of the Elkem Lease and Paragraph 3 of the letter agreement dated June 30, 1981 with Elkem (concerning a non-exclusive roadway easement for access to Building 88 in the Elkem Premises) and the rights of L-Tec pursuant to Article 1.4 of the L-Tec Lease (hereinafter collectively called the "Permitted Encumbrances"); provided, however, that as to the Excepted Space, in the event that Elkem exercises its purchase option under Article 26 of the Elkem Lease, Landlord shall enter into a lease with Elkem as provided under Article 26 of the Elkem Lease (hereinafter called the "Subsequent Lease") and shall assign or otherwise transfer to Tenant its rights (i) under the Subsequent Lease as to the Excepted Space, and (ii) to remove from the Excepted Space any fixtures, furnaces or process equipment used in the

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production of vanadium halides, all pursuant to Article 26.1 of the Elkem Lease. Except as otherwise agreed to by Landlord and Tenant, the term of the Subsequent Lease shall extend at least through December 31, 2005 and the rent and other costs thereunder shall not exceed the ad valorem taxes and assessments and the utility costs reasonably allocable to the Excepted Space. Tenant shall be solely and exclusively liable for any rent or other obligations arising under the Subsequent Lease. As of the closing with respect to the conveyance of the Elkem Premises to Elkem, Landlord shall have no further liability or obligation to Tenant as to the demising of the Excepted Space. Tenant shall comply with and perform all of the obligations of Landlord under the Permitted Encumbrances as to the Premises and said railroad tracks, including without limitation, said obligations pursuant to Article 1.3 of the Elkem Lease and Article 1.4 of the L-Tec Lease and shall indemnify and hold harmless Landlord with respect to all such obligations under the Permitted Encumbrances.

1.3 Anything to the contrary contained herein notwithstanding, Landlord excepts and reserves for itself, its successors and assigns, all right, title and possession of and easements to operate, maintain, repair, replace, change the size of and remove, those utility facilities and any necessary or convenient rights of access thereto located at the Vanadium

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Plant, all as more particularly described in Exhibit C attached hereto (hereinafter collectively called the "Utility Systems"), and the Utility Systems shall not be part of the Premises for the purposes of this Agreement; provided, however, that until such time as Landlord revokes such rights upon five (5) days' prior written notice to Tenant, Landlord hereby grants to Tenant and Tenant hereby accepts from Landlord the license, right and privilege, on a twenty-four (24) hour basis, to operate, maintain, repair and replace the Utility Systems during the term of this Agreement, and any extension periods, pursuant to the provisions of Article 5.2. Any unreasonable failure or refusal by Tenant to exercise such license or to perform its obligations with respect thereto pursuant to Article 5.2 or otherwise under this Agreement shall be a default under this Agreement. The Premises and the Utility Systems are sometimes hereafter collectively called the "Subject Property."

ARTICLE 2 - TERM OF LEASE

2.1 The term of this Agreement shall commence on the date hereof and shall expire on December 31, 2005, unless it is sooner terminated as otherwise provided herein.

2.2 Upon the expiration of the term set forth in Article 2.1, this Agreement shall automatically be extended from year to year upon the same terms, covenants, conditions and

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provisions as set forth herein, unless and until it is terminated by either party as of December 31, 2005, or any subsequent annual anniversary of such date upon not less than one (1) year's prior written notice of such termination to the other party; provided, however, that Landlord shall have no obligation to provide either electric or steam Services (as defined in Article 7.2) during any such extension periods.

2.3 Notwithstanding Articles 2.1 and 2.2, commencing as of December 31, 1990, Tenant shall have the right to cancel and terminate this Agreement at any time upon not less than one hundred eighty (180) days' prior written notice to Landlord; provided, however, that upon or prior to the expiration of the aforesaid notice period, Tenant shall cure any monetary or other defaults hereunder.

ARTICLE 3 - RENT AND ADDITIONAL RENT

3.1 Tenant shall pay to Landlord without notice or demand, in advance on the first day of each calendar month during the term hereof, without any setoff, counterclaim or deduction for any reason whatsoever, subject to adjustment as provided in Article 3.2, the following annual rent:

(i) $772,095.24 in equal monthly installments of $64,341.27 from the date hereof through April 30, 1990, and

(ii) $802,371.36 in equal monthly installments of $66,864.28 from May 1, 1990 through the termination date of this Agreement;

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provided, however, that Tenant shall not be in default hereunder so long as it pays each rental installment within sixty (60) days after its due date. All payments received beyond such sixty (60) day period shall carry interest at an annual interest rate consisting of the "base rate" as quoted by Manufacturers Hanover Trust Company, New York City, determined as of the last day of any applicable sixty (60) day period, plus two percent (2%), from the expiration of such grace period to the date of receipt of the delinquent rental installment. Out of the aforesaid annual rent, $431,145.00 shall be allocated to the Services.

3.2 As of January 1, 1987 and each subsequent anniversary of such date, the aforesaid annual rent and the monthly installments thereof shall be adjusted by Landlord to reflect the projected actual cost of providing the Services for the forthcoming calendar year, based upon (i) reasonable estimates of past usage determined according to the annual weighted average demand for electric Services, (ii) annual usage for steam Services, (iii) actual electric utility and steam rates and charges, (iv) electricity costs for process water, (v) the costs of operating, maintaining and repairing Landlord's substation, pump house and distribution facilities for the Services, and (vi) overhead and administrative charges. All such projected actual costs shall be derived from the quantity

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and minimum use restrictions and base cost data set forth in Exhibit D attached hereto. Within thirty (30) days after such date, Landlord shall give to Tenant written notice of such adjusted annual rent, including the computations on which it is based. In the event of a dispute as to any amounts payable as adjusted rent pursuant to this Article 3.2, Tenant shall pay the adjusted rent as invoiced by Landlord and the parties shall diligently negotiate in good faith to resolve such dispute. At the request of Tenant, to the extent that any such disputed amount exceeds the annual rent in effect for the immediately preceding calendar year, Landlord shall promptly deposit such disputed amount which exceeds the component of rent for Services for the immediately preceding calendar year (including the amount which exceeds the component for Services in any subsequent monthly installment payments hereunder) in a money market account at Manufacturers Hanover Trust Company in New York City, until such time as the dispute is resolved to the satisfaction of Landlord and Tenant. If any such dispute cannot be resolved by the parties within ninety (90) days after receipt by Landlord of Tenant's request to use the foregoing bank deposit mechanism, then either party shall have the right to cause said dispute to be settled by arbitration pursuant to Article 31. Promptly upon resolution of such dispute, Landlord shall remit to Tenant any overpayments, including accrued

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interest thereon, and shall retain for its own account all other amounts, including the accrued interest thereon.

3.3 The rent payable pursuant to Article 3.1 and 3.2 shall be apportioned on a per diem basis for any partial monthly period at the commencement or termination of this Agreement.

3.4 Those payments required to be paid by Tenant to Landlord pursuant to Articles 5.2, 8.3, 10.2 and 29 shall be payable as additional rent within ten (10) days after presentation of a demand therefor, without setoff, counterclaim or deduction for any reason whatsoever.

3.5 Except with respect to any net income taxes payable by Landlord or any reimbursement obligations of Landlord pursuant to Article 5.2 or 5.4, the rent payable pursuant to Article 3.1 and 3.2, and the additional rent payable pursuant to Article 29.1, 29.2 and 29.3 shall be absolutely net to the Landlord, it being the intention of the parties that Tenant shall be solely liable for all costs and expenses associated with the Subject Property or arising out of this Agreement, except as otherwise specifically provided in this Agreement.

ARTICLE 4 - USE

4.1 Tenant may use and occupy the Subject Property for the production, analysis, storage and shipment of vanadium-related and tungsten-related products and chemicals and other products and chemicals related to the metals and metal chemical

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industries, and for any purposes incidental thereto, but for no other purpose Tenant shall not cause or permit any nuisance or extra-hazardous condition to arise or be maintained in, at or on the Premises, nor permit any damage to the Subject Property.

4.2 In its occupation and use of the Premises and operation and maintenance of the Utility Systems, Tenant shall comply fully with all applicable local, State and Federal laws, ordinances, orders, directives, rules and regulations; and such compliance shall be at Tenant's sole cost and expense, except as otherwise provided in Article 5.4. Tenant shall not by reason of its use, operation or maintenance of the Subject Property at any time throughout the term of this Agreement violate or cause to be violated any laws, ordinances, orders, directives, rules or regulations of any local, State or Federal authorities having jurisdiction thereof and the reasonable rules and regulations of the carriers insuring the Subject Property, or the Board of Fire Underwriters or their equivalent.

4.3 Tenant shall not cause or permit the production, generation, transportation, storage, emission, discharge, treatment or disposal of any hazardous or toxic wastes, materials or substances upon the Premises; provided, however, that the immediately preceding clause shall not apply with respect to the continued use, production, transportation and

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storage only of any hazardous or toxic wastes, materials or substances currently lawfully used by Umetco upon the Premises in connection with its permitted use of the Subject Property. Tenant shall remain solely liable during and after the termination of this Agreement to remove, eliminate or cure any pollution or environmental damage or condition due to the possession, occupation or use of the Premises or the Utility Systems by Tenant, its agents and contractors, and for any fines, penalties or claims, including health or property related claims, relating to such damage or condition.

ARTICLE 5 - REPAIRS AND MAINTENANCE

5.1 Tenant shall take good care of the Subject Property and, at its sole cost and expense, except as otherwise provided in Articles 5.2 and 5.4, shall keep and maintain the interior and exterior of the Subject Property reasonably clean and orderly and shall perform all maintenance, repairs and replacements thereto to the extent necessary for the safe, lawful and proper operation of the Subject Property as an industrial facility, including without limitation all repair and replacement of the roofs, foundations, structural members and heating, ventilating, air conditioning, plumbing and piping, electrical and mechanical systems, fixtures and equipment, paving and repair of any parking areas, and landscaping and yard maintenance. During the term of this

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Agreement, Tenant shall not cause any damage or destruction (other than reasonable wear and tear) to the Subject Property.

5.2 Except as otherwise provided in this Article 5.2, during the term of this Agreement, and any extension periods, Tenant shall operate, maintain, repair and replace the Utility Systems and perform and discharge the obligations of Landlord to deliver to Elkem and L-Tec various applicable Services through the Utility Systems, insofar as such delivery obligation pertains to the Utility Systems, subject to the termination rights of Landlord set forth in Article 1.3, the entry and repair rights of Landlord set forth in Article 10 2 and any other applicable provision of this Agreement. In the event of any problem necessitating repairs or replacements to the Utility Systems, Tenant shall immediately notify Landlord orally as to the nature and extent of such problem, including a projected date and time when it will be corrected, and confirm such oral notice in writing within twenty-four (24) hours thereof. To the extent that Tenant proposes to undertake any corrective action which will necessitate expenditures, capital improvements or replacements in excess of $100.00, Tenant shall before implementing any plan of corrective action (except in the event of emergencies) propose to Landlord a written plan for corrective action and obtain Landlord's prior approval therefor, including any expenditures. Landlord shall reimburse

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Tenant for Landlord's proportionate share (which includes Elkem's and L-Tec's proportionate share) of the actual cost of any expenditures for approved action to the Utility Systems pursuant to the immediately preceding sentence, and for routine verifiable maintenance costs (subject to prior approval thereof by Landlord and submission of reasonable verification of performance), all based upon the proportionate usage of the affected components of the Utility Systems over the immediately preceding three (3) calendar year period by Landlord and any parties other than Tenant and its predecessors in interest (viz., Umetco and Union Carbide Metals Division). In the event of any dispute between Landlord and Tenant as to any work contemplated under this Article 5.2, Landlord reserves the right to enter upon the Premises and to perform any necessary or appropriate corrective work, as it determines in the reasonable exercise of its discretion, and to impose upon Tenant the actual cost therefor, except to the extent of Landlord's reimbursement obligations pursuant to this Article 5.2. Except as provided under this Article 5.2, Tenant shall not make any improvements, alterations or additions to the Utility Systems.

5.3 Anything to the contrary contained in this Agreement notwithstanding, at its sole cost and expense, Landlord shall have the right to enter upon the Vanadium Plant (including the

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electric control room in Building No. 13) to perform any work upon those components of the Utility Systems described in Item 1 of Exhibit C in order to relocate certain switching functions to its switching station upon the Industrial Gases Plant.

5.4 In the event that during the term of this Agreement, including any extension periods, any capital improvements or replacements are required with respect to the Utility Systems in order to permit them to function in good and safe operating order, then subject to Landlord's prior written approval of any such work, including Landlord's proportionate share of the expenditures therefor, Landlord shall promptly reimburse Tenant for Landlord's proportionate share of the actual cost of any such expenditures based upon the actual proportionate usage by Landlord and any parties other than Tenant of for the prior calendar year of the Service to which such capital improvements or replacements relate. Landlord's proportionate share of expenditures or costs, as the case may be, pursuant to this Article 5.4 shall include Elkem's and L-Tec's share.

ARTICLE 6 - ALTERATIONS

6.1 Tenant shall have the right to make any improvements, alterations or additions to Premises, related to the permitted uses under Article 4.1, provided that it obtains all necessary governmental consents and approvals. Tenant shall make no alterations to the Utility Systems, except as provided in Article 5.

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6.2 Any improvements, alterations or additions to the Premises, other than fixtures and equipment, performed pursuant to Article 6.1 shall become part thereof and shall not be removed or subsequently altered, except that upon notice of Landlord to Tenant, made within sixty (60) days after the termination of this Agreement, Tenant, at its sole cost and expense, shall remove any such improvements, alterations or additions and any fixtures and equipment as referred to in Article 8.2, as reasonably requested by Landlord, and shall repair any damage to the Subject Property caused by their installation or removal.

ARTICLE 7 - UTILITIES AND SERVICES

7.1 At its sole cost and expense, Tenant shall arrange for and provide its own telephone, gas, potable water, sewage, refuse, janitorial and any other services which it may require, except as otherwise provided in Article 7.2. Tenant shall be solely liable to any utility or other third-party providing the said services to the Premises and shall satisfy and discharge all costs and expenses with respect thereto.

7.2 Landlord shall furnish or cause to be furnished electricity, steam, process sewage disposal (to the Excepted Space only) and process water service (hereinafter individually and/or collectively called the "Services") to the boundary of the Premises in those quantities and subject to those

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conditions and limitations, all as more particularly set forth in Exhibit D attached hereto. The Services are supplied hereunder solely in conjunction with the demise of the Premises and as necessary in order to permit Tenant to enjoy the full use and occupation thereof. On a basis consistent with past practice between Landlord and Umetco, Landlord and Tenant shall cooperate as to the scheduling of electric usage to insure adequate notice for the proper distribution of electric Services, to maximize the overall site electric load factor (viz., Premises, Industrial Gases Plant, Elkem Premises, L-Tec Premises) and to insure optimal energy utilization. Tenant shall advise Landlord monthly of its expected electric usage and furnace schedules for electric demand for the immediately succeeding calendar month and any subsequent changes thereto. Tenant shall not make available or resell any Services delivered hereunder to any other party. The Services provided by Landlord shall not be deemed evidence that it is operating or holding itself out as a public utility or that it will make available the Services to any other party.

7.3 Landlord shall not be liable to Tenant for any claims, damages, loss or liability due to Landlord's failure or inability to furnish or deliver any of the Services pursuant to the provisions of Exhibit D, including without limitation (i) any interruption, curtailment or failure of the Services

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arising out of any force majeure occurrence as described in Article 21.1, (ii) any failure of Landlord's suppliers of electricity and steam to provide adequate and reliable service, or (iii) any failure or breakdown of Landlord's pumps or other equipment for process water Services, electric substation, transformers, distribution system supplying electric Services or any pipes and meters for steam Services or any tunnels, pipelines, wires, lines, conduit or other equipment and fixtures which are used in providing any of the Services; provided, however, that any such failure, inability or breakdown does not arise out of the gross negligence or willful misconduct of Landlord. Any such interruptions, curtailment or failure of the Services shall not be deemed to be a partial or constructive eviction and in no event shall Landlord be liable to Tenant for any special, incidental, consequential or punitive damages with respect thereto; provided, however, that in the event of an extended interruption of any of the Services, Landlord shall extend to Tenant an equitable reduction of the annual rent allocable to the Services and reflecting Tenant's share of any reduction of Landlord's costs of providing the Services.

7.4 In the event of any force majeure occurrence as to any of the Services or any interruption, curtailment, failure or breakdown as to such Services, which prevents Landlord from

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having adequate capacity to supply its own needs and those of Tenant and any third-parties then using said Services, Landlord shall allocate the available quantity of such Services on a fair and reasonable basis according to the respective prior rates and quantities of the Services used by Landlord, Tenant and such third-parties, and Landlord shall extend to Tenant an equitable reduction of the annual rent allocable to the Services and reflecting Tenant's share of any reduction of Landlord's costs of providing the Services.

7.5 Tenant, at its sole cost and expense, shall have the right to apply for and receive electric service directly from Niagara Mohawk Power Corporation, in which event Tenant shall be entitled to an equitable reduction in that part of the annual rent, as the same may be adjusted, allocable to electric Services.

7.6 Landlord shall have the right, upon thirty (30) days prior written notice to Tenant, to terminate (i) electric Services, in the event of (a) a final determination by a court or governmental agency that Landlord will lose all or part of its use or allocation of low-cost hydroelectric power in the event that it continues to provide electric Services to Tenant, or (b) any negotiated, good faith settlement by Landlord with Niagara Mohawk Power Corporation and/or Power Authority of the State of New York upon actual threat of loss of all or part of

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Landlord's use or allocation of low-cost hydroelectric power in the event that Landlord continues to provide electric Services to Tenant, whereby Landlord foregoes providing electric Services to Tenant in order to preserve low-cost hydroelectric power to the Industrial Gases Plant; or (ii) steam Services, in the event that Hooker, its successors or assigns, terminates the Steam Agreement or said agreement cannot be extended pursuant to the terms thereof at costs which are acceptable to Landlord in the reasonable exercise of its discretion. In the event of any termination of electric or steam Services pursuant to this Article 7.6, Tenant shall be entitled to an equitable reduction in that part of the annual rent, as the same may be adjusted, which is allocable to said Services.

7.7 In the event that Tenant ceases or shuts down its operations upon the Premises for any period, and Landlord's allocation of low-cost hydroelectric power is reduced due to Tenant's failure to use any part thereof during said period, then Landlord's obligation to supply electric Services to Tenant shall be reduced by the aforesaid overall reduction up to the full delivery obligation for electric Services as set forth in Exhibit D. Landlord, upon thirty (30) days' prior written notice to Tenant, shall have no further obligation to provide that portion of the electric Services so forfeited. Upon reduction of electric Services, Landlord shall equitably

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reduce the annual rent, as the same may be adjusted, by an amount allocable to that portion of the electric Services which are no longer available.

ARTICLE 8 - TERMINATION OF LEASE

8.1 At the expiration or earlier termination of the term hereof, including any extension periods, Tenant shall promptly vacate and yield up the Subject Property, in the condition of order and repair in which they are required to be kept throughout the term hereof, reasonable wear and tear excepted.

8.2 Upon the termination of this Agreement, Tenant shall have the right to remove all fixtures and equipment belonging to it which have been affixed, attached or otherwise made part of the Premises; provided, however that in each instance it repairs any damages to the Premises due to such installation or removal and that such repairs are sufficient to permit Landlord to occupy and use the Premises without violating any local, State or Federal building or safety laws, ordinances, rules or regulations. Any fixtures, equipment or other property of Tenant remaining upon the subject property at the expiration or termination of the term hereof shall be deemed abandoned and may be removed or otherwise disposed of by Landlord upon five (5) days' prior written notice, without any further liability or obligation to Tenant.

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8.3 Anything in this Agreement to the contrary notwithstanding, upon the expiration or other termination of this Agreement, Tenant shall remain liable at its sole expense to make any repairs to the Subject Property as required hereunder, to remove any garbage, waste, including hazardous or toxic wastes, materials or substances or other debris and to eliminate any nuisances or dangerous, harmful or unhealthful conditions which arose during the term hereof out of Tenant's use or occupation of the Premises. In the event that Tenant does not promptly perform any such work as requested by Landlord, Tenant shall be liable to reimburse Landlord the reasonable cost of so doing.

ARTICLE 9 - SIGNS AND SECURITY

9.1 Tenant may, subject to applicable municipal sign codes, install at its own cost and expense, such signs as it may require to identify Tenant's occupancy of the Premises. Tenant shall be responsible to repair any damage to the Premises caused by such installation, and Tenant shall remove such signs at the expiration or other termination of the term hereof and repair any damage caused by such removal. Tenant shall fully comply with all requirements of law pertaining to installation and use of such signs. Tenant may, in compliance with law, install directional signs in the parking areas and at or near 47th Street, directing traffic from said street to the parking or loading areas of the Premises.

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9.2 Tenant shall be solely liable for the security and protection of the Utility Systems and any property belonging to it or any third-parties which is placed upon the Vanadium Plant or the Excepted Space and Landlord shall have no liability or responsibility therefor.

ARTICLE 10 - INSPECTION BY LANDLORD

10.1 During normal business hours, upon reasonable prior notice, and at any time in the event of emergency, Tenant shall permit Landlord and the authorized representatives of Landlord to enter the Vanadium Plant and the Excepted Space for the purpose of (i) inspecting the Subject Property, (ii) performing any work as provided in Article 10.2, or (iii) showing the Subject Property to any prospective purchasers or tenants during the last one hundred eighty (180) days of the term hereof, or any extension periods.

10.2 Landlord reserves the right at any time, upon not less than ten (10) days prior written notice to Tenant (except in the event of emergency or with respect to the Utility Systems), to enter upon the Vanadium Plant and the Excepted Space and to make any repairs or replacements to the Subject Property required under this Agreement which Tenant has failed to make or to take any other actions as may be necessary or appropriate to eliminate any nuisances or any dangerous, harmful or unhealthful conditions existing thereon or for any

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purpose related to the Utility Systems. Tenant shall promptly reimburse Landlord for the costs of such work. The reservation of such rights shall not be deemed to be an acknowledgment of or imply any duty or obligation on the part of Landlord to perform any such actions, the performance of which shall be at the sole discretion of Landlord. Tenant shall remain exclusively liable for the performance of its repair and other obligations under this Agreement as to the Subject Property.

ARTICLE 11 - ASSIGNMENT AND SUB-LETTING

11.1 Tenant shall not, either voluntarily or by operation of law, assign this Agreement, sublet all or any part of the Premises, grant any licenses or other third-party rights in or to the Subject Property, all without the prior written consent of Landlord. Tenant shall not enter into any mortgage, collateral assignment or other security agreement pertaining to the Subject Property or this Agreement without the prior written consent of Landlord which shall not be unreasonably withheld. Any such assignment, subletting, license, mortgage, collateral assignment or security agreement executed without the prior written consent of Landlord shall be void. In conjunction with any such permitted assignment or subletting, Landlord shall not provide Services to any assignee, sublessee, agent or successor-in-interest of Tenant or other party without the prior written approval of (i) Niagara Mohawk Power

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Corporation and the Power Authority of the State of New York as to electric Services, or (ii) Hooker as to steam Services.

ARTICLE 12 - INDEMNIFICATION AND INSURANCE

12.1 Tenant shall indemnify and hold harmless Landlord from all claims, damages, loss and liability, including reasonable attorneys' fees, on account of any personal injury, death or property damage (including any damage or destruction of the Subject Property) arising out of any default or breach of this Agreement or the possession, occupation or use of the Subject Property or the adjoining streets and passageways by Tenant, its employees, agents, contractors, customers or invitees, except any such claims, damages, loss or liability which is due to the sole negligence of Landlord, its employees or agents. The insurance coverage required under this Article 12 shall not be a limitation upon Tenant's liability hereunder.

12.2 At its sole cost and expense, Tenant shall maintain and keep in effect throughout the term of this Agreement, fire and extended coverage insurance, together with boiler insurance, upon the Subject Property, for the benefit of Landlord and Tenant, in the amount of its actual cash value and requiring payment of any claims, losses and damages jointly to Landlord and Tenant, as their interests may appear. Tenant shall be liable to provide any deductible or level of self-insurance under such coverage, which shall not exceed

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$100,000.00. It is understood that Tenant shall be responsible for obtaining or maintaining insurance coverage for any personal property, equipment or fixtures owned by Tenant and maintained upon the Subject Property. Tenant shall release Landlord from any claims, damages, loss or liability arising as a result of damage or destruction of such personal property, equipment or fixtures in the event of a fire or other occurrence included under such fire and extended coverage insurance policies or any other condition now existing or hereafter arising upon the Subject Property. Tenant shall obtain from its insurance carriers a waiver of the right of subrogation against Landlord for any loss or damage by fire or any other cause within the scope of said fire and extended coverage insurance policies. In the event that at any time during the term of this Agreement, Tenant's insurance carrier imposes an additional charge for such waiver of subrogation, then Tenant shall give to Landlord thirty (30) days' prior written notice of such charge and Landlord shall have the option during such notice period to elect (i) to reimburse Tenant for any such charge, or (ii) to release Tenant from any obligation to provide such waiver of subrogation for any period when the same is not available from a reputable insurance company without cost or until Landlord agrees to reimburse Tenant for such costs.

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12.3 At its sole cost and expense, Tenant shall maintain and keep in effect throughout the term of this Agreement, insurance against claims for personal injury (including death) and property damage occurring upon, in or about the Subject Property and the adjoining streets and passageways, under policies of comprehensive public liability insurance, including broad form contractual liability and automobile insurance, with limits of not less than ONE MILLION DOLLARS ($1,000,000) per occurrence for one (1) person, FIVE MILLION DOLLARS ($5,000,000) per occurrence for two (2) or more persons, and THREE MILLION DOLLARS ($3,000,000) for property damage. Said insurance shall not contain any deductible or level of self-insurance exceeding $100,000.00. Tenant shall be liable to Landlord for any claim, liability or damage of Landlord and covered by such insurance, but for which Tenant is self-insured, including any deductible amount. Landlord shall be named as an additional insured in any such insurance and shall have the right to be represented by its own counsel as to any litigation proceedings. Any such insurance policy shall contain an endorsement whereby the carrier agrees that its insurance is primary and not contributory with or in excess of any coverage which Landlord may carry.

12.4 At its sole cost and expense, Tenant shall maintain and keep in effect during the term hereof worker's compensation

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and employer's liability insurance in the minimum amounts as required by law.

12.5 Upon the execution hereof, Tenant shall furnish to Landlord certificates of insurance as evidence of the insurance coverage required under Articles 12.2, 12.3 and 12.4 and each such policy of insurance shall provide that it shall not be amended, modified or cancelled, except upon ten (10) days' prior written notice to Landlord.

ARTICLE 13 - DEFAULT

13.1 Each of the following occurrences shall be deemed a default by Tenant and a breach of this Agreement during the continuance thereof:

(a) (i) filing of a petition for adjudication as a bankrupt, or for reorganization, or for an arrangement under any Federal or State statute;

(ii) dissolution or liquidation of Tenant, without the transfer to and assumption by financially responsible third-party of this Agreement;

(iii) appointment of a permanent or temporary receiver or a permanent or temporary trustee of all or substantially all the property of Tenant;

(iv) taking possession of the property of Tenant by a governmental officer or agency pursuant to statutory authority for dissolution, rehabilitation, reorganization or liquidation; or

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(v) making by Tenant of an assignment for the benefit of creditors.

If any event set forth in this subdivision (a) shall occur, Landlord may thereupon or at any time thereafter elect to cancel this Agreement upon twenty (20) days' prior written notice to Tenant and this Agreement shall terminate on the day in such notice specified with the same force and effect as if that date were the date herein fixed for the expiration of the term of this Agreement.

(b) (i) Default in the payment of the rent or additional rent herein reserved or any part thereof.

(ii) Default in the performance of any other covenant or condition of this Agreement on the part of Tenant to be performed for a period of thirty (30) days after written notice from Landlord specifying the nature of such default. For purposes of this subdivision (b)(ii), no default on the part of Tenant in performance of work required to be performed or acts to be done shall be deemed to exist if after receipt of the aforesaid notice Tenant diligently takes action to rectify the same and prosecutes such action to completion with reasonable diligence.

13.2 In case of any such default under Article 13.1(b) and at any time thereafter following the expiration of the respective grace periods above-mentioned, Landlord may serve a

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notice upon the Tenant electing to terminate this Agreement upon a specified date not less than twenty (20) days after the date of serving such notice and this Agreement shall expire on the date so specified as if that date had been originally fixed as the expiration date of the term herein granted. However, a default under Article 13.1(b) shall be deemed waived if such default is cured before the date specified for termination in the notice of termination served on Tenant pursuant to this Article 13.2.

13.3 In the event this Agreement shall be terminated pursuant to this Article 13, or by summary proceedings or otherwise, Landlord may, in its own name and in its own behalf, relet the whole or any portion of the Premises, for any period equal to or greater or less than the remainder of the then current term for any sum which it may deem reasonable, to any Tenant which it may deem suitable and satisfactory, and for any use and purpose which it may deem appropriate, and in connection with any such lease Landlord may make such changes in the character of the improvements on the Premises as Landlord may determine to be appropriate or helpful in effecting such lease and may grant concessions or free rent. However, in no event shall Landlord be under any obligation to relet the Premises; except that if Landlord does relet the Premises it shall make reasonable efforts to mitigate damages.

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Landlord shall not in any event be required to pay Tenant any surplus of any sums received by Landlord on a reletting of the Premises in excess of the rent reserved under this Agreement.

13.4 The remedies set forth hereunder shall be cumulative and non-exclusive and in addition to any other remedies permitted at law or in equity. In the event this Agreement is terminated by summary proceedings, or otherwise, as provided in this Article 13, and whether or not the Premises are relet, Landlord shall be entitled to recover from Tenant a sum equal to all expenses, if any, including reasonable counsel fees, incurred by Landlord in recovering possession of the Subject Property.

ARTICLE 14 - FIRE AND CASUALTY

14.1 In the event of any damage to or destruction of the buildings and structures comprising the Subject Property by fire or other occurrence which shall render substantially all of the Subject Property untenantable or unfit for occupancy, Tenant shall have the right to elect by written notice given to Landlord within thirty (30) days of any such occurrence, either (i) to repair and restore the Subject Property, in which event Landlord shall release to Tenant any proceeds of the insurance coverage required under Article 12.2, if any; or (ii) to cancel this Agreement as of the date of such destruction, and the rent and additional rent shall abate from the date of such

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destruction, in which event Landlord and Tenant shall share any net insurance proceeds payable on account of the fire and extended coverage insurance applicable to the Subject Property pursuant to Article 12.2 based upon the schedule as set forth in Exhibit G attached hereto and determined according to the date of the said occurrence, less the following amounts: those insurance proceeds relating to any loss or damage to the Utility Systems, which shall be remitted to Landlord prior to any distribution of the balance of the insurance proceeds.

14.2 In the event of any fire or other occurrence which shall damage or destroy the Subject Property in part only so that the Subject Property is not in substantial part untenantable and unfit for occupancy, Tenant shall repair and restore the Subject Property with reasonable speed and dispatch, provided that Landlord releases to Tenant the proceeds of the applicable insurance carried pursuant to Article 12.2, if any.

14.3 Upon any such damage or destruction as provided in Article 14.1 or 14.2, Tenant shall remain obligated promptly (i) to remove or eliminate any nuisance or dangerous, harmful or unhealthful condition, arising out of such occurrence, and (ii) to remove any violations of building or other applicable laws, ordinances or regulations due to such damage or destruction.

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14.4 In no event shall Landlord have any liability or obligation to Tenant with respect to the repair or restoration of the Subject Property due to any fire or other occurrence and Tenant hereby waives any now existing or hereafter arising statutory or judicial rights with respect to repair or restoration in such circumstances.

ARTICLE 15 - CONDEMNATION

15.1 If due to any condemnation or taking by any public or quasi-public authority or other party having the right of eminent domain, (i) ten percent (10%) or more of the building floor area comprising the Premises is taken, (ii) twenty-five percent (25%) or more of the land comprising the Premises is taken, or (iii) any smaller building floor area or land area of the Premises which materially interferes with Tenant's use of the Premises, then and in any of the aforesaid events, the term of this Agreement shall, at the option of Tenant, cease and become null and void from the date when the party exercising the power of eminent domain actually takes or interferes with the use of the Premises or denies access thereto. Rent and additional rent shall be apportioned to the time of surrender of the Premises. Provided that it may do so without diminishing Landlord's award, Tenant shall have the right to make an independent claim against the condemning authority or other party for any claim which it may have and as may be

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allowed by law, for costs and damages due to relocation, moving, replacement and other similar costs and charges directly incurred by Tenant and resulting from such condemnation.

15.2 In the event of any partial taking which does not cause a termination of this Agreement pursuant to Article 15.1, there shall be an equitable reduction of rent, additional rent or any other payment due hereunder.

15.3 After any condemnation or other taking as specified in Articles 15.1 and 15.2, provided this Agreement remains in effect, at its sole cost and expense Tenant shall, to the extent permitted by applicable law and as the same may be practicable on the site of the Premises, promptly make such repairs and alterations in order to restore the remainder of the Subject Property to their same condition prior to the condemnation or taking. Landlord shall reimburse Tenant for the reasonable cost of any such work, up to but not in excess of the net amount of any condemnation award or damages actually received after deducting any attorneys and appraisers' fees and other reasonable costs.

15.4 Landlord and Tenant shall share equitably in the net proceeds of any condemnation awards or damages as to the Premises after deduction of (i) attorneys' fees and expert testimony and other litigation costs, (ii) any payment made to

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Tenant pursuant to Article 15.3, and (iii) the costs of relocating or modifying any parts of the Utility Systems so affected.

ARTICLE 16 - RELATIONSHIP OF PARTIES

16.1 The execution of this Agreement shall not be deemed to create a partnership or other business relationship between Landlord and Tenant, other than the tenancy created hereunder, and Tenant shall be solely and exclusively liable for all claims, damages, losses, liabilities and obligations arising out of the conduct of its business upon the Premises, including the payment of all taxes with respect thereto.

ARTICLE 17 - NOTICES

17.1 Any notices or communications required or permitted hereunder shall be deemed sufficiently given if sent by United States Postal Service, certified mail, postage prepaid, return receipt requested, to the respective parties at the following addresses:

if to Landlord:

Union Carbide Corporation
Real Estate Department
Old Ridgebury Road
Danbury, CT 06817

with a copy to:

Union Carbide Corporation
Linde Division
4501 Royal Avenue
Niagara Falls, New York 14302
Attn: Plant Manager

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if to Tenant:

U.S. Vanadium Corporation
137-47th Street
Niagara Falls, New York 14302
Attn: Plant Manager

with copy to:

Strategic Minerals Corporation
30 Main Street
Danbury, Connecticut 06810
Attn: President

The date of mailing as evidenced by the stamped postal receipt shall be deemed to be the date on which any such notice is given. Either party may change the persons or addresses to which notice or other communications are to be sent to it by giving written notice of any such changes in the manner provided herein for giving notice.

ARTICLE 18 - COVENANT AGAINST LIENS

18.1 Tenant shall not encumber, or suffer or permit to be encumbered, the Subject Property by any lien, charge, security interest or encumbrance due to the acts or negligence of Tenant, its employees, agents, or contractors. Within thirty (30) days after notice thereof, Tenant shall satisfy or otherwise caused to be removed by bonding or otherwise any mechanic's, materialmen's or other lien or encumbrance filed against the Subject Property arising out of its occupancy and use thereof.

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ARTICLE 19 - CONDITION OF SUBJECT PROPERTY

19.1 Tenant has inspected the Subject Property and accepts the same "as is," without any reliance upon any representation, warranty or guarantee, either express or implied, by Landlord, its employees or agents. Tenant shall assume all risk of damage to its property, equipment and fixtures due to the possession, use or occupancy of the Premises or the Utility Systems, including any latent defects or conditions not otherwise apparent. Landlord shall not be liable for any injury, death or property damage occurring upon the Premises due to electricity, steam, gas, water, process water, rain, snow, ice or any leak or flow into any part of the Premises.

19.2 Except as otherwise specifically set forth herein, LANDLORD MAKES NO REPRESENTATIONS, WARRANTIES OR GUARANTEES, EITHER EXPRESS OR IMPLIED, AS TO THE PREMISES OR THE UTILITY SYSTEMS. NO WARRANTY OR GUARANTEE SHALL BE IMPLIED OR OTHERWISE CREATED UNDER THE UNIFORM COMMERCIAL CODE (OTHER THAN THE WARRANTY OF TITLE AS PROVIDED UNDER THE UNIFORM COMMERCIAL CODE) OR OTHERWISE AS TO THE EQUIPMENT OR FIXTURES LOCATED UPON OR COMPRISING PART OF THE PREMISES OR THE UTILITY SYSTEMS, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

ARTICLE 20 - ESTOPPEL CERTIFICATE

20.1 Tenant shall, at any time and from time to time, within ten (10) days after Landlord's written request, execute,

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acknowledge and deliver to Landlord a written instrument in recordable form certifying that this Agreement is in full force and effect, and if modified, stating the modifications and the dates to which the rent and additional rent and other charges have been paid in advance, if any, and stating whether or not to the best knowledge of Tenant Landlord is in default in the performance of any covenant, agreement or condition contained in this Agreement and, if so, specifying each such default of which Tenant may have knowledge. Tenant shall be entitled to receive a similar certificate from Landlord according to the provisions of this Article 20.1, mutatis mutandis.

ARTICLE 21 - FORCE MAJEURE

21.1 Except for the obligations of Tenant to pay rent (subject to the provisions of Article 7.3 and 7.4), additional rent and other charges as in this Agreement provided, the period of time during which Landlord or Tenant is prevented from performing any act required to be performed under this Agreement by reason of fire, flood, hurricanes, strikes, lock-outs or other industrial disturbances, explosions, civil commotion, acts of God or the public enemy, government prohibitions or preemptions, embargoes, inability to obtain material or labor, the act of default of the other party, or other events beyond the reasonable control of Landlord or Tenant, as the case may be, and which event makes performance

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hereunder commercially impracticable, shall be added to the time for performance of such act.

ARTICLE 22 - QUIET ENJOYMENT

22.1 If and so long as Tenant shall pay the rent and additional rent reserved hereunder and shall perform and observe all the terms, covenants and conditions on the part of Tenant to be performed and observed, Landlord covenants that Tenant shall lawfully and quietly hold, occupy and enjoy the Premises, subject, however, to the provisions of this Agreement and to Elkem's rights in the Excepted Space.

22.2 Landlord hereby represents and warrants to Tenant as follows:

(i) Landlord is owner of the Premises;

(ii) Landlord has the right to lease the Premises to Tenant.

ARTICLE 23 - WAIVER

23.1 No consent or waiver, express or implied, by Landlord to or of any breach or default in the performance by Tenant of Tenant's obligations hereunder shall be deemed or construed to be a consent or waiver of any other breach or default in the performance by Tenant of the same or any other obligations of Tenant hereunder. Failure on the part of Landlord to complain of any act or failure to act of Tenant or to declare Tenant in

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default, irrespective of how long such act or failure continues, shall not constitute a waiver by Landlord of its rights hereunder.

ARTICLE 24 - MEMORANDUM OF LEASE

24.1 This Agreement shall not be recorded. At the request of either party, the parties shall execute and acknowledge a memorandum of lease suitable for recording purposes.

ARTICLE 25 - BROKERAGE FEES

25.1 Landlord and Tenant acknowledge that no finder or real estate broker or agent or other party is entitled to any brokerage fee, commission or other compensation on account of this Agreement or any transaction contemplated hereunder. Tenant shall indemnify and hold harmless Landlord from all claims, damages, loss or liability of Landlord for any brokerage fee, commission or other compensation owing to any party claiming to represent Tenant hereunder. Landlord shall indemnify and hold harmless Tenant from all claims, damages, loss or liability of Tenant for any brokerage fee, commission or other compensation owing to any party claiming to represent Landlord hereunder.

ARTICLE 26 - CAPTIONS

26.1 The captions of the Articles of this Agreement are for the convenience of reference only and shall not affect the meaning or interpretation of this Agreement.

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ARTICLE 27 - GOVERNING LAW

27.1 The validity, interpretation and performance of this Agreement shall be governed according to the laws of the State of New York applicable to agreements made and to be performed entirely in that state.

ARTICLE 28 - HOLDOVER

28.1 If Tenant continues to occupy the Premises after the termination of this Agreement, such holding over shall not be deemed to extend or renew the term hereof, but the tenancy thereafter shall continue from month-to-month upon the same terms and conditions as provided herein. Landlord shall have the right to terminate any such tenancy upon not less than twenty (20) days' prior written notice to Tenant.

ARTICLE 29 - ADDITIONAL RENT: TAXES

29.1 Tenant shall pay as additional rent all taxes and assessments, general and special, including any assessments or impositions for capital improvements assessable by law, applicable to (i) the Premises based upon an allocation of the total taxes and assessments applicable to the Niagara Falls Complex; (ii) twenty-six percent (26%) of such taxes and assessments allocable to Building 44 and eight and thirty-three one hundredths percent (8.33%) of such taxes and assessments allocable to the Pump House, all located upon the Industrial

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Gases Plant; and (iii) such taxes and assessments allocated to the Utility Systems but only to the extent of Tenant's proportionate usage of the Utility Systems. If any such assessments are payable in installments, Tenant shall pay same as they become due during the term of this Agreement. Within ten (10) days after written request and prior to their respective due dates, Tenant shall pay to Landlord its share of all taxes and assessments as provided in this Article 29. Landlord shall furnish to Tenant a copy of the bills of any applicable taxing authority in connection with the aforesaid obligation, together with those calculations upon which any allocation of taxes and assessments are based.

29.2 All taxes and assessments applicable (i) to the Premises shall be allocated thereto based upon the percentage reflecting the proportion which the assessed valuation of the land, buildings and improvements comprising the Premises bears to the total assessed valuation of all the land, buildings and improvements comprising the Niagara Falls Complex; (ii) to Building 44 or the Pump House shall be allocated thereto based upon a percentage reflecting the proportion which the assessed valuation of each such facility and the land upon which it is situated bears to the total assessed valuation of all land, buildings and improvements comprising the Niagara Falls Complex; and (iii) to the Utility Systems shall be allocated thereto based upon a percentage reflecting the proportion which

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the assessed valuation of the Utility Systems bears to the total assessed valuation of the Niagara Falls Complex. The tax parcels pertaining to the Niagara Falls Complex are currently identified on the official Tax Map 133, as (1) Block A, Lot 21 and Lot 21A; (2) Block A, Lot 12A; (3) Block A, Lot 11A; (4) Block A, Lot 11B; (5) Block B, Lot 22 (part) and 22A; and (6) Block B, Lot 17 (part). Promptly upon the execution hereof, the parties shall cause a duly qualified appraiser to propose the applicable percentages upon which such allocations shall be made, until such time as the local assessor's records are sufficient for such purposes or further improvements are made or the existing tax assessment is modified. If there shall be any dispute with respect to any allocation made hereunder, either party may request a redetermination thereof and Tenant shall duly pay the amount determined pursuant to said disputed allocation until a redetermination thereof is made and accepted by the parties. The parties shall promptly resolve the matter and Landlord shall make any appropriate refunds to Tenant or Tenant shall make any additional payments to Landlord, as appropriate. If any such dispute cannot be resolved by the parties within ninety (90) days after either party requests such redetermination, then either party shall have the right to cause said dispute to be settled by arbitration pursuant to Article 31.

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29.3 If at any time during the term of this Agreement or any renewal period, (i) the method, configuration of tax parcels or scope of taxation prevailing at the commencement of the term hereof shall be altered, modified or enlarged, (ii) a tax, excise or other imposition is levied, assessed or imposed upon or measured by the rent, additional rent or other charges payable by Tenant to Landlord hereunder, or (iii) a capital levy or other imposition based on the value of the Subject Property, or the rents received therefrom, or some other form of assessment based in whole or in part on some other valuation of the Landlord's real property comprising the Subject Property is enacted; then, and in such event, such tax or imposition shall be payable and discharged by the Tenant in the manner required pursuant to such law or Tenant shall reimburse Landlord for any such tax or imposition paid by it.

ARTICLE 30-PURCHASE OPTION

30.1 Upon the expiration or earlier termination of this Agreement, Tenant shall have the option to purchase the Equipment and the Vanadium Plant (hereinafter called the "Purchase Option") for a consideration as determined pursuant to Exhibit E attached hereto based upon the year in which it exercises the Purchase Option plus, if Tenant exercises the Purchase Option prior to December 31, 2005, an amount sufficient to cover Landlord's costs for any additional

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equipment and Utility Systems modifications necessary to separately supply the Services to the Elkem Premises and the L-Tec Premises (hereinafter called the "Purchase Price"); provided, however, that Tenant shall exercise the Purchase Option by written notice to Landlord given not later than ten (10) days after said expiration or termination date and that Tenant shall promptly cure any defaults in the payment of rent, additional rent or other payments owing hereunder and assume full liability and responsibility for any matters for which it may be liable pursuant to the terms of this Agreement to the reasonable satisfaction of Landlord, all prior to or coincident with the closing of the Purchase Option pursuant to Article 30 2. Tenant shall not exercise the Purchase Option except as to both the Equipment and the Premises.

30.2 Within sixty (60) days after receipt of written notice by Landlord from Tenant that it is exercising the Purchase Option, or such later date as may be necessary to obtain any requisite subdivision approvals, a closing shall be held upon a mutually convenient date at the offices of Landlord in Danbury, Connecticut. This Agreement shall be deemed to remain in full force and effect to the time of closing.

30.3 At the closing, Tenant shall deliver to Landlord the Purchase Price via wire transfer of immediately available Federal Reserve funds, Landlord and Tenant shall each execute

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and deliver in duplicate counterparts a bill of sale for the Equipment on the same form as Exhibit F attached hereto, and Landlord shall deliver to Tenant a duly executed and acknowledged bargain and sale deed with covenant against grantor's acts sufficient to convey good and marketable fee simple title to the Vanadium Plant, subject to (i) the Permitted Encumbrances (other than mortgages, deeds of trust, liens or security interests created or caused to be imposed by Landlord), and (ii) the reservation by Landlord of appropriate easements for the Utility Systems, together with any necessary additional rights to permit the reasonable reconfiguration of the Utility Systems. Landlord shall be liable for all New York transfer and real property gains taxes as to the Vanadium Plant and Tenant shall be liable for all sales or use taxes as to the Equipment.

30.4 In the event of a conveyance as contemplated in Article 30.1, Landlord shall have no further duty or obligation to Tenant to supply any Services after the time of closing. Tenant shall be responsible to obtain steam, process water and electricity from third-parties which produce and/or distribute such Services. To the extent that it may be able to do so without thereby becoming a public utility subject to regulation by the State of New York, Landlord shall make reasonable, good faith efforts to negotiate separate services agreements with

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Tenant (i) for the sale and delivery of process water to Tenant, and (ii) for the use in common with Landlord of any tunnels, conduits, lines and other equipment supplying steam to Tenant from a mutually acceptable point of delivery by a third-party producer or distributor of steam, all upon terms and conditions which are commercially reasonable at the time of execution of any such services agreements. The execution of any services agreements between Tenant and Landlord or any third-party as contemplated under this Article 30.4 shall not be a condition of or delay any closing as to the conveyance of the Vanadium Plant as provided under Article 30.3.

30.5 In the event that Tenant fails to duly exercise the Purchase Option set forth in Article 30.1, it shall expire and be of no further force and effect.

ARTICLE 31 - ARBITRATION

31.1 In the event that either party elects to pursue arbitration pursuant to Article 3.2 or 29.2, such arbitration shall be conducted in accordance with the then prevailing rules of American Arbitration Association, including the Real Estate Valuation Arbitration Rules, in Hartford. Landlord and Tenant shall bear equally the expenses of such arbitration, except that each party shall be responsible for the expense of its own counsel, experts and preparation and presentation of proof.

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ARTICLE 32 - ENTIRE AGREEMENT

32.1 This Agreement contains all the promises, agreements, conditions and understandings between Landlord and Tenant with respect to the Subject Property, except as to certain environmental matters which are set forth in a separate agreement of even date herewith. No amendment, modification or addition to this Agreement shall be effective unless it is contained in a written agreement executed by authorized representatives of both parties.

32.2 The covenants, conditions and agreements contained in this Agreement shall bind and inure to the benefit of the parties hereto and their respective successors and permitted assigns.

IN WITNESS WHEREOF, the parties have caused this Lease Agreement to be executed by their duly authorized representatives as of the day and year first above written.

UNION CARBIDE CORPORATION

By _____

Title_____

U.S. VANADIUM CORPORATION

By_____

Title_____

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STATE OF CONNECTICUT

SS:

COUNTY OF FAIRFIELD

Before me, notary public in and for said county and State, personally appeared _____, _____ of Union Carbide Corporation, to be known to be the person who executed the foregoing instrument and acknowledged to me that he executed the foregoing instrument on behalf of such corporation, that the same is the free act and deed of said corporation and of said officer for the uses and purposes therein set forth, and that said officer was duly authorized to execute the same.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed by official seal this __ day of _____, 1986.

_____

Notary Public

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STATE OF CONNECTICUT

SS:

COUNTY OF FAIRFIELD

Before me, notary public in and for said county and State, personally appeared _____, _____ of U.S. Vanadium Corporation, to be known to be the person who executed the foregoing instrument and acknowledged to me that he executed the foregoing instrument on behalf of such partnership, that the same is the free act and deed of said partnership and of said general partner for the uses and purposes therein set forth, and that said general partner was duly authorized to execute the same.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed by official seal this ___ day of _____, 1986.

_____

Notary Public

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EXHIBIT A

Vanadium Plant

All that tract or parcel of land, situated in the City of Niagara Falls, County of Niagara, State of New York, being part of Lot 47 and 48 of the Mile Reserve, bounded and described as follows: beginning at the intersection of the easterly line of 47th Street with the southerly line of Royal Avenue projected easterly

1) thence northerly along the east line of 47th Street on a course of north 4 degrees 34 minutes east a distance of 659.57 feet
2) thence south 85 degrees 56 minutes east, 669.75 feet
3) thence south 4 degrees 34 minutes west, 1341.02 feet
4) thence north 86 degrees 3 minutes 55 seconds west, 135.09 feet
5) thence south 70 degrees 17 minutes 53 seconds west, 50.00 feet
6) thence south 3 degrees 58 minutes 51 seconds west, 65.00 feet
7) thence south 36 degrees 36 minutes west, 148.41 feet
8) thence south 3 degrees 58 minutes 51 seconds west, 100.00 feet
9) thence north 86 degrees 1 minute 9 seconds west, 289.26 feet
10) thence south 4 degrees 28 minutes 25 seconds west, 123.85 feet
11) thence north 86 degrees 28 minutes 55 seconds west, 15.00 feet
12) thence south 4 degrees 28 minutes 25 seconds west, 92.66 feet
13) thence north 85 degrees 22 minutes 45 seconds west, 33.40 feet
14) thence south 5 degrees 34 minutes 41 seconds west, 60.93 feet
15) thence north 86 degrees 01 minutes 05 seconds west, 73.67 feet
16) thence south 4 degrees 34 minutes west, 36.33 feet
17) thence north 85 degrees 24 minutes 34 seconds west, 235.20 feet
18) thence north 4 degrees 41 minutes 23 seconds east, 200.00 feet
19) thence south 85 degrees 26 minutes east, 174.75 feet
20) thence north 4 degrees 34 minutes east, 211.38 feet
21) thence north 85 degrees 26 minutes west, 194.53 feet
22) thence north 4 degrees 39 minutes 44 seconds east, 217.09 feet
23) thence north 36 degrees 39 minutes 11 seconds east, 18.70 feet
24) thence north 4 degrees 39 minutes 42 seconds east, 48.30 feet
25) thence north 43 degrees 29 minutes 59 seconds east, 203.79 feet
26) thence south 85 degrees 26 minutes 24 seconds east, 43.59 feet
27) thence north 4 degrees 27 minutes 26 seconds east, 342.47 feet
28) thence north 85 degrees 55 minutes 52 seconds west, 20.47 feet
29) thence north 4 degrees 23 minutes 28 seconds east, 111.91 feet
30) thence south 85 degrees 56 minutes east, 93.64 feet to the point of beginning.

The aforesaid description is pursuant to the Parcel Map of Millard & MacKay last revised March 26, 1986.

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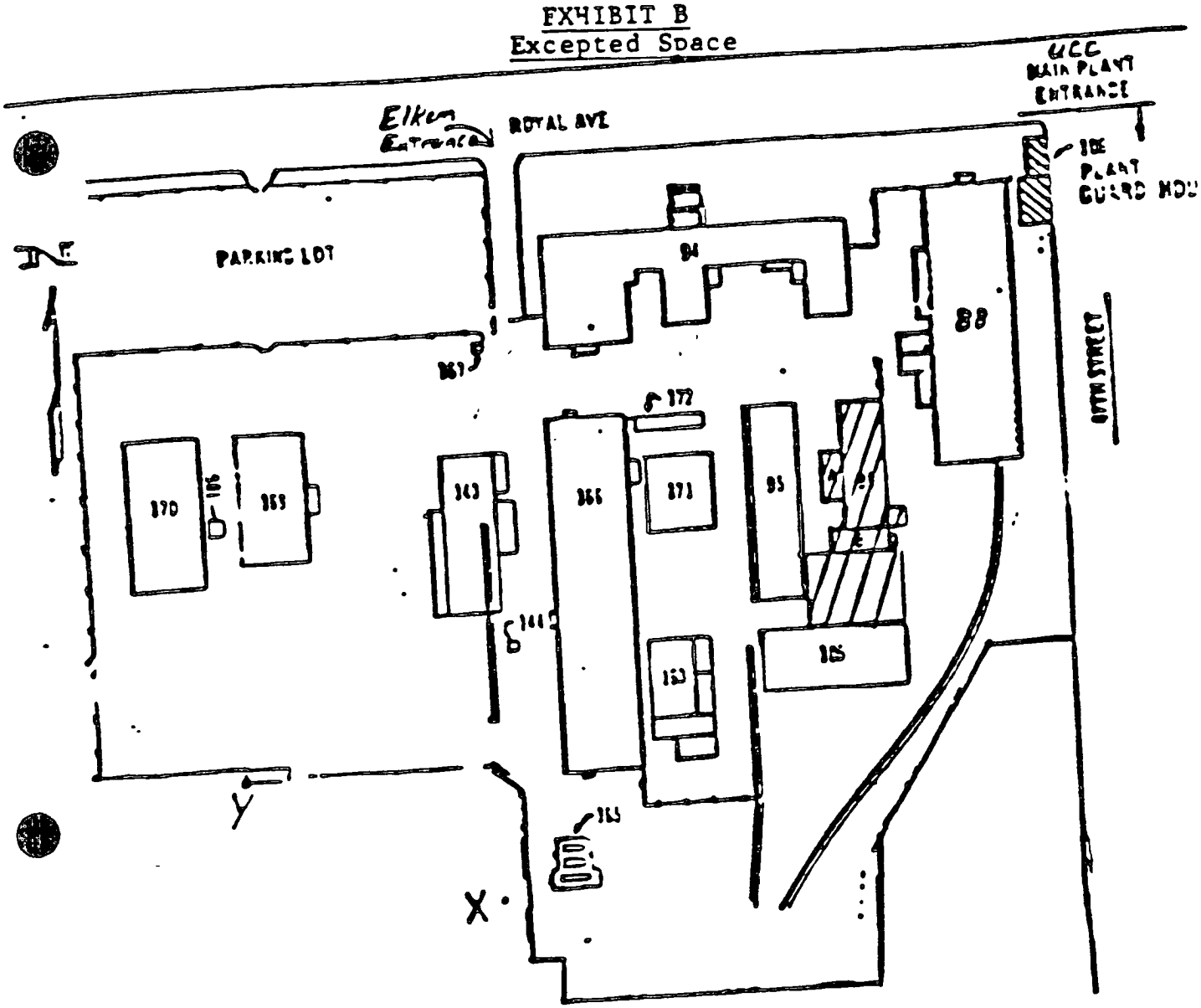
EXHIBIT B
Excepted Space



▨ - EXCEPTED SPACE

The Excepted Space shall consist of all of Buildings 99, 99A and 99B and the surface area between Buildings 99B and 105, as more particularly shown on above sketch.

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EXHIBIT B-1

Equipment

The machinery and equipment as set forth on Landlord's Property Scroll for the Niagara Falls plant dated March 31, 1986, item numbers _____ through _____.

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EXHIBIT C

Utility Systems

1. Electrical distribution system, and its equipment and appurtenances, including all transformers, motor stations, switching gear, cables, conductors and other facilities comprising the electrical distribution system located upon the Vanadium Plant and servicing the Industrial Gases Plant, the Elkem Premises or the L-Tec Premises, but specifically excluding all such facilities which are within any buildings comprising the Vanadium Plant and which are devoted solely to servicing the Vanadium Plant and not the Industrial Gases Plant, the Elkem Premises or the L-Tec Premises.

2. Process water distribution system and its equipment and appurtenances, but only as to those pipes and other facilities necessary to service the Industrial Gases Plant, the Elkem Premises or the L-Tec Premises.

3. Steam distribution system and its equipment and appurtenances, but only as to those pipes, conduits, mains, supporting structures and other facilities as may be necessary to supply steam to the Industrial Gases Plant or the Elkem Premises.

4. Sanitary sewer and natural gas lines and their appurtenances, extending easterly from the Industrial Gases Plant into Union Street, including any such facilities in Union Street extending northerly to Royal Avenue which do not belong to the City of Niagara Falls or the gas utility.

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EXHIBIT D

Services

I. Electricity

1. Specifications: 60 Hertz and 25 Hertz power.

2. Quantity: (i) 60 Hertz power: Maximum peak or sustained demand not exceeding 3,500 kilowatts, an annual weighted average demand not exceeding 3,337 kilowatts, and total annual usage (calendar year basis) not exceeding 20 million kilowatt-hours. Minimum annual weighted average demand of not less than 2,638 kilowatts.

(ii) 25 Hertz power: Not in excess of average usage for immediately preceding three (3) calendar years.

II. Steam

1. Specifications: Delivered at the pressure of 180 psig, dry and saturated condition, and at a temperature range of 325 to 425 degrees Fahrenheit.

2. Quantity: Up to 30,000 pounds per hour; average annual usage of 4,255 pounds per hour, but not exceeding 60 million pounds per calendar year nor less than 1.225 million pounds per calendar month if Landlord's total steam purchases are less than 3.2 million pounds in any such calendar month. For 1987 and thereafter, annual usage will be based upon

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Tenant's metered usage, plus its proportionate share of system losses, for the preceding year. For 1987 and thereafter, Tenant's monthly steam usage shall not be less than Tenant's pro rata share of 3.2 million pounds, based upon Tenant's actual consumption and share of system losses of total steam usage for the 1986 calendar year.

III. Process Water

1. Specifications: Non-potable process water drawn from the Niagara River without any filtering or other treatment.

2. Quantity: Up to 1,500 gallons per minute.

IV. Process Sewage Disposal

1. Specifications: Process waste from existing vanadium halides activities only.

2. Quantities: Not exceeding average usage for those three (3) years terminating as of June 30, 1981.

COSTS

In addition to Tenant's share of Landlord costs of purchased Electricity and Steam and cost of electricity for Process Water, the rent also includes Tenant's share of Landlord's costs for labor, material and supervision relating to the provision of Services, such share of costs for the 1986 calendar year is more completely described as follows:

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	ELECTRICITY SYSTEM	PROCESS WATER SYSTEM	STEAM SYSTEM	TOTAL
Maintenance Labor	$1,121.00	$4,333.00	$214.00	$5,668.00
Maintenance Material	$1,264.00	$5,981.00	0	$7,245.00
Supervision	$1,638.00	$1,558.00	$1,360.00	$4,556.00

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EXHIBIT E

Calendar Year	Consideration
1986	$3,328,027.80
1987	$3,250,091.61
1988	$3,165,697.25
1989	$3,074,309.54
1990	$2,987,083.67
1991	$2,891,336.31
1992	$2,786,234.96
1993	$2,670,865.80
1994	$2,544,225.70
1995	$2,405,213.57
1996	$2,252,620.73
1997	$2,085,120.40
1998	$1,901,256.22
1999	$1,699,429.53
2000	$1,477,885.49
2001	$1,234,697.82
2002	$967,752.06
2003	$674,727.18
2004	$353,075.39
2005 and thereafter	$0

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EXHIBIT F

Bill of Sale

KNOW ALL MEN BY THESE PRESENTS, that UNION CARBIDE CORPORATION, a New York corporation (hereinafter called "Vendor"), for and in consideration of Ten Dollars ($10.00) and other valuable consideration, paid by U.S. VANADIUM CORPORATION, a Delaware corporation (hereinafter called "Vendee"), receipt whereof is hereby acknowledged, does, subject to the terms and conditions hereinafter set out, hereby bargain, sell, transfer, assign, set over and deliver to Vendee, without any warranties of title except as set forth below, the property and improvements as described in Schedule A attached hereto and made a part hereof (hereinafter called the "Miscellaneous Property") formerly used at Vendor's Niagara Falls, New York plant.

Vendee accepts the said property and improvements "as is, where is."

It is expressly understood and agreed that Vendor makes no warranties or guarantees, either express or implied, as to the Miscellaneous Property, except that it is free and clear of all mortgages, liens and security interests. NO WARRANTY OR GUARANTY SHALL BE IMPLIED OR OTHERWISE CREATED UNDER THE UNIFORM COMMERCIAL CODE (OTHER THAN THE WARRANTY OF TITLE AS PROVIDED UNDER THE UNIFORM COMMERCIAL CODE) OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY

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OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE as to the Miscellaneous Property.

Vendee accepts all risks and assumes all liabilities in the possession, operation and use of the Miscellaneous Property, and shall indemnify and hold harmless Vendor from all claims, damages, loss and liability, including reasonable attorney's fees, due to any personal injury, death or property damage or destruction arising on or after the date hereof out of the possession, operation or use of the Miscellaneous Property by Vendee or any other party.

IN WITNESS WHEREOF, the parties have executed this instrument as of this ____ day of _____, ____.

UNION CARBIDE CORPORATION

By: _____

Title: _____

U.S. VANADIUM CORPORATION

By: _____

Title: _____

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EXHIBIT G

Calendar Year	Landlord's Share	Tenant's Share
1986	97.88%	2.12%
1987	95.59%	4.41%
1988	93.11%	6.89%
1989	90.42%	9.58%
1990	87.86%	12.14%
1991	85.04%	14.96%
1992	81.95%	18.05%
1993	78.56%	21.44%
1994	74.83%	25.17%
1995	70.74%	29.26%
1996	66.25%	33.75%
1997	61.33%	38.67%
1998	55.92%	44.08%
1999	49.98%	50.02%
2000	43.47%	56.53%
2001	36.31%	63.69%
2002	28.46%	71.54%
2003	19.84%	80.16%
2004	10.38%	89.62%
2005 and thereafter	0	100%

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PURCHASE AGREEMENT

AMONG

UNION CARBIDE CORPORATION,

UMETCO MINERALS CORPORATION

AND

STRATEGIC MINERALS CORPORATION

RELATING TO THE
PURCHASE OF CERTAIN ASSETS OF
UMETCO MINERALS CORPORATION
AND
UNION CARBIDE CORPORATION

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PURCHASE AGREEMENT

AGREEMENT made as of the 23rd day of April, 1986, among UNION CARBIDE CORPORATION, a New York corporation ("UCC"), UMETCO MINERALS CORPORATION, a Delaware corporation ("Umetco"), each having its principal office at 39 Old Ridgebury Road, Danbury, Connecticut 06817, and STRATEGIC MINERALS CORPORATION, a Connecticut corporation having its principal office at 30 Main Street, Danbury, Connecticut 06810 ("Buyer").

W I T N E S S E T H:

WHEREAS, Umetco or UCC own, and Umetco operates, a tungsten facility in Bishop, California, vanadium facilities in Hot Spring and Garland Counties, Arkansas, a processing facility in Niagara Falls, New York and a leased sales facility in Pittsburgh, Pennsylvania and Umetco owns all the outstanding capital stock of Vametco Minerals Corporation, a Delaware corporation ("Vametco"), which in turn owns and operates a vanadium facility in Bophuthatswana, a homeland located within the Republic of South Africa and operates a related housing facility in Brits, Republic of South Africa owned or to be owned by Vametco Properties (Pty.) Ltd., a South African corporation ("Landco"), a subsidiary of UCC; and

WHEREAS, Umetco and UCC desire to sell and Buyer desires to acquire, directly and through wholly owned subsidiaries,

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substantially all of the assets, in the United States and Africa, devoted to Umetco's vanadium and tungsten operations, including all the outstanding capital stock of Vametco and all the outstanding capital stock of Landco which will become a wholly owned subsidiary of Vametco, but not including the Excluded Assets described in paragraph II of Exhibit A, (such assets being more completely described in Exhibit A and Schedules thereto and collectively herein and therein called the "Assets"), and in connection with such sale subsidiaries of Buyer will assume certain specified obligations of Umetco; and

WHEREAS, substantially all the assets to be acquired which are devoted to Umetco's U.S. vanadium operations are to be acquired by U.S. Vanadium Corporation ("USV"), and substantially all the assets to be acquired which are devoted to Umetco's U.S. tungsten operations are to be acquired by U.S. Tungsten Corporation ("UST"), both of which are Delaware corporations and are to become wholly owned subsidiaries of Buyer; and

WHEREAS, the assets of Umetco and UCC to be acquired by USV and UST are collectively referred to in this Agreement and its Exhibits as the "Business"; and

WHEREAS, UCC has agreed to undertake certain obligations in connection with such sale,

NOW, THEREFORE, in consideration of the purchase price and the mutual covenants herein contained, the parties agree as follows:

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I. THE ASSETS

1.01 Purchase and Sale of the Assets. On the Closing Date, provided for in Section 9.01, Buyer shall purchase from Umetco and UCC, and Umetco and UCC shall sell, convey, assign, transfer to and vest in Buyer or its subsidiaries, all of the Assets, except that, at the option of UCC, transfer of the capital stock of Landco may be deferred for up to 30 days pending the completion of certain formalities in South Africa and Bophuthatswana. However, all closing calculations, including determination of the actual purchase price as provided in Exhibit B, shall be made as of the close of business on March 31, 1986 (the "Effective Date"). Between the Effective Date and the Closing Date the Business is to be operated for the benefit of the Buyer, and the parties have entered into a separate agreement (the "Bridging Agreement") setting forth, among other things, the terms of that arrangement.

1.02 Instruments of Transfer.

(a) On the Closing Date, Umetco and UCC shall deliver to Buyer duly executed instruments of transfer and assignment, sufficient to vest in Buyer or its subsidiaries good and valid title to, and all of Umetco's and UCC's right, title and interest in and to, the Assets (other than the capital stock of Landco) as follows:

(i) With respect to the outstanding capital stock of Vametco, by stock certificates issued to Buyer upon surrender of all stock certificates for previously issued shares of capital stock of Vametco.

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(ii) With respect to the other Assets, by appropriate instruments of transfer and assignment, in favor of Buyer, USV, or UST, as appropriate, including any instruments of transfer and assignment designated as Schedules to Exhibit A.

(b) Within 30 days following the Closing Date, UCC shall cause certificates representing all the outstanding capital stock of Landco to be issued to Vametco.

1.03 Collection of Accounts Receivable. Immediately following the Closing, Umetco shall inform all persons and firms responsible for the payment of the Accounts Receivable to be Purchased (as described in paragraph I(5) of Exhibit A) that payment therefor is to be made to USV or UST, as appropriate. After the Closing Date, any check or any other evidence of payment or indebtedness received by UCC or Umetco on account of any Accounts Receivable to be Purchased shall, at Buyer's option, by written instruction of Buyer, be either (a) forwarded by UCC or Umetco, as the case may be, to a bank designated by Buyer, with appropriate instructions that such instruments be collected for the account of USV or UST, as the case may be, or (b) be deposited to the account of the named payee with the proceeds of collection made available to USV or UST, as the case may be, immediately upon receipt of such proceeds.

1.04 Transfer Costs. All sales and transfer taxes, fees for transfers of permits, authorizations and licenses, and costs for title examinations or certifications, and title insurance,

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payable in connection with the transactions contemplated hereby shall be shared equally between a) Umetco, and b) Buyer and its subsidiaries.

1.05 Risk of Loss. Risk of loss or damage to the Assets up to 11:59 P.M. (Eastern Time) on the Closing Date shall be borne by Umetco and UCC; from and after such time such risk of loss or damage shall be borne by Buyer.

II. PURCHASE PRICE

2.01 Purchase Price. The consideration ("Purchase Price") for the purchase of the Assets is set forth in Exhibit B, subject to the adjustments therein described.

2.02 Payment. The Purchase Price shall be paid in the manner described in Exhibit B. On or before the Closing Date, in addition to the documents described in Section 1.02 and Exhibits A and B, Buyer, Umetco and UCC shall execute and deliver the following agreements, among others ("Supplemental Agreements"):

Environmental Agreements with respect to the facilities in Bishop, California; Garland and Hot Spring Counties, Arkansas; Niagara Falls, New York; and Bophuthatswana
(Exhibits C, D, E and F)

Assumption Agreements in favor of Umetco by USV and UST
(Exhibits G and H)

Power Letter Agreement (Exhibit I)

Bridging Agreement among UCC, Umetco and Buyer
(Exhibit J)

Lease Agreement between Umetco and USV with respect to the Niagara Falls, New York, facility
(Exhibit K)

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Assignment of Exxon "Flexicoke" contract by Umetco to USV (Exhibit L)

Letter Guarantee of certain receivables by UCC and representation that the Receivables to be Purchased, as described in Paragraph I(5) of Exhibit A, are believed to be collectible in due course (Exhibit M)

Tungsten Payable Letter Agreement (Exhibit N)

Option and Right of First Refusal Agreements (Exhibits O and P)

Tubatse Inventories Side Letter (Exhibit T)

Vanadium Tech Granular Storage Agreement (Exhibit U)

III. ASSIGNMENT OF CONTRACTUAL RIGHTS, ASSUMPTION OF OBLIGATIONS, AGREEMENTS AND LIABILITIES

3.01 Customer Orders and Purchase Orders. Umetco shall assign to USV and UST, as appropriate, and USV and UST shall assume and perform all open and unfilled orders of the Business as of the Closing Date which were placed by customers and accepted by Umetco in the ordinary course of business on or prior to the Closing Date. Umetco also shall assign to USV and UST, as appropriate, and USV and UST shall assume and perform all purchase orders open and unfilled as of the Closing Date which were placed by the Business with suppliers or other parties prior to the Closing Date in the ordinary course of business. At the Closing, Umetco shall deliver to Buyer a schedule of all customer orders and purchase orders open and unfilled as of a date not earlier than 10 days prior to the Closing Date, and within five days after the Closing, Umetco shall deliver to Buyer a schedule

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of all customer orders and purchase orders open and unfilled as of the Closing Date.

3.02 Obligations Other Than Customer Orders or Purchase Orders. Umetco shall assign to USV and UST, as appropriate, and USV and UST shall assume and perform those obligations, agreements and liabilities of the Business incurred by or on behalf of the Business in the ordinary course of business, in addition to those referred to in Section 3.01. The obligations to be assumed by USV and UST, including those assumed pursuant to Section 3.01 and this Section 3.02, are sometimes collectively referred to herein as the "Assumed Obligations".

3.03 Assumption Agreements. USV and UST shall assume the Assumed Obligations by execution and delivery of Assumption Agreements in the forms attached as Exhibits G and H.

3.04 Limitations on Assumption. Any other provision of this Agreement to the contrary notwithstanding, neither USV nor UST, nor Buyer, shall assume any obligation, agreement or liability of UCC or Umetco or of any other person or corporation not included in the Assumed Obligations. The parties have, however, agreed to share certain employee obligations, as described in a memorandum attached as Exhibit R. Except for rights accorded Employees and Former Employees, as set forth in Exhibit R, nothing contained in this Article III is intended to create any right in any third person against UCC, Umetco, Buyer, USV or UST that such person would not otherwise have, or to prevent

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Buyer, USV or UST from contesting in good faith any of the Assumed Obligations with any third party obligee.

3.05 Required Consents. Nothing in this Agreement shall constitute or be deemed to constitute an assignment or attempt to assign any contract, license, lease, commitment, customer order or purchase order to which Umetco or UCC is a party if the attempted assignment thereof without the consent of the other party thereto would constitute a breach thereof or would adversely affect the rights of Umetco or UCC thereunder so that Buyer, USV or UST, as the case may be, would not in fact receive all the benefits and rights thereunder that it would otherwise receive had such consent been obtained. If Umetco and UCC have used their best efforts to obtain the consent of any such other party to such contract, license, lease, commitment, customer order or purchase order and such consent has not been obtained prior to or at the Closing, or an attempted assignment thereof at the Closing would be ineffective or would adversely affect the rights of Umetco or UCC thereunder so that Buyer, USV or UST, as the case may be, would not receive the benefits and rights as aforesaid, Umetco and UCC shall cooperate with Buyer, USV and UST in any reasonable arrangement designed to provide for them the benefits under any such contract, license, lease, commitment, customer order or purchase order, including the enforcement, for their benefit, of any and all rights of Umetco or UCC against such other party thereto arising out of the breach or cancella-

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tion thereof by such other party; provided no act pursuant to this Section 3.06 by Umetco, UCC, Buyer, USV or UST shall be deemed a waiver by Buyer, USV or UST of any breach by Umetco or UCC of any of their representations and warranties set forth in Article IV.

3.06 Right of Enforcement and Settlement. After the Closing Date, Buyer, USV and UST shall have complete control over the payment, settlement or other disposition of the Assumed Obligations and the right to conduct and control all negotiations and proceedings with respect thereto. Umetco and UCC shall notify Buyer promptly of any claim made with respect to any of the Assumed Obligations, and shall not, except with Buyer's prior express written consent, voluntarily make any payment of, settle or offer to settle, consent to any compromise, or admit any liability with respect to, any of the Assumed Obligations.

IV. REPRESENTATIONS AND WARRANTIES OF UCC AND UMETCO

UCC and Umetco represent and warrant that:

4.01 Organization, Good Standing, Etc.

(a) Umetco is a corporation duly incorporated, validly existing and in good standing under the laws of Delaware, is duly qualified to do business in Arkansas, California, Connecticut, New York, Pennsylvania and every other jurisdiction in which the failure to qualify would have a material adverse effect on the conduct of the Business by USV and UST after the Closing Date, and has full power and authority to own or lease its properties,

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to conduct its business as now conducted, to execute and deliver this Agreement, the Supplemental Agreements, and all other documents and instruments the execution of which by it is contemplated herein or therein, and to consummate the transactions contemplated hereby or thereby, including the sale of the Assets and the assignment of the Assumed Obligations to USV and UST.

(b) UCC is a corporation duly incorporated, validly existing and in good standing under the laws of New York, is duly qualified to do business in every jurisdiction in which the failure to qualify would have a material adverse effect on the conduct of the Business by USV and UST after the Closing Date, and has full power and authority to own or lease its properties, to conduct its business as now conducted and to execute and deliver this Agreement, the Supplemental Agreements, and all other documents and instruments the execution of which by it is contemplated herein or therein, and to consummate the transactions contemplated hereby or thereby.

(c) Vametco is a corporation duly incorporated, validly existing and in good standing under the laws of Delaware, is duly registered as an external corporation in Bophuthatswana and in the Republic of South Africa, is not qualified to do business in any other State, since neither the nature of its business nor the location of its assets so requires, and has full power and authority to own or lease its properties and to conduct its business as now conducted.

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(d) Landco is a corporation duly incorporated, validly existing and in good standing under the laws of the Republic of South Africa, and has full power and authority to own the employee housing at Brits, South Africa and to lease the same to Vametco, and has no other assets, or contractual relationships or liabilities, of any kind whatsoever.

4.02 Effect of Agreement, Etc. Neither the execution nor delivery of this Agreement, any Supplemental Agreement, or any of the other documents and instruments the execution of which is contemplated by UCC or Umetco herein or therein, nor consummation of the transactions contemplated hereby or thereby, will conflict with or cause the breach of the terms, conditions or provisions of any material agreement or instrument to which UCC or Umetco is a party, or by which UCC or Umetco may be bound, or constitute a default under any provision thereof, or violate UCC's or Umetco's Certificate of Incorporation or By-laws, as amended, the execution, delivery and performance of this Agreement, the Supplemental Agreements, and all such other documents and instruments having been duly authorized by all necessary corporate actions and proceedings.

4.03 Title to Properties; Absence of Liens and Encumbrances, Etc. On the Closing Date Umetco or UCC will have and will convey and transfer to the Buyer, USV or UST, as the case may be, good and marketable title to the Assets (subject to no liens, objections, mortgages, security interests, or encumbrances

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except as contained in or represented by the Assumed Obligations or as otherwise set forth in Exhibit Q, and the Schedules thereto) and will have full corporate power and authority to sell, convey and transfer the Assets and assign the Assumed Obligations to USV and UST.

4.04 Information Furnished By Umetco and UCC. Umetco and UCC have made the following disclosures to Buyer, set forth as Schedules to Exhibit Q, and such schedules are accurate and complete:

(a) Schedule 1: Information provided the Buyer regarding the financial operations of the Business (the "Business Financials"), on which the Buyer based its projections of future financial operations (for which projections neither UCC nor Umetco take any responsibility).

(b) Schedule 2: Financial statements of Vametco for its last two fiscal years, including statements of profit and loss and balance sheets as of the end of each such year, which have been prepared according to generally accepted accounting principles applicable to U.S. domestic corporations (the "Vametco Financials").

(c) Schedule 3: A list of all liens, objections, mortgages, security interests and encumbrances which are material to the Assets (including, for this purpose, not only the outstanding capital stock of Vametco and Landco, but also all the assets owned or used by either).

(d) Schedule 4: A list of all material (i)

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leases from others of personal property relating to the Business or to Vametco and (ii) contracts, agreements (including, but not limited to, purchase orders issued by UCC and Umetco and other agreements with suppliers), and other instruments to which UCC, Umetco or Vametco is a party and which relate to the Assets, the Business or Vametco, which list describes any known breaches thereof, copies of which have been separately delivered.

(e) Schedule 5: A list of all pending or threatened litigation, arbitration or other proceeding against UCC, Umetco, Vametco or Landco arising out of the Assets, Business, the operations of Vametco or Landco, or the Assumed Obligations (including, but not limited to, all known material claims against Umetco or Vametco on account of the delivery by either of products that allegedly were defective or failed to meet specifications or caused personal injury or damage to property).

(f) Schedule 6: A list of all customers of the Business and Vametco and a list of all open and unfilled customer orders of the Business and Vametco as of the Effective Date, which list describes any termination, cancellation, or modification of, or state of facts materially and adversely affecting, the business relationship of the Business or Vametco with such customers.

(g) Schedule 7: A list and description of all patents, copyrights, trade names and trademarks in which UCC,

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Umetco or Vametco has any right, title or interest and which are used or have been used in the Business or by Vametco, all of which were originally issued directly to UCC or Umetco or were acquired through standard assignments of inventors' rights by their employees, copies of which have already been delivered to Buyer and certain of which, pursuant to Paragraph II of Exhibit A, are Excluded Assets.

(h) Schedule 8: A description of all proprietary and confidential information in which UCC, Umetco or Vametco has any right, title or interest and which is used or has been used in the Business or by Vametco (other than such information reflected in the technical data, files, reports and drawings described in Paragraph I(C)(12) of Exhibit A).

(i) Schedule 9: A list of all licenses, surety bonds, permits and variances from any governmental agency or other regulatory body that are material to the Assets or material to the operations of the Business, Vametco or Landco and any known violations by UCC, Umetco, Vametco or Landco (other than alleged violations described in Schedule 5) of any law, regulation or ordinance, the enforcement of which law, regulation, or ordinance would interfere adversely with the value of or the possession or use by Buyer, USV or UST of the Assets, or with the operations of the Business, Vametco or Landco after the Closing Date.

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(j) Schedule 10: A list of all Assets (including, for this purpose, not only the outstanding capital stock of Vametco and Landco, but also all assets owned or used by either) in which any person or corporation other than Umetco or UCC has or has claimed any right, title or interest, which list identifies by item the person or corporation having or claiming such right, title or interest.

(k) Schedule 11: (1) Copies of Umetco's and Vametco's Certificates of Incorporation, as amended to date, certified by the Secretary of State for the State of Delaware, and copies of their By-laws, as amended to date, certified by their Secretaries or Assistant Secretaries.

(2) A copy of Landco's corporate Statutes, as amended to date, certified by a director of Landco.

(l) Schedule 12: Certificates from the insurance companies providing liability insurance to Umetco, UCC or Vametco, applicable to the operations or products of the Business and of Vametco, stating that such policies are in effect and the status of all known claims arising out of the operations or products of the Business or Vametco.

4.05 Completeness of Information Furnished. All material information, agreements, documents and instruments, financial or otherwise, regardless whether identified in Section 4.04 or Exhibit Q, of which UCC, Umetco or Vametco has knowledge, relating to the Business, Vametco, Landco, the Assets or the

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Assumed Obligations, have been made available to Buyer, its representatives or agents on or prior to the execution hereof and such disclosures, including in particular the disclosures identified as the Business Financials and the Vametco Financials, are accurate and complete, and there will be no material change therein prior to the Closing, other than in the ordinary course of business or as required or contemplated by this Agreement. There has been no misstatement of any material fact or omission to state a material fact concerning the Business, Vametco, Landco, the Assets or the Assumed Obligations, and neither the information and documents which have been furnished by UCC, Umetco or Vametco, or by any of their representatives or agents, to Buyer or to any of Buyer's representatives or agents, in connection with the transactions contemplated hereby, nor any certificate or other document delivered by or on behalf of UCC, Umetco or Vametco in connection with the transactions contemplated hereby, is materially false or misleading or contains any misstatement of a material fact or omits any material fact necessary to be stated in order to make the statements therein not misleading.

V. REPRESENTATIONS AND WARRANTIES OF BUYER

Buyer represents and warrants that:

5.01 Organization, Good Standing, Etc.

(a) Buyer is a corporation duly incorporated, validly existing and in good standing under the laws of the State of Connecticut, and has full power and authority (i) to own or

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lease its properties, (ii) to execute and deliver this Agreement, the Supplemental Agreements, and all other documents and instruments the execution of which by it is contemplated herein or therein, and (iii) to consummate the transactions contemplated hereby or thereby, including the purchase of the Assets, directly and through its subsidiaries.

(b) USV and UST are corporations duly incorporated, validly existing and in good standing under the laws of Delaware and have full power and authority to own or lease their properties and to execute, deliver and perform the Assumption Agreements and any Supplemental Agreement to be executed by them.

(c) Appropriate applications have been filed to qualify Buyer as a foreign corporation under the laws of Pennsylvania, to qualify USV as a foreign corporation under the laws of Arkansas, Connecticut, and New York and to qualify UST as a foreign corporation under the laws of California and Connecticut, there being no other jurisdiction where the failure to qualify would have a material adverse effect on the interests of UCC or Umetco under this Agreement, the Supplemental Agreements or any other instrument entered into in connection with this Agreement.

5.02 Effect of Agreement, Etc. Neither the execution or delivery of this Agreement, any Supplemental Agreement, or any of the other documents and instruments the execution of which is contemplated herein or therein, nor consummation of the transactions contemplated hereby or thereby, will conflict with or cause

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a breach of the terms, conditions or provisions of any material agreement or instrument to which Buyer, USV or UST is a party, or by which Buyer, USV or UST may be bound, or constitute a default under any provision thereof, or violate their Certificates of Incorporation or By-laws, as amended, the execution, delivery and performance of this Agreement, the Supplemental Agreements, and all such other documents and instruments having been authorized by all necessary corporate actions and proceedings.

5.03 Other Information. Neither the information and documents which have been or may be furnished by Buyer, or by any of Buyer's representatives or agents, to UCC or Umetco or to any of their representatives or agents, in connection with the transactions contemplated hereby, nor any certificate or other document delivered by or on behalf of Buyer, USV or UST in connection with the transactions contemplated hereby, is materially false or misleading or contains any misstatement of a material fact or omits any material fact necessary to be stated in order to make the statements therein not misleading.

VI. CONDUCT OF BUSINESS UNTIL CLOSING DATE

Except as permitted or required hereby or as the Buyer may otherwise consent to in writing, between the Effective Date and the Closing Date UCC and Umetco shall, and UCC shall take all necessary steps to ensure that Umetco and Vametco shall:

6.01 Operate the Business and Vametco only in the usual, regular and ordinary manner and, to the extent consistent

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with such operation, use their best efforts (a) to preserve the present business organization of the Business and Vametco intact, (b) to keep available the services of the present employees of both, and (c) to preserve the present business relationships of both with customers, suppliers, and other parties having business dealings with them.

6.02 Maintain all properties necessary for the conduct of the Business and the operations of Vametco and Landco, whether owned or leased, in substantially the same condition as they now are (reasonable wear and tear excepted). If any property is materially damaged and has not been repaired on or prior to the Closing Date, or provision made for such repair, so that it is, or after such repair, will be, in as good condition as it was prior to such material damage, Buyer shall have the option either to receive a compensatory credit against the Purchase Price, or to treat the property as an Excluded Asset as provided for in Paragraph II of Exhibit A.

6.03 Maintain the books, records and accounts of the Business and Vametco in the usual, regular and ordinary manner, on a basis consistent with the past.

6.04 Duly comply in all material respects with all laws, rules and regulations known to UCC or Umetco to be applicable to the Business or Vametco or the operations thereof.

6.05 Neither merge with or into, consolidate, amalgamate or otherwise combine with, any other entity nor change in

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any material respect the character of the Business, Vametco or Landco.

6.06 Neither (a) encumber, mortgage, or voluntarily subject to lien any of the Assets, nor (b) sell, convey, transfer, lease or acquire any Asset to, for or on behalf of the Business, Vametco or Landco other than in the ordinary course of business (the term "Assets" to include, for the purpose of this Section, not only the outstanding capital stock of Vametco and Landco, but also all assets owned or used by them).

6.07 Give Buyer prompt written notice of any material damage to any of the Assets, and specify whether it intends to repair such material damage or replace the Asset (the term "Assets" to include, for the purpose of this Section, not only the outstanding capital stock of Vametco and Landco, but also all assets owned or used by them).

6.08 Neither modify, change nor terminate any of the Assumed Obligations except in the ordinary course of business, and notify Buyer of any modification, change or termination of any of the Assumed Obligations whether or not in the ordinary course of business.

6.09 Notify Buyer promptly of any fact which, if known on the date of this Agreement, would have been required to be set forth or disclosed herein or pursuant to this Agreement.

6.10 Not enter into any transaction or take any action which would result in any of the representations and warranties

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contained in this Agreement, or any document delivered to Buyer pursuant hereto, not being true and correct, at and as of the time immediately after such transaction has been entered into or such action has been taken, and at and as of the Closing Date.

6.11 Make all books, records and documents, including computer records, of the Business, Vametco and Landco, available to Buyer, Buyer's counsel, Buyer's accountants and others authorized by Buyer for the inspection, copying and making of extracts therefrom, to the extent permitted by law.

6.12 Conduct no transactions in or through Landco, it being the intent that the capital stock thereof be acquired at a time when Landco has no asset other than the Brits housing, including land, and no contractual relationships or liabilities whatsoever.

VII. CONDITIONS PRECEDENT TO UCC'S AND UMETCO'S UNDERTAKINGS.

The following shall be conditions precedent to the undertakings of UCC and Umetco hereunder except to the extent waived by them:

7.01 Compliance with Agreement. All the terms, covenants, agreements and conditions of this Agreement to be complied with and performed by Buyer, USV or UST on or prior to the Closing Date shall have been duly complied with and performed, and UCC and Umetco shall have received a certificate of an executive officer of Buyer to such effect dated as of the Closing Date.

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7.02 Board of Directors' Approval. The Board of Directors of Buyer shall have duly taken all action necessary to authorize the execution and delivery of this Agreement, the Supplemental Agreements, and all other documents and instruments the execution of which by it is contemplated herein or therein, and the consummation of the transactions contemplated hereby or thereby. The Boards of Directors of USV and UST shall have duly taken all action necessary to authorize the execution, delivery and performance of their respective Assumption Agreements and any Supplemental Agreement to be executed by them. The Buyer shall have provided to UCC and Umetco certified copies of resolutions duly adopted by such Boards of Directors to such effect.

7.03 Representations and Warranties. The representations and warranties of Buyer contained herein shall be true in all material respects on and as of the Closing Date with the same effect as though such representations and warranties had been made on and as of such date, and UCC and Umetco shall have received a certificate of an executive officer of Buyer to such effect dated as of the Closing Date.

7.04 Opinion of Buyer's Counsel. On the Closing Date, Buyer shall cause to be delivered to UCC and Umetco an opinion of Buyer's counsel, Gager, Henry & Narkis, dated the Closing Date, to the effect that:

(a) Buyer is a corporation duly incorporated, validly existing and in good standing under the laws of

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the State of Connecticut and Buyer has full corporate power and authority to execute and deliver this Agreement, the Supplemental Agreements, and all other documents and instruments the execution of which by it is contemplated herein or therein, and to consummate the transactions contemplated hereby or thereby, including the purchase of the Assets, directly or through its subsidiaries.

(b) USV and UST are corporations duly incorporated, validly existing and in good standing under the laws of the State of Delaware and have full corporate power and authority to execute, deliver and perform their respective Assumption Agreements and other agreements executed by them in connection with this Agreement.

(c) Appropriate applications have been filed to qualify Buyer as a foreign corporation under the laws of Pennsylvania, to qualify USV as a foreign corporation under the laws of Arkansas, Connecticut and New York, and to qualify UST as a foreign corporation under the laws of California and Connecticut, there being no other jurisdiction where the failure to qualify would have a material adverse effect on the interests of UCC or Umetco under this Agreement.

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(d) The purchase of the Assets and the execution and delivery to UCC and Umetco by Buyer of this Agreement, the Supplemental Agreements and the other documents and instruments executed and delivered to UCC or Umetco by Buyer, and the execution and delivery to Umetco by USV and UST of their respective Assumption Agreements and the other documents and instruments executed by them in connection with this Agreement, have been duly authorized by all necessary corporate action of Buyer, USV and UST, as the case may be, and this Agreement, the Supplemental Agreements and such other documents and instruments have been duly executed and delivered by Buyer, USV and UST, as the case may be, and are legal, valid and binding obligations of Buyer, USV and UST, as the case may be, except as enforcement thereof may be limited by bankruptcy, insolvency, or similar laws affecting the enforcement of creditors' rights generally and except as enforcement thereof by way of specific performance or by other equitable remedies may be limited by general, equitable principles.

(e) The execution and delivery of this Agreement, all Supplemental Agreements, and all of the other

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documents and instruments the execution of which is contemplated by Buyer, USV or UST herein or therein, and the consummation of the transactions contemplated hereby or thereby, do not conflict with, or cause a breach of the terms, conditions or provisions of, any material agreement or instrument to which Buyer, USV or UST is a party, or by which Buyer, USV or UST is bound, or constitute a default under any provision thereof, or violate Buyer's, USV's or UST's Certificate of Incorporation or By-laws, as amended.

7.05 Good Standing Certificate. UCC and Umetco shall have received a certificate of the Secretary of the State for the State of Connecticut, and certificates of the Secretary of State for the State of Delaware, or other evidence satisfactory to it, that Buyer, USV and UST are all in good standing in their respective States of incorporation. To the extent available, UCC and Umetco shall have received similar evidence with respect to the good standing of Buyer, USV and UST as foreign corporations in the jurisdictions referred to in Section 5.01(c).

7.06 Secretaries' or Assistant Secretaries' Certificates. UCC and Umetco shall have received certificates of the Secretaries or Assistant Secretaries of Buyer, USV and UST, dated the Closing Date, setting forth the names and respective offices of all incumbent executive officers of Buyer, USV and UST and

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including the signatures of executive officers who have signed this Agreement, any Supplemental Agreement or any of the other documents or instruments delivered pursuant hereto or thereto.

7.07 No Litigation. No suit, action or other proceeding to restrain, prohibit or otherwise affect the consummation of this Agreement or any Supplemental Agreement shall have been instituted or threatened which, in the judgment of UCC, Umetco or their counsel would, if successful, prohibit the Closing or the transactions contemplated by this Agreement or any Supplemental Agreement or require the termination of this Agreement or any Supplemental Agreement.

VIII. CONDITIONS PRECEDENT TO BUYER'S UNDERTAKINGS

The following shall be conditions precedent to the undertakings of Buyer, USV and UST hereunder except to the extent waived by Buyer:

8.01 Compliance with Agreement. All the terms, covenants, agreements and conditions of this Agreement to be complied with and performed by UCC or Umetco on or prior to the Closing Date shall have been duly complied with and performed, and Buyer shall have received certificates of executive officers of UCC and Umetco to such effect dated as of the Closing Date.

8.02 Board of Directors' Approval. The Boards of Directors of UCC and Umetco shall have duly taken all action necessary to authorize the execution and delivery of this Agreement, the Supplemental Agreements and all other documents and

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instruments the execution of which by them is contemplated herein or therein, and the consummation of the transactions contemplated hereby or thereby, and UCC and Umetco shall have provided to Buyer certified copies of resolutions duly adopted by the Boards of Directors of UCC and Umetco to that effect.

8.03 Representations and Warranties. The representations and warranties of UCC and Umetco contained herein shall be true in all material respects on and as of the Closing Date with the same effect as though such representations and warranties had been made on and as of such date, and Buyer shall have received certificates of executive officers of UCC and Umetco to such effect dated as of the Closing Date.

8.04 Opinion of UCC's and Umetco's Counsel. On the Closing Date, UCC and Umetco shall cause to be delivered to Buyer an opinion of their counsel, dated the Closing Date, to the effect that:

(a) Umetco is a corporation duly incorporated, validly existing and in good standing under the laws of the State of Delaware, and is duly qualified to do business in Arkansas, California, Connecticut, New York, Pennsylvania and every other jurisdiction in which the failure to qualify would have a material adverse effect on the Buyer, USV or UST, with full power and authority to own or lease its properties, to conduct its business as

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now conducted, to execute and deliver this Agreement, the Supplemental Agreements, and all other documents and instruments the execution of which by it is contemplated herein or therein, and to consummate the transactions contemplated hereby or thereby, including the sale of the Assets and the assignment of the Assumed Obligations to USV and UST.

(b) UCC is a corporation duly incorporated, validly existing and in good standing under the laws of the State of New York, and is duly qualified to do business in every jurisdiction in which the failure to qualify would have a material adverse effect on the Buyer, USV or UST, with full power and authority to own or lease its properties, to conduct its business as now conducted and to execute and deliver this Agreement, the Supplemental Agreements, and all other documents and instruments the execution of which by it is contemplated herein or therein, and to consummate the transactions contemplated hereby or thereby.

(c) Vametco is a corporation duly incorporated, validly existing and in good standing under the laws of the State of Delaware, is duly registered as an external corporation in Bophuthatswana and

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the Republic of South Africa, is not qualified to do business in any other foreign jurisdiction, or in any State, since neither the nature of its business nor the location of its assets so requires, with full power and authority to own or lease its properties and to conduct its business as now conducted.

(d) Landco is a corporation duly incorporated, validly existing and in good standing under the laws of the Republic of South Africa, with full power to own or lease its properties.

(e) The execution and delivery of this Agreement, all Supplemental Agreements, and all of the other documents and instruments the execution of which is contemplated by UCC or Umetco herein or therein, and the consummation of the transactions contemplated hereby or thereby, do not conflict with, or cause a breach of the terms, conditions or provisions of, any material agreement or instrument to which UCC or Umetco is a party, or by which UCC or Umetco is bound, or constitute a default under any provision thereof, or violate UCC's or Umetco's Certificate of Incorporation or By-laws, as amended.

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(f) The sale of the Assets by UCC and Umetco and the assignment to USV and UST of the Assumed Obligations by Umetco pursuant to this Agreement, the execution and delivery to Buyer by UCC and Umetco of this Agreement, the Supplemental Agreements, and the other documents and instruments executed and delivered to Buyer by UCC or Umetco, have been duly authorized by all necessary corporate action on the part of UCC and Umetco, and this Agreement, the Supplemental Agreements, and such other documents and instruments have been duly executed and delivered by UCC and Umetco and are their legal, valid and binding obligations, except as enforcement thereof may be limited by bankruptcy, insolvency, or similar laws affecting the enforcement of creditors' rights generally and except as enforcement thereof by way of specific performance or by other equitable remedies may be limited by general, equitable principles.

8.05 Good Standing Certificates. Buyer shall have received (i) a certificate of the Secretary of State for the State of New York, or other evidence satisfactory to it, that UCC is in good standing in the State of New York, (ii) certificates of the Secretaries of State for the States of Arkansas, California,

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Connecticut, Delaware and New York, and for the Commonwealth of Pennsylvania, or other evidence satisfactory to it, that Umetco is in good standing in such jurisdictions, and (iii) a certificate of the Secretary of State for the State of Delaware, or other evidence satisfactory to it, that Vametco is in good standing in the State of Delaware. Buyer shall also have received evidence, satisfactory to it, that Vametco is in good standing as an external corporation registered in Bophuthatswana and the Republic of South Africa and that Landco is a corporation in good standing under the laws of South Africa.

8.06 Secretaries' or Assistant Secretaries' Certificates. Buyer shall have received certificates of the Secretaries or Assistant Secretaries of UCC and Umetco, dated the Closing Date, setting forth the names, respective offices and signatures of executive officers who have signed this Agreement, any Supplemental Agreement or any of the other documents or instruments delivered pursuant hereto or thereto.

8.07 Availability of Financing. There shall be available to the Buyer, on the Closing Date, financing reasonably acceptable to it.

8.08 No Material Change. There shall have been, as of the Closing Date, no material adverse change in (a) the operations of the Business or Vametco, (b) the world trading price of V_2O_5 or (c) the amount, nature or condition of either the Assets (including, for this purpose, not only the outstanding capital

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stock of Vametco and Landco, but also all assets owned or used by them) or the Assumed Obligations.

8.09 No Litigation. (a) No suit, action or other proceeding to restrain, prohibit or otherwise affect the consummation of this Agreement or any Supplemental Agreement shall have been instituted or threatened which, in the judgment of Buyer or its counsel, would, if successful, prohibit the Closing or the transactions contemplated by this Agreement or any Supplemental Agreement or require the termination of this Agreement or any Supplemental Agreement, and (b) no suit, action or other proceeding shall have been instituted or threatened which, in the judgment of Buyer or its counsel, would, if successful, materially and adversely affect the value of the Assets or the Assumed Obligations or materially and adversely interfere with operations of the Business or of Vametco after the Closing Date.

8.10 Vametco Bank Financing. Vametco shall, with UCC's assistance, have obtained commitments for bank lines of credit in South Africa equal to the maximum available in South Africa to 100% foreign-owned corporations, in amounts and on terms acceptable to Buyer.

8.11 Vametco Balance Sheet. Umetco or Vametco shall have made or caused to be made such transfers, adjustments or payments, or have issued or caused to be issued such credits, as shall be necessary in order to permit the preparation of a balance sheet for Vametco, as of the Effective Date, using, for this

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purpose, a rand-dollar conversion rate of $.3825 per rand, reflecting (a) assets of approximately $2,800,000 in accounts receivable, approximately $1,800,000 in inventory, approximately $8,600,000 in net fixed assets and approximately $600,000 in other assets, and (b) liabilities of approximately $1,700,000 in current liabilities, approximately $2,300,000 in bank debt payable in rand and approximately $2,500,000 in deferred taxes, and (c) net worth of approximately $7,300,000.

8.12 Utility Review. Acceptable responses shall have been obtained from Niagara Mohawk Power Corporation and The New York Power Authority regarding the Lease between UCC and USV.

8.13 Delivery of Financial Statements. Umetco shall have delivered (a) balance sheet of Vametco, as of March 31, 1986, audited by KMG Main Hurdman, (b) a statement of selected asset balances of Umetco's domestic vanadium and tungsten businesses, as of March 31, 1986, reflecting Assets of the Business to be purchased as described in and valued according to Exhibit A, showing accounts receivable, inventory, and net fixed assets, and dividing the assets shown on such statement between Umetco's vanadium and tungsten businesses, audited by KMG Main Hurdman, together with supporting documentation from Umetco showing, in the case of inventory and fixed assets, the location thereof, and (c) a statement audited by KMG Main Hurdman showing the principal

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and interest balances under the pollution control bonds described in paragraph 4(j) (iii) of Buyer's Series A Adjustable Rate Note attached as Schedule B-1 to Exhibit B, and stating that, in the opinion of such accountants, no default existed under the Acquisition Agreements dated November 1, 1976, with respect to such bonds, on March 31, 1986.

IX. CLOSING AND POST CLOSING.

9.01 Closing. The "Closing Date" shall be May 13, 1986, and the "Closing," which shall be held at UCC's offices in New York, New York, shall commence at 10 o'clock A.M. (Eastern Time) on the Closing Date, or on such other date, or such other time or place, as shall be mutually agreed to by Umetco and Buyer.

9.02 Closing Adjustments. Any of the following items applicable to the Assets which do not require an adjustment of the Purchase Price pursuant to Exhibit B shall be equitably apportioned as of the Effective Date (to the extent then determinable) between Umetco and Buyer and the total net adjustment shall be paid by certified or bank check on the Closing Date:

(a) Personal or real property taxes;

(b) The adjustments described in Section 1.04;

(c) Rentals or other payments under any Assumed Obligation; and

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(d) Other miscellaneous items normally adjusted between buyers and sellers.

9.03 Post Closing Adjustments. Those adjustments described in Section 9.02 that are not determinable on the Closing Date shall be made as soon as the adjustments become determinable, by cash payments between or among the parties. Any party receiving an invoice for the costs described in Section 1.04 shall pay such invoice within the required payment period and shall bill the other party or parties for their share of the amount paid which share shall be paid within 30 days of receipt of such bill.

X. INDEMNITY; REMEDIES OF BUYER

10.01 Buyer. Except as provided in Section 10.06, Buyer shall indemnify and defend UCC and Umetco and hold them harmless from any and all liability, obligation, cost, damage, loss or expense of any nature (including court costs and reasonable attorneys' fees) incurred or arising out of (a) the breach by Buyer, USV or UST of any representation or warranty by them contained in this Agreement, in any Supplemental Agreement or in any other document or instrument delivered pursuant hereto or thereto, or their failure to perform any obligation on or after the Closing Date as required by this Agreement, by any Supplemental Agreement or by any other document or instrument delivered pursuant hereto or thereto, or (b) any Assumed Obligation or any document or instrument delivered in connection therewith (except

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with respect to any claim of the breach thereof by UCC or Umetco) or otherwise incurred or arising out of the operation of Vametco or the Business carried on by USV or UST after the Closing Date, except as otherwise provided in this Agreement or any Supplemental Agreement or any other document or instrument delivered pursuant hereto or thereto.

10.02 UCC and Umetco. Except as provided in Section 10.06, UCC and Umetco, jointly and severally, shall indemnify and defend Buyer, USV and UST and hold them harmless from any and all liability, obligation, cost, damage, loss or expense of any nature (including court costs and reasonable attorneys' fees) incurred or arising out of (a) the breach by UCC or Umetco of any representation or warranty contained in this Agreement, in any Supplemental Agreement or in any other document or instrument delivered pursuant hereto or thereto, or failure by UCC or Umetco to perform any obligation on or after the Closing Date as required by this Agreement, by any Supplemental Agreement or by any other document or instrument delivered pursuant hereto or thereto, or (b) any claim arising from an obligation, agreement or liability of UCC or Umetco not included in the Assumed Obligations, including any claim for personal injury or property damage, or any claim for defective product, arising out of the manufacture of product by UCC or Umetco on or before the Closing Date (regardless of when sold or delivered).

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10.03 Request for Indemnity. As a condition of any indemnification required by Sections 10.01 or 10.02, any party on which a claim or demand is made as to which it claims indemnification herein (such party being herein referred to as "indemnitee") shall give prompt written notice of each such claim or demand to the other party (such other party being herein referred to as "indemnitor") and furnish the indemnitor with copies of all documents evidencing the same and, in the case of a claim or demand made by a third party, permit the indemnitor to take charge of the defense thereof and afford the indemnitor all cooperation reasonably requested by it in defending the claim, and further provided that the indemnitee shall have the right to employ counsel in any action arising out of such claim or demand and participate in the defense thereof, but the fees and expenses of such counsel shall not be at the expense of the indemnitor unless the indemnitor:

(i) does not assume such defense; or

(ii) specifically authorizes the employment of such counsel.

10.04 Buyer's Remedies Before or at Closing. If before or at the Closing, Buyer determines that either UCC or Umetco has failed to comply in any material respect with its agreements or conditions contained herein, or any of the representations or warranties of UCC or Umetco shall not have been accurate in any material respect when made (but only if such inaccuracy shall not

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have been remedied as of such time), or shall not be accurate in any material respect at the Closing with the same force and effect as though first made on and as of the Closing Date (except to the extent any such representations and warranties (a) shall be incorrect as of the Closing Date because of events or changes occurring or arising after the date hereof and either permitted by the terms of such representations and warranties or in fulfillment of other express provisions of this Agreement or (b) are made only as of a specified date (and as to such representation and warranties the same shall have been true as of such specified date)), UCC shall inform Buyer as to whether UCC or Umetco, as the case may be, will remedy, correct or repair the state of affairs or condition as to which such representation and warranty is false or as to which such agreement or condition has not been satisfied, provided that the Closing shall be postponed pending such remedy, correction or repair by UCC and Umetco and if UCC or Umetco declines to remedy, correct or repair such state of affairs or condition within 30 days after the Closing Date, Buyer may then elect either (x) to receive a compensatory credit against the Purchase Price or (y) to terminate this Agreement (with no liability to UCC or Umetco under Section 11.08 or otherwise).

10.05 Remedies not Exclusive. Except as provided in Section 10.04, the remedies available to the parties under this Article 10 are not exclusive but are cumulative and in addition to any others available in law or in equity, and may be exercised separately or concurrently or successively.

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10.06 Limitations on Indemnity.

(a) No claim for indemnity under Section 10.01 or under 10.02(a) shall be effective unless notice of such claim is given the indemnitee by the indemnitor on or before the third anniversary of the Closing Date.

(b) No claim for indemnity may be made by either party unless and until the aggregate of all such claims, by such party after the Closing, shall equal or exceed the sum of $50,000. Once, however, that a party's claims for indemnity equal or exceed $50,000, such party shall be entitled to indemnity for all claims as to which indemnity is provided under this Article X.

(c) Buyer, USV and UST shall not be entitled to an aggregate indemnity, under this Article X, in excess of the Purchase Price (as determined and paid pursuant to Exhibit B). Any indemnity due hereunder shall be paid in cash to the extent of cash theretofore paid in respect of the Purchase Price (cash paid at Closing, and cash thereafter paid in respect of securities issued by Buyer, USV or UST, to UCC or Umetco, at the Closing, including interest and principal paid on notes, and dividends and redemption payments made in respect of preferred stock, by Buyer or any of its subsidiaries). To the extent that the indemnity due hereunder exceeds the amount of such cash theretofore paid, such excess shall be paid by reducing the amounts of notes and preferred stock issued to UCC or Umetco at the Closing, by Buyer, USV and UST, and still held by UCC or Umetco. Such reduction

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shall be made pro rata among such notes and preferred stock still held. To the extent that the indemnity due hereunder exceeds the aggregate of (i) such cash theretofore paid, and (ii) the amounts of such securities still held by UCC or Umetco, such excess shall be paid in cash.

(d) Buyer, USV, UST and Vametco shall not be entitled to any indemnity from UCC or Umetco for use of the following occupational health and product safety information, which has been, or will shortly after the Closing Date be, delivered to Buyer, USV, UST or Vametco for use by them: (i) all Material Safety Data Sheets ("MSDS") and labels (including supporting documentation) for USV, UST and Vametco products, materials-in-process and other hazardous materials at the plant sites of USV, UST and Vametco; (ii) a copy of the procedure used to develop MSDS and product labels; (iii) Umetco Policy, Procedures and Standards Manuals regarding Occupational Health, Hearing Conversation and Noise Control, Respiratory Protection; Industrial Hygiene and Product Safety; and (iv) shipping procedure documents for vanadium pentoxide (V_2O_5), ammonium metavanadate, sodium metavanadate, vanadium chloride and vanadium oxychloride.

XI. MISCELLANEOUS

11.01 Exhibits and Schedules. The Exhibits and Schedules referred to in this Agreement are to be considered an integral part of this Agreement for all purposes, regardless whether a particular Exhibit or Schedule is physically attached to this Agreement or every counterpart thereof.

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11.02 Entire Agreement, Survival, No Waiver. This Agreement, the Supplemental Agreements and the other documents and instruments contemplated hereby or thereby constitute the entire agreement between the parties pertaining to the subject matter hereof, and supersede all prior and contemporaneous agreements, understandings, negotiations, and discussions, whether oral or written, of the parties, and there are no warranties, representations or other agreements between the parties in connection with the subject matter hereof, except as specifically set forth herein, or as may be set forth in the Supplemental Agreements or in the other documents and instruments contemplated hereby. All covenants, agreements, indemnifications, representations and warranties made herein, in the Supplemental Agreements and in the other documents or instruments to be delivered pursuant hereto or thereto shall survive the closing of the transactions contemplated by this Agreement and the Supplemental Agreements, except that the representations of UCC, Umetco and Buyer contained in this Agreement, or any agreement entered into in connection herewith shall not survive beyond the third anniversary of the Closing Date. No supplement, modification, waiver or termination of this Agreement shall be binding unless executed in writing by the party to be bound thereby. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provision hereof (whether or not similar), nor shall such waiver constitute a continuing waiver unless otherwise expressly provided herein.

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11.03 No Rights in Third Parties. Except as otherwise provided in Section 3.04, 11.15 and 11.16, nothing herein expressed or implied is intended, or shall be construed, to confer upon or to give any person, firm or corporation, other than Buyer, USV, UST, Vametco, UCC and Umetco and their respective legal representatives, successors and assigns, any rights or remedies under or by reason of any term, provision, condition, undertaking, warranty, representation, or agreement contained in this Agreement.

11.04 Headings. The Table of Contents, and article and section headings are not to be considered part of this Agreement, are included solely for convenience, and are not intended to be full or accurate descriptions of the contents thereof.

11.05 Further Assurances. UCC and Umetco at any time and from time to time after the Closing Date, upon the request of Buyer, shall perform, execute, acknowledge and deliver all such further acts, deeds, assignments, transfers, conveyances and assurances as Buyer may deem necessary or advisable to confirm Buyer's, USV's and UST's record and full title to and interest in, or to enable Buyer, USV and UST to deal with and dispose of any of, the Assets and rights to be conveyed, transferred and delivered to them hereunder, and to settle and determine the Assumed Obligations (the term "Assets" to include, for the purposes of this Section, not only the outstanding capital stock of Vametco and Landco, but also all assets owned or used by them).

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11.06 Counterparts. For the convenience of the parties, any number of counterparts of this Agreement may be executed and each such executed counterpart shall be, and shall be deemed to be, an original instrument, and to have the same force and effect as an original, but all of which together shall constitute and shall be deemed to constitute, in the aggregate, but one and the same instrument.

11.07 No Assignment by Buyer. This Agreement may not be assigned by Buyer or by operation of law without the prior written consent of UCC and Umetco. The taking of title to assets of the Business, by USV and UST, however, shall not constitute an impermissible assignment. All of the terms and provisions of this Agreement shall be binding upon and shall inure to the benefit of the parties, their transferees, successors and assigns.

11.08 Costs. Should the transactions contemplated by this Agreement not be consummated through no fault of Buyer, Umetco shall pay, or reimburse Buyer for, Buyer's, USV's and UST's out of pocket costs, including finance costs, legal and accounting fees, in connection with incorporation of the Buyer, USV and UST, negotiation and preparation of documents and preparation for the Closing contemplated by this Agreement. Otherwise, Buyer, UCC and Umetco shall bear their respective costs with respect to the transaction and Buyer shall reimburse UCC or Umetco any of its costs, relating to this transaction, advanced by UCC or Umetco prior to the Closing.

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11.09 Governing Law. This Agreement and every Supplemental Agreement, and every other document and instrument delivered by the parties in connection with the transactions contemplated hereby and thereby, shall be construed in accordance with and governed by the laws of the State of Connecticut.

11.10 Notices. Any notice or other communication required or permitted hereunder shall be in writing, and shall be deemed to have been given if placed in the United States Mail, registered or certified, postage prepaid, addressed as follows:

If to UCC or Umetco, addressed to such corporation as follows:

39 Old Ridgebury Road
Danbury, Connecticut 06817
Attention: President
Umetco Minerals Corporation

If to Buyer:

Strategic Minerals Corporation
30 Main Street
Danbury, Connecticut 06810
Attention: Mr. William G. Beattie, President

with a copy to:

Gager, Henry & Narkis
30 Main Street
Danbury, Connecticut 06810
Attention: Mr. David R. Chipman

Each of the foregoing shall be entitled to specify a different address by giving notice as aforesaid to the others.

11.11 Disputes. Any dispute that the parties are unable to resolve may be submitted to any court having jurisdiction over such dispute.

UCCNHT0001572

11.12 Bulk Sales Law. Without admitting that the Bulk Sales Law of any State or Commonwealth is applicable to the transactions contemplated hereby, it is understood and agreed that the parties will not comply with the Bulk Sales Law of any State or Commonwealth, and UCC and Umetco shall jointly and severally indemnify and defend Buyer, USV and UST, and hold them harmless, from and against any and all liability, other than Assumed Liabilities, arising by reason of such noncompliance.

11.13 Additional UCC Rights. For so long as at least $5,000,000, in principal or face or par value, of the Notes and Preferred Stock issued to UCC or Umetco, as part of the consideration described in Exhibit B, is held by UCC or Umetco, UCC shall be entitled (a) to designate, and from time to time to redesignate, an employee of UCC or Umetco as a member of Buyer's Board of Directors, and Buyer shall take whatever action which may from time to time be necessary to implement that arrangement, (b) to have reasonable access to the books and records of Buyer, USV, UST and Vametco, for the purpose of determining compliance with the terms of such Notes and Preferred Stock and (c) to receive copies of reports required by loan agreements to be provided by Buyer, USV, UST and Vametco to any of their lenders.

11.14 UCC Obligation to Loan to UST. Upon the written request of UST made prior to payment in full of the UST Adjustable Rate Note, the form of which is attached as Schedule B-5 to Exhibit B, UCC shall lend up to $1,000,000 to UST, represented by

UCCNHT0001573

a note of UST (a) requiring current payment of interest at 200 basis points in excess of the "base rate" from time to time (while the note is outstanding) offered by Manufacturers Hanover Trust Company of New York (or its successor), (b) requiring payment in full within three years following date of issue and (c) secured by a first priority security interest in the accounts receivable of UST.

11.15 Employee Relations and Benefit Plans.

(a) Employee Relations. Exhibit S sets forth (by title and date) all collective bargaining agreements with labor unions or associations representing employees connected with the Business. USV and UST as appropriate, shall assume all such collective bargaining agreements (as renegotiated prior to, and effective upon, closing). Except as set forth on Exhibit S hereto, Umetco has not made any commitment or agreement to increase the wages or to modify the conditions or terms of employment of any employee of Umetco who are employed in connection with the Business.

(b) Employee Benefits. At Closing, those Umetco employees employed in connection with the Business, who are not involved with other businesses of Umetco or UCC (hereinafter referred to as the "Employees"), shall be employed by Buyer, USV or UST, as appropriate (individually, the "New Employer"), at the same wage rates (except those wage rates which have been renegotiated by Buyer) and with benefits provided under Buyer's benefit

UCCNHT0001574

plans listed in Exhibit S. With respect to Employees employed by it, each New Employer shall (i) maintain such benefits for such Employees for at least three years from and after the Closing Date, (ii) accept and credit to all such Employees, for all purposes under all benefit plans, all previous service with Umetco or UCC, and (iii) credit and assume responsibility for all current year, vested, or carried forward vacation accrued by such Employees under Umetco's vacation plan but not taken as of the Closing Date. All Employees who have previously elected UCC's "VSP option" will receive the full benefits thereof, including 1985 and 1986 accrued vacation benefits, and lay off allowances, at Umetco's cost. The following provisions shall pertain to UCC's qualified pension plans, viz., The Retirement Program Plan for Employees of Union Carbide Corporation and its participating Subsidiary Companies ("Pension Plan"), the Savings Plan for Employees of Union Carbide Corporation and Participating Subsidiary Companies ("Savings Plan") and the 401(k) Opportunity Plan for Salaried Employees of Union Carbide Corporation and the 401(k) Opportunity Plan for Hourly Employees of Union Carbide Corporation (collectively "401(k) Plan"):

(i) Pension Plan. Buyer shall accept and credit as to each Employee all previous service creditable under the Pension Plan. No transfer of assets from UCC's pension fund to Buyer's pension fund shall be made with respect to the Employees. Upon any Employee's retirement from employment with a New

UCCNHT0001575

Employer, UCC shall provide to such Employee the benefit to which such Employee is entitled under the Pension Plan as of the Closing Date based on earnings and service credit with UCC or Umetco, provided that, only for purposes of determining whether such Employee is vested under the Pension Plan, UCC shall credit all Employees having at least one year of service credit with UCC or Umetco as of the Closing Date with all employment service with Buyer recognized by Buyer's pension plan and accumulated after the Closing Date. Buyer may reduce the benefit payable to such Employee under Buyer's pension plan by the amount paid to such Employee under UCC's Pension Plan. UCC shall have the right to suspend payment of benefits under the Pension Plan to any Employee, or to any person who was an employee of UCC or Umetco at any time during the twelve month period immediately preceding the Closing Date ("Former Employees"), for any period during which such Employee or Former Employee is or was either an employee of the Buyer or, unless otherwise agreed to in writing by UCC, an independent contractor or consultant performing duties for Buyer on a substantially full-time basis. UCC has consented to independent contractor agreements with Harold A. Spratt, R.G. Charland, D.J. Ippolito, and G.L. Schierman. Buyer shall notify Seller within 10 days of Buyer's employment, as employee or independent contractor, of any person who was a Former Employee, or reemployment of any Employee whose employment with Buyer terminates after the Closing Date.

UCCNHT0001576

(ii) 401(k) Plan. Funds held by UCC in UCC's 401(k) Plan on behalf of Employees will be transferred, at fair market value determined in accordance with the terms of said Plan, as soon as practicable after the Closing Date to the trustees of Buyer's new 401(k) Plan.

(iii) Savings Plan. Funds held by UCC in UCC's Savings Plan on behalf of Employees will be transferred, at fair market value determined in accordance with the terms of said Plan, as soon as practicable after the Closing Date to the trustees of Buyer's new qualified savings plan.

(c) For purposes of Buyer's obligations with respect to Employees under this Section 11.15, Former Employees shall be deemed to be Employees as of the first date of employment with Buyer.

(d) Employee Health Records. Employees' x-rays which have been transferred to Buyer, USV or UST, as the case may be, will be returned to Ometco promptly following the taking of a new chest x-ray for each of the Employees, but in no event later than the fifth anniversary date of the Closing.

11.16 Vametco Pension Fund.

(a) Maintenance of Benefits. Effective upon Closing, Buyer shall cause Vametco to establish a registered plan (referred to in the remainder of this Section 11.16 as the "Vametco Plan") which provides benefits substantially equivalent to those currently provided to Vametco's employees under the Union Carbide

UCCNHT0001577

South Africa and Associated Companies Pension and Life Insurance Fund (referred to in the remainder of Section 11.16 as the "Pension Plan") as of Closing. Buyer will cause Vametco to agree to maintain such benefits for a period of at least three years from Closing.

(b) Assumption of Liability by Vametco.

(i) Buyer shall cause Vametco to assume responsibility for making or causing to be made all payments due to Vametco employees on and after Closing which have accrued or are payable under the Pension Plan as of Closing.

(ii) For all purposes under the Pension Plan and the Vametco Plan, Buyer shall cause Vametco to agree to credit Vametco employees with all service prior to Closing which is recognized for such purposes under the Pension Plan.

(iii) Buyer shall cause Vametco to assume responsibility for making all payments due on and after Closing to retired and other individuals formerly employed by Vametco who as of Closing are not Vametco employees, which are payable under the terms of the Pension Plan as of Closing. Notwithstanding anything to the contrary in this Agreement (including but not limited to the three-year period Buyer agrees to maintain substantially equivalent benefits pursuant to paragraph (a) above), Buyer agrees to cause Vametco to continue any payments pursuant to this subparagraph (b)(iii) for the full period of time specified by the Pension Plan as of Closing.

UCCNHT0001578

(iv) Buyer shall cause Vametco to assume responsibility for making all payments due on or after Closing to retired and other individuals formerly employed by Vametco who as of Closing are not Vametco employees, which are payable under ex-gratia promises made by the trustees of the Pension Plan prior to Closing. Notwithstanding anything to the contrary in this Agreement (including but not limited to the three-year period Buyer agrees to maintain substantially equivalent benefits pursuant to paragraph (a) above), Buyer agrees to cause Vametco to continue any payments pursuant to this subparagraph (b)(iv) for the full period of time specified in the promises made by the trustess of the Pension Plan as of Closing.

(c) Transfer of Funds.

(i) UCC will transfer or cause to be transferred from the trust fund of the Pension Plan (referred to in the remainder of this paragraph (c) as the "Pension Fund") to the trust fund of the Vametco Plan (referred to in the remainder of this paragraph (c) as the "Vametco Fund") an amount equal to the liability attributable to accrued benefits as of Closing (based on service and compensation prior to Closing as determined on an ongoing plan basis, with future salary increases but without future benefit service accruals, by an actuary appointed by UCC and to which Buyer has no reasonable objection), which is assumed by Vametco pursuant to subparagraphs (b)(i), (ii) or (iii) above. Such transfer shall be made either at market value as of the date

UCCNHT0001579

of transfer or through transfer of in-kind assets, at UCC's discretion. The transfer shall be made as soon as practicable after Closing.

11.17 Vametco Tax Provisions.

(a) Representations. All Federal, state, local and foreign income tax, sale and use tax, property tax, franchise tax, and employment tax (including social security) returns required to be filed by or on behalf of Vametco have been properly filed in the manner and within the time, taking into account any filing date extension, prescribed by law, and all taxes shown thereby to be due and payable have been paid or accrued. The accrual for taxes in the balance sheet of Vametco as of the Effective Date will be sufficient for all unpaid state, local and foreign income taxes and other taxes, whether or not disputed, in respect of the business and operations of Vametco for the period then ended and all prior periods.

(b) Federal Income Taxes. Vametco was included in the consolidated Federal income tax return of the affiliated group of which UCC is the common parent for all periods during which the stock of Vametco has been owned by any member of such group, and UCC shall include the results of operations of Vametco through the Effective Date in such return.

(c) State, Local, and Foreign Income Taxes. Buyer shall cause Vametco to include the results of its operations through the Effective Date in any state, local, or foreign income

UCCNHT0001580

tax returns required to be filed by Vametco for any taxable year beginning before and ending on or after the Effective Date.

(d) Allocation of Tax Liability. All liabilities of Vametco arising under Federal income tax laws for periods prior to and including the Effective Date, including liabilities for interest and penalties, shall be borne by UCC, regardless of whether such liabilities are attributable to items of income, deduction, or credit of Vametco, and any refunds or credits or rights to refunds or credits with respect thereto (including interest and penalties) shall be the property of UCC. All state, local and foreign tax liabilities attributable to Vametco or its properties, assets, operations, purchases, sales, income, capital stock, or surplus for periods ending on or after the Effective Date shall be borne by Buyer, and any state, local, and foreign refunds or credits attributable to the operations of Vametco and received after the Effective Date (whether or not such refund is for periods prior to the Effective Date) shall be the property of Buyer.

(e) Post-Closing Taxes. All taxes attributable to Vametco or its properties, assets, operations, capital stock, or surplus incurred after the Effective Date shall be the responsibility of Vametco or Buyer.

(f) Reimbursement. If either party pays, or causes to be paid, any taxes to be borne by the other party under this section, the other party shall promptly reimburse such party

UCCNHT0001581

for the taxes paid. If either party receives any refunds or credits which are the property of the other party under this section, such party shall promptly pay the amount of such refunds or credits to the other party.

(g) No Liquidation or Deemed Liquidation Liability. Notwithstanding anything herein contained to the contrary, Buyer shall bear all tax liability (and UCC shall not have any liability) resulting from any election by Buyer under Section 338 of the Internal Revenue Code of 1954, as amended ("Code"), or any similar provision of state law, including any transaction which for state tax law purposes shall be treated as a liquidation of Vametco by Buyer or its successors and assigns.

(h) Certain Reporting Matters and Information. In order to comply with the requirements of Treasury Regulation section 1.1502-76(b), Vametco will close its books as of the Effective Date. All items of income, deduction, or credit appearing on such books will be reported by UCC on its consolidated Federal income tax return for the calendar year beginning January 1, 1986, and all items of income, deduction, or credit appearing on the books of Vametco for the period after the Effective Date shall be reported on the consolidated Federal income tax return of Buyer. UCC and Buyer will cooperate regarding the closing of the books and the proper reporting of items on their respective Federal income tax returns.

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(i) Carryback of Tax Items. (1) If, after the Effective Date, Vametco recognizes a loss or becomes entitled to a credit which may be carried back to a taxable year of Vametco during which Vametco was included in UCC's consolidated Federal income tax return (without regard to whether Vametco could have elected to relinquish the carryback, and without regard to the fact that the recognition of all or any portion of the loss or credit is within the control of Vametco), Vametco or Buyer shall have the right to file for a tentative carryback adjustment pursuant to Section 6411 of the Code with the cooperation of UCC under the condition stated in this paragraph. Vametco or Buyer shall prepare and file such application with the cooperation of UCC; provided, however, that no such application shall be filed if the tentative carryback adjustment will increase UCC's consolidated Federal income tax liability in an amount equal to or greater than the tentative carryback adjustment in the year to which the loss or credit is carried back. If the tentative carryback adjustment is greater than the increase in UCC's consolidated Federal income tax liability in such year, Vametco or Buyer may file such application, and UCC shall pay to Buyer within 10 days after receipt of the tentative carryback adjustment or its crediting against the tax liability of any member of the UCC affiliated group, the amount of such tentative carryback adjustment less any increase in UCC's Federal income tax liability for the year to which such carryback adjustment applies, including,

UCCNHT0001583

but not limited to, (a) an increase in the minimum tax, and (b) the inability of use in such year any tax credits.

(ii) If the Internal Revenue Service (after the allowance of such application) adjusts any item carried back, an appropriate adjustment consistent with the computation under subparagraph (1) shall be made to the payment due or made to Buyer by UCC, and Buyer shall refund to UCC an appropriate portion of any payment previously made by UCC pursuant to subparagraph (1). A similar adjustment shall be made in the event UCC could have obtained a refund for the taxable year by carrying back tax items of UCC or other members of its affiliated group where such carryback items arise subsequent to those carried back by Vametco.

(iii) Notwithstanding anything foregoing to the contrary, Buyer will indemnify and hold UCC harmless for any UCC consolidated Federal income tax liability incurred as a result of the filing of the application for tentative carryback adjustment in subparagraph (1) and not deducted from the amount paid to Union Carbide pursuant thereto.

11.18 Note Exchange Rights. Upon the request and at the expense of Umetco, Buyer will cooperate with Umetco in the restatement of Buyer's Series A and Series B Notes, including the transfer of any of the provisions thereof from the Notes to a note agreement, and the reissuance of the Notes in smaller denominations, provided the obligations of the Buyer under the Notes remain substantively unchanged.

UCCNHT0001584

IN WITNESS WHEREOF, the parties have caused this Agreement to be entered into and executed in their respective names and their seals to be hereto affixed by their officers thereunto duly authorized, on April 28, 1986 but as of April 23, 1986.

UNION CARBIDE CORPORATION

[Seal]

Attest:

By _____
Attorney-in-Fact

_____
Asst Secretary

UMETCO MINERALS CORPORATION

[Seal]

Attest:

By _____
President

_____
Secretary

STRATEGIC MINERALS CORPORATION

[Seal]

Attest:

By _____
President

_____
Secretary

UCCNHT0001585

7 2.6

Umetco Minerals Corporation

SEP 8 1986

PO BOX 66 137 47th STREET • NIAGARA FALLS, NEW YORK 14302

September 4, 1986

Mr. Lawrence E. Barron
Associate Director SHEA
Union Carbide Corporation
Linde Division (R4674)
39 Old Ridgebury Road
Danbury, CT 06817-0001

Subject: Niagara Falls Environmental Issues
Filling in Pond Area between Stratcor & L-Tec

Dear Larry:

On July 18, 1986 I discussed with you by phone the disposal of a clay cap that had been used as temporary fill over an area within Elkem's boundary that had been excavated to remove radioactive soil. I proposed using the clay to partially fill the drained pond between Stratcor and L-Tec (Lake Linde). Before proceeding with the plan I had Advanced Environmental Systems obtain a composite sample of the clay cap and run analyses for the EP Toxicity Metals. I then submitted the sample to Mr. William Smith of the Linde Division R & D Analytical Services, Tonawanda, NY for radio-assays. As expected, the clay material was essentially void of leachable toxic metals and had radioactivity barely above background.

I had Dube Construction Company include this material in that used to level and fill the pond area.

Copies of the reports of analyses by Advance Environmental Systems and Linde Analytical Services are enclosed for your records.

Regards,

Donald J. Hansen

/mau
Enclosures

cc: Messrs:
J. F. Frost
V. L. Gustavson
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller
C. T. Wentzel

UCCNHT0001586

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

To (Name) Mr. J. F. Frost
Division Umetco Minerals Corporation
Location Grand Junction, CO
Area

Copy to

Date July 1, 1986
Originating Dept. TECHNOLOGY
Area
Answering Letter Date
Subject Divestiture - Niagara Site

JUL 7 1986

Enclosed please find a copy of Dick Crago's letter that I promised to send to you during our phone conversation of June 30.

D. J. Hansen

mau/
Enclosure

UCCNHT0001587

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

July 1, 1986

JUL 7 1986

Mr. George Parker
Strategic Minerals Corporation
P. O. Box 66
Niagara Falls, NY 11402

Subject: Niagara Environmental

Dear George·

In a meeting in my office, July 1, 1986 we discussed the issues that you were handling that are contained in the Environmental Agreement between Stratcor and Umetco.

I explained that it is my responsibility, acting for Umetco, to see that these jobs are completed quickly, economically, and in a manner acceptable to both parties. Specific items discussed were

1. Completion of Halide Scrubber

The venturi scrubber has been installed and first tests indicate it is working satisfactory. However when cleaning out heels, fumes are still escaping - the trough will have to be enclosed and perhaps hooded. You agreed to get together with Ron Sullivan and Peter Sherman to propose corrective action. You will furnish me with a timetable to complete the job and a cost estimate.

2. Disposal of "Super Sucker Dust

You had samples from six piles of "Super Sucker" dust analyzed. With the exception of two samples that analyzed 6.69 and 15.0 mg/L barium (maximum allowable is 100.0 mg/L) the other fourty-six (46) analyses were below detectable limits for the eight (8) EP toxic metals. Don Millenbruch, in his letter of May 12, 1986 to you suggested that since this material is non-hazardous it should be removed to a suitable landfill. While you were on vacation SCA quoted on removal for a cost of $179/ton provided we supply the front end loading equipment. This would amount to several thousands of dollars. They are treating the material as if it were hazardous and I feel this will set a precedent. If we can not transport this to a local dump without all the red tape and further analyses you suggest I would be in favor of using the material to fill in and level "Lake Linde". You will get back to me after conferring with Rich Miller.

UCCNHT0001588

3. Disposal of Sample Cans

You informed me that more than one half of the cans have been disposed of through B.F.T. You are proceeding to identify the contents of the remaining cans and will provide me with an estimate of the additional time you require. If this looks like it is going to take too long due to priorities in other areas I will arrange to have the job completed. I would appreciate you supplying me with the quantity of samples disposed of to date together with costs.

In addition to the above items which were addressed in the Environmental Agreement two others were brought to your attention

4. Radioactive Sources

Last week I was informed that the plant had a radioactive source that was used in the past to calibrate the X-ray equipment in the Vanadium Aluminum Department. This source is not licensed and should be disposed of. You will provide me with the history of this source, if possible, and I will begin the paperwork to have it disposed of.

5. Radioactive License No. 955-0139

This license, for a cesium source that you returned last August, is still in the name of Umetco. If you will turn over the files to me I will continue to press for termination along with the other two licenses that I am currently involved with.

D. J. Hansen

/mau

CC Messrs
J. F. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. C. Miller
C. T. Wentzel

UCCNHT0001589

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

JUL 7 1986

To (Name) Mr. F. V. McMillen
Division Umetco Minerals Corporation
Location Danbury, CT
Area

Date July 2, 1986
Originating Dept TECHNOLOGY
Area
Answering Letter Date

Subject Environmental at Niagara

Copy to
Messrs:
~~J. F. Frost~~
T. J. Kagetsu
D. G. Millenbruch

On Wednesday, June 25, 1986, Jack Kagetsu and I met with Don Millenbruch to bring him up-to-date on the environmental and other issues in which we are involved. This letter is intended to give you the status of the activities at Niagara Falls; Jack Kagetsu will report on the other locations.

I am enclosing the "hand-out" that was used as the basis of our discussion. It contains both the status summary and proposed action. In addition, I am enclosing Schedule A which lists those items addressed in the "Environmental Agreement (Niagara Falls)" between Stratcor and Umetco which was also used in our discussion with Don.

The following comments pertain to decisions made at the meeting and to information received since June 25.

1. I have received the Transportation Permit Number from the South Carolina Department of Health and Environmental Control. I can now proceed to make arrangements for disposing of the radioactive material through Chem Nuclear.

2. Disposal of the "Super Sucker" dust was discussed. It appeared that Stratcor, by asking SCA to bid on the disposal, was treating the material as a hazardous waste. This would cost us more for disposal. I have sent you a copy of a letter to George Parker that addresses this and other items.

3. Since the 25th we have received the second bid to remove the asbestos from the Niagara Plant. This bid was for $88,000 (Frontier Insulation Contractors) compared to the $49,700 (Niagara Insulations). Unfortunately neither bid included the approximately 900 feet of 8-inch steam line which is supported on a rack which carries the pipe from Niacet to where it enters the ground. Rebids have been requested.

UCCNHT0001590

4. Don Millenbruch said that a cash flow analysis would not justify removal of the boilers from the building on Niacet property. Therefore it was decided to only arrange for dismantling of the two stacks. Because one of the guy wires is broken it was suggested that we proceed with this at once.

5. Craig Wentzel and I have discussed filling in the pond east of No. 6 Furnace Room (Linde Lake) . We have not agreed to a satisfactory plan at this time.

6. It was decided that as each item is completed I would draft a letter to Stratcor (or Elkem) which they would sign signifying the work was completed to their satisfaction. These letters would be included in the appropriate files.

I will keep you posted on the progress of the various items.

D. J. Hansen

mau/
Enclosures

UCCNHT0001591

June 25, 1986

STATUS OF ENVIRONMENTAL, RECLAMATION AND TECHNICAL PROBLEMS AT THE NIAGARA FALLS FACILITY

D. J. Hansen

1.0 TERMINATION OF RADIOACTIVE LICENSE

1.1 License 210-0090 (Technology) Radioactive Sources

Status: All radioactive sources, Thorium chemicals and crucibles, have been disposed of. Letter to New York State Department of Labor, with accompanying documentation, requesting termination of the license were mailed to Dr. Kasyk on February 7, 1986. Robert Kelly visited the site and took wipe tests on February 28, 1986.

Action: Inform Elkem Metals of wipe test results when available.

1.2 License 950-0139 (Plant) Processing Columbite Ores

Status: Contaminated soil south of Building 166 on the Technology Complex was sent to Barnwell, SC and Uravan, CO. - Letter documenting receipt of material and requesting termination was mailed to Robert Kelly on August 17, 1985. A second request for termination was made to Dr. Bradley on January 31, 1986. Robert Kelly attempted to obtain confirmation samples on February 28, 1986 but was unsuccessful due to the ground being frozen. He returned on March 20, 1986 and successfully obtained samples of the area.

Action: When State completes analysis of the samples we will be able to proceed with reclamation of the area (see Elkem below). However the license may not be terminated until additional radioactive waste is disposed of (see radioactive waste below.)

1.3 License 955-0139 (Plant) Radioactive Sources

Status: Cs source for Bin Level indicator was returned to the manufacturer in 1st half of 1985 by George Parker. State was notified.

Action License still in Umetco's name. Should request a wipe test be completed to assure termination of License. (Note Stratcor still has a source to calibrate VAl X-ray unit).

UCCNHT0001592

2.0 RECLAIM ELKEM PROPERTY

Status. R. J. Klotzbach wrote a letter to John Oxaal on August 6, 1984 agreeing to re-excavate areas behind Building 166, install permeable liner, and backfill with gravel.

Action: When State gives the okay to allow unrestricted use of the area the above work should be contracted and completed. A letter should be written to Elkem indicating our intentions.

3.0 REMOVE LOW LEVEL RADIOACTIVE WASTE FROM NIAGARA SITE

3.1 VAl Slag - East of No. 6 Furnace Room

Status: 75.5 tons of material was sent to the SCA Hazardous Waste Disposal Site on June 18, 1986 at a cost of $179/ton = $13,500.

Action: (a) Letter to NY State Department of Labor with documentation.
(b) Later in the year the NY State Hazardous Waste Tax must be paid.

3.2 Radioactive Illmenite

Status· One hundred thirty (130) 55-gallon drums of illmenite was sent to SCA on June 19 and 20, 1986 at a cost of $14,200.

Action. (a) Letter to NY State Department of Labor with documentation.
(b) Later in the year the NY State Hazardous Waste Tax must be paid.

3.3 Slag and Soil from No. 30 Furnace plus Radioactive Samples

Status. A check for $500 along with a Proof of Liability was sent to the State of South Carolina to obtain a Transportation Permit. Paper work was initiated to alter the UCC Contract with Chem Nuclear Systems Inc. to enable them to act as brokers for this work.

Action· After the Transportation Permit is obtained, arrange for Chem Nuclear to send a Broker to Niagara Falls (probably mid-August) to prepare the material for transport to Barnwell. Forward documentation of receipt of the material to the New York State Department of Labor.

UCCNHT0001593

4.0 ESTABLISH BASELINE ENVIRONMENTAL CONDITION OF YARD - EAST AND NORTH OF THE NIAGARA PLANT

4.1 Radiation Survey

Status Memo issued May 15, 1986.

Action None required.

4.2 Soil Sample Analysis

Status Nine composite soil samples were analyzed for EP Toxicity, 13 Priority Pollutants, and PCB's. A memo was issued June 15, 1986.

Action. None required.

4.3 Lake "Linde"

Status: Water samples were analyzed. V. L. Gustavson was informed in a letter dated April 23, 1986 that the quality was okay. Samples of silt from the lake bed showed no pollution (memo June 15, 1986).

Action. L-Tec has begun to grade the area with fill from higher ground. Arrangements must be made to drain the section on Umetco property and to grade in conjunction with L-Tec.

5.0 ASBESTOS REMOVAL

Areas include Elevator Shaft, Building 111, old Boiler House and Storeroom for asbestos.

Status: Bids have been solicited. Two have responded.

Niagara Insulations - $49,700.
Frontier - Pending

Action: Arrange and supervise removal by low bidder.

6.0 REMOVAL OF STACKS AND BOILERS FROM NIACET

Status Quote from Niagara Insulations to remove and scrap two boiler stacks was $1,400.

Quotation on boiler removal is pending.

Action: To arrange and supervise removal. (Note: One guy wire has snapped and the removal of the stack should proceed immediately.)

UCCNHT0001594

7.0 SURPLUS EQUIPMENT

7.1 Laboratory Equipment and Office Equipment

Status Equipment and office supplies stored in Building 111 and the garage was let for bids on "take all, as is, where is" basis. J. Mercer of Buffalo agreed to $10,000 for equipment but dropped to $3000 after learning that the high bidder had withdrawn. Investment Recovery decided not to accept.

Action Continue to cooperate with Investment Recovery.

7.2 Surplus Automobiles

Status Requested forms from Investment Recovery.

8.0 PATENTS

Status: Transfer of patents to Stratcor is completed. Patent Applications on Roasting and Heap Leaching of UCAR Vanadium Ore have been written and submitted.

Action: Prepare final draft of Patent Application on "Burning Flexicoke" in conjunction with N. Balmer in early July. Answer objections from Patent Examiner on above and recent application by D. O. Skiles.

9.0 FILES

9.1 Technology Technical Files

Status Personal files (Niagara and Grand Junction) and Marketing and Sales Development departmental files have been combined according to topic.

The uranium section has been incorporated into the Niagara Falls Technology files and is boxed for shipment to Grand Junction.

Action Gold and silver will be completed and boxed by July 15. Vanadium and tungsten require considerable work.

9.2 Active Files

Status. Files on environmental and radioactive licenses are still on-going.

Action· Files must be maintained until license termination and then should be transferred to J. Frost at Grand Junction.

UCCNHT0001595

Schedule A

Niagara Falls, New York

Description of the Work

Work to be Done	Estimated Cost M$	Estimated Completion Date
A. Replace, retrofill or dispose of PCB containing transformers, capacitors and dispose of cleanup materials.	200-250	8/86
B. Complete halide scrubber.	100	8/86
C. Dispose of chrome oxide Completed!	8-10	6/86
D. Remove globar elevator asbestos.	12-15	8/86
E. Dispose of hi antimony tungsten. Completed	15-25	10/86
F. Dispose of sample cans	15-25	10/86
G. Sample, test and dispose of, if necessary, supersucker dust.	5-75	10/86
H. Yard area sampling and cleanup, if necessary. Completed	25- ? (big)	3/87
I. Drain and fill Lake Linde	25-50	12/86
J. Clean up radioactive areas of plant.	25-50	8/86

Clean Up Complete
Disposal of Radioactive material pending

UCCNHT0001596

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

SEP 12 1986

To (Name) Mr. F. V. McMillen
Umetco Minerals Corporation
Division Danbury, CT

Date September 9, 1986

Originating Dept

Location

Area

Area

Answering Letter Date

Subject Environmental Issues
Niagara Falls, NY

Copy to Messrs.
J. F. Frost
T. J. Kagetsu
D. G. Millenbruch

Dear Frank.

The environmental issues at Niagara are proceeding to a satisfactory conclusion pretty much on schedule. The following are the highlights of the past month.

1. The Department of Labor has finally cancelled all our radioactive material licenses. They apparently did not connect the radioactive slag awaiting transportation to Barnwell with any of the licenses. However I will notify them with documentation when it leaves the property and is received in South Carolina.

2. The reclamation of the area behind Building 166 on Elkem property has been completed. I received a signed acceptance from Elkem yesterday. This has been sent to you under separate cover. I am enclosing a couple of Polaroid snapshots of the completed job.

3. "Lake Linde" has been filled in. Part of the material came from the clay cap from the Elkem reclamation. Some low areas remain on the L-Tec property which they (L-Tec) should remedy.

4. Asbestos has been removed from the boiler room and the pipe racks at Niacet. The elevator shaft in "Globar" is a little more difficult than anticipated. However they still predict completion before the end of the month.

5. I was misled on the number of samples in quart cans requiring disposal. Rather than 300, the number is closer to 1200 and no mention was made of approximately 600 or more samples in bottles. Unfortunately a number of the samples are unidentified which may require qualitative analyses. However I still expect the job will be completed by the end of September.

I am also enclosing an up-date of my work summarizing the status of all the environmental issues.

Regards,

Donald J. Hansen

/mau
Enclosures

UCCNHT0001597

9/9/86

PROJECT	STATUS	ACTION	COMPLETION DATE Est.	COMPLETION DATE Actual	BUDGET Est. $/M	BUDGET Actual $/M
1.0 Halide Scrubber						
1.1 Install Venturi Scrubber	1.1 Complete					
1.2 Install Trough to collect heels from returned cylinders	1.2 Complete					
1.3 Enclose trough and install a fume collection system	1.3 Proposed modifications submitted to H. Wilber by R. Sullivan 9/2/86.	1.3 Scrufari Construction to begin modifications.	9/30/86 (old) 11/30/86 (new)		100 (old) 118 (new)	
2.0 Asbestos Removal						
Elevator shaft, Bldg. 111, storage room, boiler rooms (Niacet), six (6) pipes running 800' on pipe rack.	Asbestos removed from Niacet Boiler Room and pipe racks. Elevator shaft in progress.	Continue to follow.	9/30/86		90 (old) 61.8 (new)	
3.0 Sample Cans						
Approximately ~~300~~ 1200 one quart cans containing different alloys, slags, and ores to be classified as toxic or non-toxic and disposed of.	Progress on schedule.	Contact SCA and Modern Disposal to arrange for burial of toxic and non-toxic materials.	9/30/86		10	

UCCNHT0001598

PROJECT	STATUS	ACTION	COMPLETION DATE Est.	COMPLETION DATE Actual	BUDGET Est. $/M	BUDGET Actua $/M
4.0 Supersucker Dust						
Dust collected from rafters of plant in commercial vacuum cleaner and dumped in piles throughout yard area.	Complete Disposed of through Modern Disposal on 7/11/86.	Complete	7/11/86		1.5	
5.0 Fill in Lake						
Low area east of No. 5 Fce. Room collected rainfall and discharge from L-Tec Plant. Drain and level.	Complete	Complete	7/25/86	8/22/86	2.5	6.4
6.0 Remove Radioactive Waste						
Slag and contaminated soil from No. 30 Furnace (twenty 55-gallon drums). Radioactive samples.	UCC Purchasing in Danbury is writing a new National Contract with Chem Nuclear. No problems but may delay removal by a week or so.	Work with broker from Chem Nuclear.	9/30/96		12.5	

UCCNHT0001599

PROJECT	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est. $/M	Actua $/M
7.0 Remove Radioactive Source						
Previously used to calibrate X-ray equipment in VA1.	Found that source is Cs137 and only 5μCi, Does not require license.	None required.				
8.0 Reclaim Elkem Property						
Hold over from "Tiger" project. UCC agreed to remove clay and backfill when State released property for unrestricted use.	Complete	Complete		8/15/86		18.3
9.0 Terminate Licenses						
9.1 210-0090						
Technology sources.	Complete Letter received from Department of Labor cancelling license 8/15/86.	Complete		8/15/86		

UCCNHT0001600

PROJECT	STATUS	ACTION	COMPLETION DATE Est.	COMPLETION DATE Actual	BUDGET Est. $/M	BUDGET Actua $/M
9.0 Terminate Licenses (cont'd)						
9.2 950-0139						
Processing Columbium Ores.	Complete Letter received from Department of Labor cancelling license 8/15/86.	Complete		8/15/86		
9.3 955-0139						
Plant Sources.	Complete Letter received from Department of Labor cancelling license 9/4/85.	Complete		9/4/85		
10.0 Patents						
Finish filings. Respond to Patent Examiners.	Responded to Stratcor Attorney on objection of Polish Patent Application for addition of V_2O_3.	Complete	7/31/86	9/5/86		

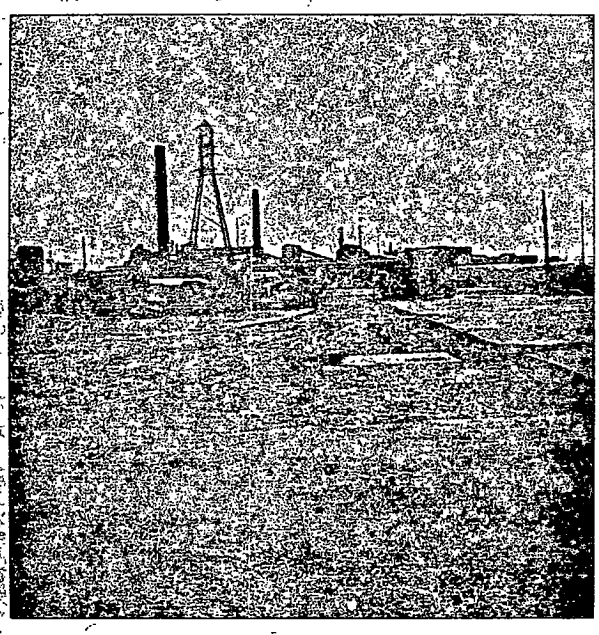
UCCNHT0001601

PROJECT	STATUS	ACTION	COMPLETION DATE Est.	COMPLETION DATE Actual	BUDGET Est. $/M	BUDGET Actua $/M
11.0 Files						
11.1 Uranium to Gr. Jct.	Complete Shipped nineteen (19) boxes on 8/14/86.	Complete		8/14/86		
11.2 V & W Files	Worked on "as time permits basis"		8/31/86 (old) 9/30/86 (new)			
11.3 Active Files to Gr.Jct.	Spoke to J. Frost on 7/1/86. He plans to visit Niagara Falls to discuss.	None required.				
12.0 Surplus Equipment	No action from Investment Recovery. I have been selling some non-capital items and sending checks to Grand Junction.					

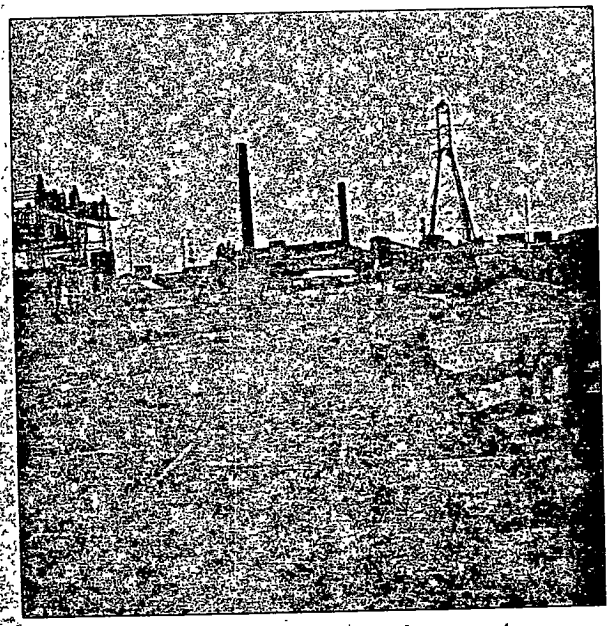
UCCNHT0001602

PROJECT	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est. $/M	Actual $/M
13.0 Remove Stacks						
Two stacks at old Boiler Room in Niacat.	Complete	Complete		7/24/86	2.3	4.4

UCCNHT0001603



8/18/86 Back Fill with Crushed Stone Completed - Looking South - West Area EIKEM PROPERTY



8/18/86 Back Fill with Crushed Stone Completed Looking South - East Area EIKEM PROPERTY

UCCNHT0001604

Umetco Minerals Corporation

INTERNAL CORRESPONDENCE

137 47TH STREET PO BOX 66 • NIAGARA FALLS NEW YORK 14302

To (Name) Mr F V McMillen
Umetco Minerals Corporation
Division Danbury, CT 06817

Location

Area

Copy to Messrs ~~J E Frost~~
T J Kagetsu
D G Millenbruch

Date July 21, 1986

Originating Dept

Area

JUL 23 1986

Answering Letter Date

Subject Environmental Issues
Niagara Falls, NY

Dear Frank

A number of environmental issues at Niagara Falls are coming to a head and I thought that it was time I brought you up-to-date

1 The disposal of the "Supersucker" dust that was piled on the east side of No 6 Furnace Room has been completed

2 Dube Construction Company is currently filling in the low lying area referred to as "Lake Linde"

3 The stacks on the boiler house on Niacet property are scheduled to be removed by Scrufari Construction Company tomorrow, July 22

4 The soil samples taken by Bob Kelly in March from the Elkem property located along side of Building 166 showed no evidence of radionuclides The restoration of the property is scheduled to begin July 28

5 The radioactive slag and samples are scheduled to be transporated to Barnwell, SC the second week of September

6 The bids on the removal of asbestos have been extended for one week to allow for the additional material on the Niacet pipe rack

I am enclosing a copy of my worksheet which summarizes the status of the above and the remaining environmental issues

I am planning to be on vacation the last three weeks of August and expect that by that time the workload will be reduced substantially Beginning in September, I would expect that my time should be minimal

Regards,

D J Hansen

DJH/dv
Enclosures

UCCNHT0001605

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
1.0 Halide Scrubber 1 1 Install Venturi Scrubber 1 2 Install trough to collect heels from returned cylinders 1 3 Enclose trough and install a fume collection system	1 1 Complete 1 2 Complete 1 3 Discussed with R Miller on 7/9/86.	1 3 Peter Sherman in conjunction with Ron Sullivan to complete design	9/30/86		100	67.7
2.0 Asbestos Removal Elevator shaft, Bldg 111, storage room, boiler rooms (Niacet), six (6) pipes running 800' on pipe rack	Bids to be closed out on 7/18/86	Contract to be let. EPA to be notified.	9/30/86		90	
3.0 Sample Cans Approximately 300 one quart cans containing different alloys, slags, and ores to be classified as toxic or non-toxic and disposed of	Discussed with R Miller on 7/9/86 George Parker working on identification	Make composits of toxic & non-toxic samples Sample - Complete EP Tox analyses Arrange for disposal	10/31/86		10	

UCCNHT0001606

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
4.0 Supersucker Dust Dust collected from rafters of plant in commercial vacuum cleaner and dumped in piles throughout yard area.	Disposed of through Modern Disposal on 7/11/86.	Complete		7/11/86	1 5	
5.0 Fill in Lake Low area east of No 6 Furnace room collected rainfall and discharge from L-Tec Plant. Drain and level	Area drained by L-Tech Reclaimation scheme discussed with R. Miller on 7/9/86. Dube Const began work 7/14/86	Finish grading Document with photos	7/25/86		2 5	
6.0 Remove Radioactive Waste Slag and contaminated soil from No. 30 Furnace (twenty 55-gallon drums). Radioactive samples	Have S C. Transportation Permit. UCC Purchasing working with Chem Nuclear to update contract	Complete arrangement with Chem Nuclear for disposal in Barnwell, S.C.	9/30/86			

UCCNHT0001607

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
7.0 Remove Radioactive Source Previously used to calibrate X-ray equipment in VAl.	Found that source is Cs137 and only 5μCi Does not require license.	None required.				
8.0 Reclaim Elkem Property Hold over from "Tiger" project. UCC agreed to remove clay and backfill when State released property for unrestricted use	Phone call from L Cabasino, Dept. of Labor 7/15/86 Samples showed no radionuclides Dube Construction contacted to bid on job.	If quote is satisfactory will arrange with Dube Const to complete job	9/18/86		20	
9.0 Terminate Licenses 9.1 210-0090 Technology sources	Waiting for NY Dept of Labor to act					

UCCNHT0001608

	STATUS	ACTION	COMPLETION DATE		BUDGET	
			Est.	Actual	Est.	Actual
					$/M	$/M
9.0 Terminate Licenses (cont'd)						
9.2 950-0139 Processing Columbium Ores	On hold	When last of radioactive material is removed from property another request for license termination will be made	12/31/86		0	
9.3 955-0139 Plant Sources	George Parker turned over files on 7/3/86 Waiting for NY Dept of Labor to act					
10.0 Patents Finish filings Respond to Patent Examiners.	Completed application on burning Flexicoke with Norm Balmer on 7/8/86.	Respond to Patent Attorney re objection of Patent Examiner to Flexicoke Leaching Patent (J Goddard)	7/31/86		N B.	

UCCNHT0001609

AUG 5 1986

STRATCOR

U S VANADIUM CORPORATION • A SUBSIDIARY OF
STRATEGIC MINERALS CORPORATION
137 47TH STREET NIAGARA FALLS, NEW YORK 14302
TELEPHONE (716) 278 3123

July 30, 1986

Dr. D. J. Hansen
Asst. Director of Technology
Umetco Minerals Corporation
47th Street
Niagara Falls, New York 14303

Dear Don:

Re: Niagara Environment

Mr. Wentzel has requested that I respond to your letter of July 1, 1986, concerning the status of the five projects you noted that I was working on. Specific items covered were:

1. Completion of Halides Scrubber - The scrubber per se is now operational and appears to be working satisfactorily when Cells #3 and #5 are "blown back." However, work still needs to be completed on the tank cleaning station which will, in all probability, involve a hood in some form above the tank when it is cleaned. Our Plant Engineering Department under Mr. Wilber, along with Scrufari, is currently working on this phase of the project. In addition to this, it is currently expected that the cleaning station will have to be enclosed. I would anticipate that, by the end of October, this job will have been completed with total costs not exceeding the $100,000 initially budgeted for the project.

2. Disposal of "Supersucker" Dust - Approximately one week ago, I forwarded to you a memorandum noting that, following examination by myself of the area east of C5F and C6F, I believed that the Supersucker dust we had mutually agreed needed removing had been disposed of.

3. Disposal of Sample Cans - Per our discussions this morning, I have turned over to you a complete listing of all materials with accompanying can numbers currently in the Globar cage. In my opinion, this completes STRATCOR's portion of the can disposal project.

UCCNHT0001610

4. Radioactive Sources - The radioactive source cited in your July 1 letter has been forwarded to you and accepted by you for disposal, along with material found to be radioactive in the Globar cage.

5. Radioactive License No. 955-0139 - All information pertaining to your license, including our request for delicensing of the source, has been turned over to you for follow-up.

Very truly yours,

G. P. Parker

GPP:ew

cc.: J. E. Frost
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller
C. T. Wentzel

UCCNHT0001611

Umetco Minerals Corporation

PO BOX 66 137 47th STREET • NIAGARA FALLS NEW YORK 14302

SEP 8 1986

September 4, 1986

Mr. Lawrence E. Barron
Associate Director SHEA
Union Carbide Corporation
Linde Division (R4674)
39 Old Ridgebury Road
Danbury, CT 06817-0001

Subject. Niagara Falls Environmental Issues
Filling in Pond Area between Stratcor & L-Tec

Dear Larry

On July 18, 1986 I discussed with you by phone the disposal of a clay cap that had been used as temporary fill over an area within Elkem's boundary that had been excavated to remove radioactive soil. I proposed using the clay to partially fill the drained pond between Stratcor and L-Tec (Lake Linde). Before proceeding with the plan I had Advanced Environmental Systems obtain a composite sample of the clay cap and run analyses for the EP Toxicity Metals. I then submitted the sample to Mr. William Smith of the Linde Division R & D Analytical Services, Tonawanda, NY for radio-assays. As expected, the clay material was essentially void of leachable toxic metals and had radioactivity barely above background.

I had Dube Construction Company include this material in that used to level and fill the pond area.

Copies of the reports of analyses by Advance Environmental Systems and Linde Analytical Services are enclosed for your records.

Regards,

Donald J. Hansen

/mau
Enclosures

cc: Messrs
~~D.~~ F. Frost
V. L. Gustavson
T. J. Kagetsu
F. V. McMillen
D. G. Millenbruch
R. L. Miller
C. T. Wentzel

UCCNHT0001612

Umetco Minerals Corporation

APR 18 '86

INTERNAL CORRESPONDENCE

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

xc J. F. Frost

4/21/86 RKJ

To (Name) Mr D G Millenbruch
Umetco Minerals Corporation
Division Danbury, CT

Date April 15, 1986

Originating Dept TECHNOLOGY

Location

Area

Area

Answering Letter Date

Subject Niagara Plant Radioactive Material License 950-0139

Copy to

Messrs.
R G Beverly/R Jones
L G Evans
T J Kagetsu
F. V McMillen
W D Smith

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background

For your convenience, I am appending my letter of March 25, 1986 to Mr R F Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed

In cleaning up the area around No 30 furnace we filled seventeen 55-gallon drums We had Mr. William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanada The activity suggested the cleanup was not complete

The radiation in Building 24 (V-Al) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite This pit seemed endless, we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet In addition, the pit was found to extend beneath the floor of the V-Al operation

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons. Even this amount presents problems in packaging for disposal

UCCNHT0001613

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time The gamma radiation increases from 200 µR/hr at the surface to about 600 µR/hr at a depth of one foot

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses The sample identification and results are reported in the attached Table 1 Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license Section 38 11, 38 29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified, all radioactive material must be shipped to an approved recipient, the premises must be decontaminated and surveyed to show decontamination took place, and the survey must be verified by the State Source material (uranium and thorium) must be reduced to 0 05 percent by weight to meet decontamination (This is 500 ppm or 500 µg/g) For non-source material for which we are not licensed, the levels are specific for each element e g for radium the exempt concentration is 0 1 pico currie per gram

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in µg/g) 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm) Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination Looking at samples from each of the areas

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance We have made no attempt to determine the amount of soil that is contaminated

Slag Pile East of No 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226 The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally) This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag This falls into the category of non-licensed material and possibly we need a ruling on it

Furnace No 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium

Sample 41-1 tells us we have more cleanup to do around the north furnace support This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports

UCCNHT0001614

TABLE 1

RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT

BY: EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

		ANALYSES					
				Thorium			
Sample No.	Description	Ra 226 pCi/g	Uranium µg/g	232 pCi/g	230 pCi/g	228 pCi/g	(229)* (pCi/g)
2446-40-1	Surface Sample - L-Tec Property	14±2	34 7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33 8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No. 6 Furnace Building	4 4±1.1	20 2	16±2	299±7	4 0± 9	17±2
2446-40-4	Light Slag - East of No. 6 Furnace Building	7 0±1 4	18 6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No 24, V-A1	19±2	28.9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No 24, V-A1	31±3	44 3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No. 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No 30 After Cleanup	42±3	68 4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No 30 After Cleanup	43±3	24 9	9 6±1 3 8 5±1 3	6 2±1 1 5 9±1 0	9 5±1 3 9 2±1 3**	

*Th229 (not positively identified)
**Duplicate Analyses

UCCNHT0001615

Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access

Pit in Building No 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium However gamma radiation next to a drum will read 150 µR/hr I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard The pit is still not completely clean with radiation of about 50 µR/hr above the pit and about 150 µR/hr at the surface 9 feet down Background is about 9µR/hr

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation

We are faced with the decision on how to proceed (1)Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc and would be unable to sell the property, (2)Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R F Kelly

Hopefully we can tackle this on your planned visit next week

Sincerely,

D J Hansen

mau/357h
Attachments

UCCNHT0001616

Umetco Minerals Corporation

PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject Termination of Radioactive Materials License 950-0139

Dear Mr Kelly·

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No 950-0139

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonas and I completed a gamma survey of the various buildings and grounds on the Niagara site We found four areas with radiation significantly above background In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed

The location of the radioactivity and the levels of radiation observed are shown in Table I.

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

Date Surveyed	Location	Background	Maximum Reading	Times Background
2/12/86	Bldg. 29 (#6 Fce Rm)	5-10 µR/hr		
	- I-beam south of 30 Fce		200 µR/hr	20
	- Trunion support north of 30 Fce.		420 µR/hr	42
2/18/86	Bldg 24 (V-Al)	8-13 µR/hr.		
	- Area below dust collector		170 µR/hr	15
2/20/86	Yard East of #6 Fce. Rm	8-12 µR/hr		
	- 6' x 6' Areas near slag pile		200 µR/hr	20
2/20/86	Yard East of #6 Fce. Rm			
	- 2' x 2' area near Bldg 191		210 µR/hr	20

UCCNHT0001617

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984 (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986)

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II More detailed information is contained in Laboratory Notebook 2446

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

Date	Buildings	Background	Comments
2/12/86	29, 30, 77 (Fce Rm #6)	5-10 µR/hr	Area next to Fce 30 above background
2/14/86	25, 71, (UCAR, GLOBAR)	8-10 µR/hr	Some sample cans >1mR/hr
	32 (#2 Packing)	8-10 µR/hr	OK
2/14/86	89, 89A (#10 Packing)	8-10 µR/hr	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 µR/hr	Area below Dust Coll above background
2/20/86	(Storage Shed N W Corner of Umetco Property)	8-12 µR/hr	OK
2/25/86	7 (Storeroom)	8-10 µR/hr	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 µR/hr	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 µR/hr	OK
2/27/861	13, 14 (Aux Storeroom, Drum Shop, #8 Packing)	10-12 µR/hr	OK
3/14/86	111 (Eng Annex-Works Lab)	15-17 µR/hr	OK
3/14/86	3 (Compressor Bldg)	7-8 µR/hr	OK

UCCNHT0001618

The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers

2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.

3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.

4 Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.

5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No 30 (contaminated slag and soil were being placed into 55-gallon drums) This has been completed and we are now working on cleaning up the area in Building 24

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981 However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above

Very truly yours,

D J. Hansen

mau/349h

cc: Messrs·
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G Millenbruch
R. C. Smith
R. G Tisch
C. T Wentzel

UCCNHT0001619

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38 11 Duration of licenses Except as below provided, a license shall expire at the end of the expiration date therein stated The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule) To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule)

38 12 Renewal of licenses An application for a renewal of a license shall be made on a form prescribed by the commissioner Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal

38 13 Amendment of licenses A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule) Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license

38 14 Suspension or revocation The Commissioner may revoke or suspend any license, or approval, in whole or in part, for

(a) Any material misstatement in the qpplication therefor or in any supplementary statement thereto,

(b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or

(c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order

38 15 Additional requirements Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate

UCCNHT0001620

timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38 27 Enclosed controlled areas Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38 28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38 29 Vacating installations and property (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule) A survey shall be made after such decontamination and the commissioner and subsequent transferee or owner shall be provided with a copy of such survey No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

UCCNHT0001621

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits			
(1) Alpha emitters			
(i) Removable	15 pCi / 100 cm	= 33 dpm / 100 cm²	average over any one surface
	45 pCi / 100 cm²	= 100 dpm / 100 cm²	maximum
(ii) Total (fixed)	450 pCi / 100 cm²	= 1000 dpm / 100 cm²	average over any one surface
	2250 pCi / 100 cm²	= 5000 dpm / 100 cm²	maximum
	0 25 mrem at 1 cm / hr		
(2) Beta-Gamma emitters			
(i) Removable (all beta-gamma emitters except	100 pCi / 100 cm²		average over any one surface
Hydrogen 3)	500 pCi / 100 cm		maximum
Removable (Hydrogen 3)	1000 pCi / 100 cm²		average over any one surface
	5000 pCi / 100 cm²		maximum
(ii) Total (fixed)	0 ?		surface

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2 Column 2

(2) Source material 0 05 per cent by weight

Note Jurisdictional limits The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

UCCNHT0001622

TABLE 2
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
	Cs 137		2×10^{-4}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}

See notes at end of table

UCCNHT0001623

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Europium (63)	Eu 152 (T $_{1/2}$ = 9 2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

UCCNHT0001624

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

UCCNHT0001625

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

UCCNHT0001626

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	*Isotope*	*Column 1 Gas concentration μCi/ml**	*Column 2 Liquid and solid concentration μCi/ml***
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-8}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

** μc/g m for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive In expressing the concentrations in Table 2 the activity stated is that of the parent radionuclide and takes into account the daughter products

Note 2 For the purposes of section 38 41 Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2 The sum of such quotients shall not exceed ' one"

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} + \cdots < 1$$

UCCNHT0001627

UCCNHT0001628

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JOB NO	TITLE	PAGE NUMBERS
	Radiation Survey of Niagara Plant	p12-23, p32-35 ~~p36-39~~,
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	Samples Taken for Radon assays from Plant & Slag Piles	p36-44
	Soil Samples of Yard Area	p42-45
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	Ulodag Ore	
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UCCNHT0001629

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JOB NO	TITLE	PAGE NUMBERS

UCCNHT0001630

CONTENTS

JOB NO	TITLE	PAGE NUMBERS

UCCNHT0001631

INSTRUCTIONS FOR USE OF DATA BOOK

1 ENTER JOB NUMBER AND TITLE AT TOP OF PAGE

2 FOR EACH EXPERIMENT, STATE OBJECT, EQUIPMENT USED

3 RECORD ALL NECESSARY DATA

4 DISCUSS RESULTS OF TEST, PRODUCT OBTAINED, ETC

5 ENTER DATE OF THE DAY DURING WHICH WORK WAS DONE

6 SIGN EACH PAGE

7 DO NOT ERASE-CROSS OUT DO NOT REMOVE PAGES FROM BOOK

8 DO NOT LEAVE UNUSED AREAS AT TOP OF PAGE CROSS HATCH UNUSED AREAS AT BOTTOM OF PAGE

9 TABLES REQUIRING MANY COLUMNS MAY BE CONTINUED OVER SEVERAL PAGES BUT FILL IN HEADINGS, SIGN, AND DATE EACH PAGE

UCCNHT0001632

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Uladag W Ore · OR ~~716~~ 711 — July 9, 1984

JOB NO

OR ~~716~~ 711 (XRD on head sample) Head Analysis 0.30 % WO_3

Mill Feed Sample 14 m x D

Wet Screened:

Feed wt = 1003.7 gm

No	Size	wt	% WO_3	Wt %	% W Dist
2446-1-1	14 m x 48 m	433.5 gm	0.25*	43.63	39.98
-1-2	48 m x 100 m	195.4 gm	0.283*	19.66	20.40
-1-3	100 m x 200 m	126.1 gm	0.303*	12.69	14.09
-1-4	200 m x D	238.7 gm	0.29	24.02	25.53
		993.7	0.27		

Heavy Liquid Separation @ sp. gr 3.3 on above screen fractions:

Sample No	Description	wt gm	Wt %	% WO_3	% WO_3 Dist
2446-1-1F	14x48 m, Float	~~68.70~~ 299.5	69.12	0.040	11.06
-1-1S	" , sink	133.8	30.88	0.72	88.94
				0.25	
-1-2F	48x100 m, Float	68.79	69.36	0.023	5.646
-1-2S	" , sink	30.39	30.64	0.87	94.354
				0.283	
-1-3F	100x200 m, Float	67.4	71.78	0.021	4.976
-1-3S	" , sink	26.5	28.22	1.02	95.024
				0.303	

Magnetic Separation on 100x200 m, sink: (feed wt = 23.2 gm - 3.3 gm for analysis)

No	Fraction	wt-gm	Wt %	% WO_3	% WO_3 Dist
2446-1-3S-1	Hand mag.	4.05	17.56	0.41	7.03
-1-3S-2	mag @ 0.2a	0.13 } combined 2 & 3	15.61	0.21	3.20
-1-3S-3	mag @ 0.4a	3.47			
-1-3S-4	mag @ 0.6a	10.30	44.67	0.094	4.10

continued on page 7

* calculated from subfractions

RECORDED BY C J Bartholomew — DATE 7/16/84

WITNESSED AND UNDERSTOOD BY — DATE

2

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Uladag W Ore - OR 714 July 9, 1984

JOB NO

XRD head sample

RECORDED BY DATE

WITNESSED AND UNDERSTOOD BY DATE

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Vlasday Ore - OR715 July 9, 1984

JOB NO

XRD on lead sample

RECORDED BY DATE

WITNESSED AND UNDERSTOOD BY DATE

UCCNHT0001635

4

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Uladag Ore - OR716 — July 9, 1984

JOB NO

XRD on lead sample

RECORDED BY _____ DATE _____

WITNESSED AND UNDERSTOOD BY _____ DATE _____

UCCNHT0001636

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Uladag Ore — July 11, 1984

JOB NO

Composite OR716 + OR715 Calc. Head Analysis = 0.70% WO_3

Blended equal splits (by wt) of OR715 and OR716 for mineralogy tests

Wet screening:

Sample No	SIZE (mesh)	Wt-gm	Wt %	% WO_3	% W-Dist
2446-5-1	14X48	480.5	48.29	0.551*	36.94
-2	48X100	197.9	19.89	1.186*	32.75
-3	100X200	113.0	11.35	0.679*	10.70
-4	200XD	203.7	20.47	0.69	19.61
		995.1		0.72	

*calculated from subfractions

Heavy liquid separation @ sp. gr = 3.3

No ~~FRACTION~~	FRACTION	wt-gm	Wt %	% WO_3	% W Dist
2446-5-~~2~~1F	14X48 ~~48X100~~ Float	262.9	54.79	0.18	17.91
5-~~2~~1S	14X48 ~~48X100~~, Sink	216.9	45.21	1.00	82.09
				.551	
992-5-2F	48X100M, FLOAT	53.45	53.90	0.080	3.64
-5-2S	48X100M, SINK	45.71	46.10	2.48	96.36
				1.186	
-5-3F	100X200M, FLOAT	59.8	53.11	0.042	3.29
-5-3S	100X200M, SINK	52.8gm	46.89	1.40	96.71
				0.679	

continued on next page

RECORDED BY E J Bartlomei — DATE 7/16/84

WITNESSED AND UNDERSTOOD BY — DATE

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Magnetic Separations on Wadag Ore

OR 715+716

JOB NO

Continued from page 5:

Magnetic separations on 2446-5-3S (100x200m, sink)

Sample No	Fraction	Wt-gm	Wt %	% WO_3	% W-DIST
2446-5-3S-1	Hand-mag	10.70	23.25	0.34	5.62
-2	mag @ 0.3 amps	1.90	4.13	1.21	3.55
-3	mag @ 0.5 amps	16.42	35.69	0.32	8.12
-4	mag @ 0.8 amps	2.82	6.13	1.09	4.75
-5	mag @ 1.2 amps 1.10	0.72	1.56	4.49	7.63
-6	mag @ 1.6 amps	0.38	0.83		~~70.33~~
-7	non-mag @ 1.6 amps	13.08	28.42	3.48	70.33
				1.40	
				1.41	

RECORDED BY DATE

WITNESSED AND UNDERSTOOD BY DATE

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Gladay Ore - OR711

JOB NO

Continued from page 1

Mag. separations:

NO	FRACTION - wt	wt%	%WO3	% W Dist
2446-1-3S-5	{mag @ 1.1a 0.56g}	3.56	1.99	6.90
-6	{mag @ 1.7a 0.26g}			
combined -5 & -6	1.7a			
-7	Non Mag @ 1.7a 4.29g	18.60	4.34	79.77
			1.03	

RECORDED BY _____ DATE _____

WITNESSED AND UNDERSTOOD BY _____ DATE _____

UCCNHT0001639

8

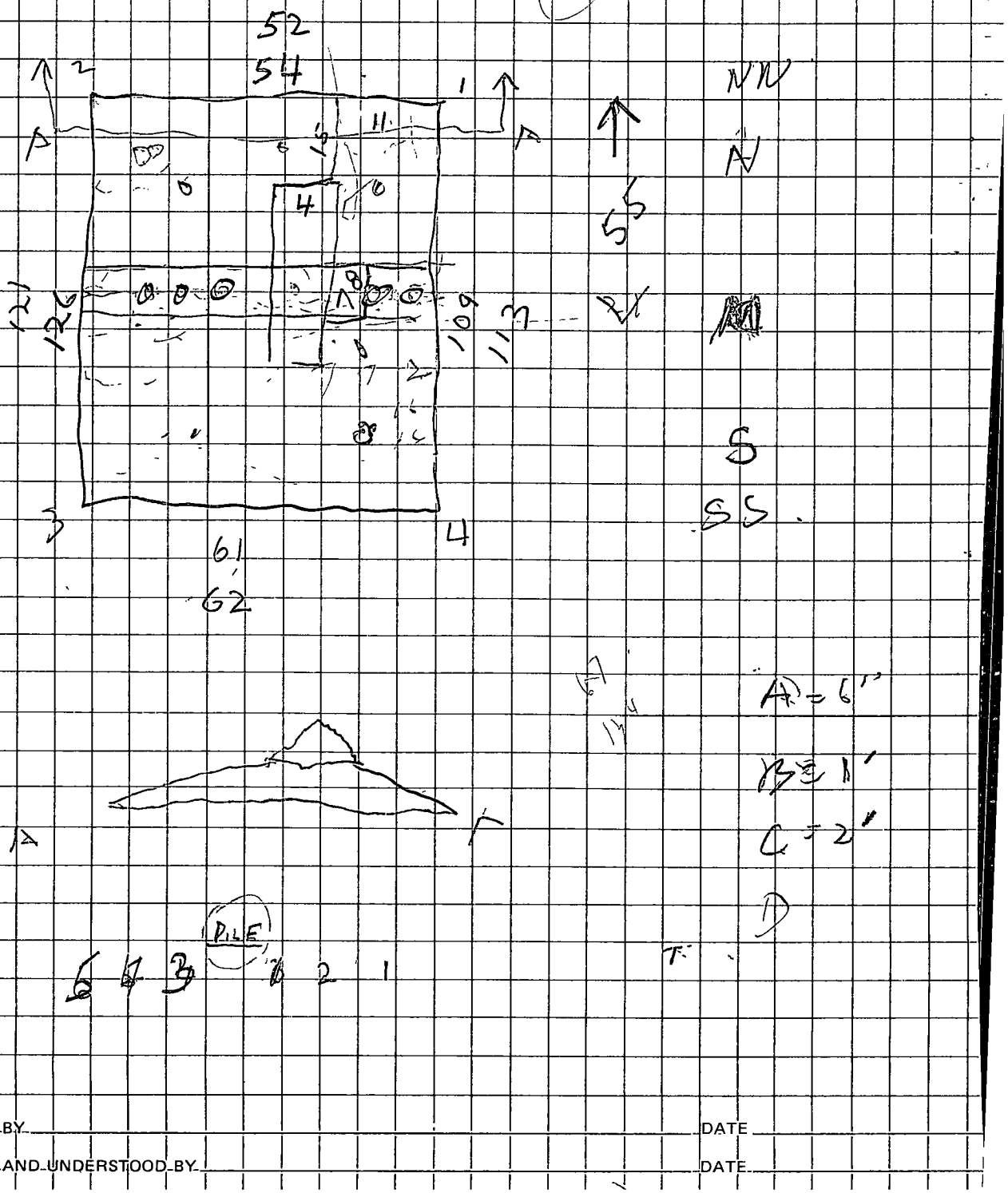
METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT VENTURI SCRUBBER CAKE

JOB NO

PILE DIMENSIONS

Nov 12/85



RECORDED BY DATE

WITNESSED AND UNDERSTOOD BY DATE

UCCNHT0001640

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

Nov 13/85

SUBJECT _____

JOB NO _____

Height of P.I

1 to 4 @ 10 places

10	6"
20	2'
30	2.5
40	2'
50	3'
60	3'
70	2'
80	3'
90	2'
100	1.1
109	=
	0

Av 1.6

Say 2.0'

3 to 2

10	2.5'
20	3.5
30	3.'
40	4'
50	4.5'
60	4.5'
70	5'
(13) 80	5'
90	4.6
100	4.1
110	3.1
120	2.5'
130	1'
	36

Say 4.0

Ao = 3' in depth

RECORDED BY _____ DATE _____

WITNESSED AND UNDERSTOOD BY _____ DATE _____

UCCNHT0001641

10

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT _____

JOB NO Nov 12

SAMPLES

M1A

M1B

M1C

RECORDED BY _____ DATE _____

WITNESSED AND UNDERSTOOD BY _____ DATE _____

UCCNHT0001642

METALS DIVISION · UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT _____

JOB NO Nov 13

BULK DENSITY OF STOCK PILE

Wt of Beaker	1003.8	
Wt of Sample	1158	158
Wt after Submerged		1168.5
Vol of Sample	1000 ml	11c

pH - by meter 8.2
by Indicator 8

pH of Pile on Top 4.4

After Wt 1169 After Bulk Specific Gravity 1.15 g/cc
Before Wt 1158
Gain 11 g

RECORDED BY _____ DATE _____

WITNESSED AND UNDERSTOOD BY _____ DATE _____

UCCNHT0001643

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey of Niagara Plant 2/12/86

No 6 Furnace Rm JOB NO 523-20301

(Bldg 24 - 30 - 77) DJH 3/26

A radiological survey of Furnace Rm No 6 of the Niagara Plant was performed by A. Jones + D Hansen during the afternoon of Feb 12, 1986. The survey consisted of a scan of floor areas, lower wall surfaces, and containers located on both the main floor and the deck.

Portable instrumentation used in the survey included a Ludlum Model 19, ~~and~~ Micro R Meter and a Thyac III (Victoreen) Meter with a 489-35 alpha-beta-gamma GM Probe.

Background was between 5 to 10 μR/hr. In the foremans office (enclosed by brick walls) the background was 20 μR/hr.

RECORDED BY D J Hansen DATE 2/13/86

WITNESSED AND UNDERSTOOD BY A M Jones DATE 2/13/86

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Cont — 2/12/86

JOB NO

Drums containing V_2O_5 (UCC not Finland) showed a level of 50 μR/hr. The same reading was observed on the surface of 2 drums marked ferro vanadium on the West wall. The highest reading was observed at the base of an "I" beam located to the south of No 30 Fa. The reading was 200 μR/hr.

Nothing above 30 μR/hr was observed on the deck.

RECORDED BY D F Hansen — DATE 2/13/86

WITNESSED AND UNDERSTOOD BY O M Gore — DATE 2/13/86

UCCNHT0001645

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey Cont Feb 14/86

JOB NO AM

No 2 PACKING - GLOWBAR AREA -

Background S ENTRANCE 8-10 μR/hr

Sample Cage - Background 28-30 μR/h

Cabinette - 428 A - 280 μR/hr (Can 12904)
(Ws Wall 4th Cab) 900 μR/hr (Can 12599)
Sec 117 Can 13231 160 μR/hr

Cans on top of N shelf 4500 μR/hr

East Wall S to N
Boxes Hex containing Samples to be disposed of
80 to 120 μR/
Av 80

West Wall N to S
OK
Center Area OK

Blender Rm
8-10 μR Background

Ground Floor No 2 PACKING
E wall S to N OK
CRUSHER RM OK
Sample Prep Rm OK

RECORDED BY [signature] DATE 2/14/86
WITNESSED AND UNDERSTOOD BY [signature] DATE 2/19/86

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey Cont Feb 14/86

No 10 PACKING JOB NO 523-20301

S END E Wall
Background 8-10 μR/hr at S ENTRANCE

DECK on East Wall S To N OK on East Wall
N to S OK on West Edge

Ground Floor
S END E Wall To N
Sump E Wall 25 μR/hr OK

N END To S West OK
V2US Rise 32 μR/hr
" 42

Slightly above background against walls 15 μR/hr

RECORDED BY D J Hansen DATE 2/14/86
WITNESSED AND UNDERSTOOD BY C M Gomes DATE 2/14/86

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey Cont. 2/18/86

JOB NO 523-20301

A radiological survey of Dept 146 - Vanadium Aluminum was done by A. Gomez, Tuesday Feb 18, 1986, 1 to 2:30 PM.

After establishing a background radiation level of 8-13 micro R/hr. just inside the department door, a survey was performed of the melting dept. and storage area.

Only one area indicated any large increase over background level. This was in a very heavily layer of dust in the west side, enclosed portion of the building.

One employee said the area was the old C2F that was dismantled years ago.

The readings were 100 to 130 micro R/hr over a large area of dust.

RECORDED BY A M Gomez DATE 2/18/86

WITNESSED AND UNDERSTOOD BY D J Hamm DATE 2/18/86

UCCNHT0001648

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey Cont 2/20/86

Outside of Fce #6 JOB NO 523-20301

In this case due to mud and deep water in the area East of #6 Furnace Rm to the property boundary only a rough survey could be made, using the Lundlum Model 19 micro R/hr meter suspended on a rope to approximately 3 to 6" above the ground. Three walking passes were made on this area, not in straight lines due to obstructions. Only one area gave readings high enough to be noted. 0.10 to 0.15 mR/hr This area is a pile of large pieces of furnace slag located in a straight line East of 6 furnace between Stack 2 and 3 of the building - Background measures 8-12 micro R/hr.

Another small area had a reading of 0.30 mR/hrs This area is located west of a mixing ~~tank~~ tank and on the the east side of a line of slag dividing the property from Eltec. This material is probable on Eltec property

Also rechecked was the room in Bldg #143 where the radium was kept. - No reading above background were observed Background here is 8-13 micro R/hr.

The fiberglass storage shed on the northwest corner of the Umetco property was also surveyed. Nothing above background was observed. Background here is 8-12 micro R/hr. Surveying the field north of the parking lot in one pass North to South, no reading above background were observed

RECORDED BY [signature] DATE 2/21/86

WITNESSED AND UNDERSTOOD BY Donald J Hansen DATE 2/21/86

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey Cont. 2/25/86

JOB NO 523-20301

Using a Ludlum-Model #19 Micro R/hr meter

A recheck of two areas noted previously was done to confirm the result.

6 furnace Room

The area around # 30 furnace was again surveyed

The background was measured at 5-8 micro R/hr

The base area around the 6th support I-beam column from the south end of the building was rechecked at 50 to 170 micro R/hr.

Also at the base of the furnace pivot or tilt mechanism, north side, a reading of 420 Micro R/hr was measured

Also the area in the Vanadium-Al building - was rechecked - The reading of 50 to 170 micro R/hr was conformed to be higher than originally observed in the dusty area where a furnace was many years ago. This area is on the north west abandoned area of the bldg.

RECORDED BY A. McGarr DATE 2/26/86

WITNESSED AND UNDERSTOOD BY Donald J. Hamm DATE 2/26/86

METALS DIVISION UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey Cont. 2/25/86

JOB NO 523-20301

Radiation survey was done by Dr D.J. Hansen and A.M. Gonas.
Surveyed was the storeroom and maintenance buildings.

Storeroom Survey — Ground floor
Background — 8-10 micro R/hrs
O.K. — No high readings were noted.

— Basement
Background — 8-10 micro R/hrs
O.K. —

— Top Floor
Background — 8-10 micro R/hrs
O.K. —

Electrical Shop — Top floor

Background — 8-10 micro R/hrs

Office
Storeroom North
" " South
Lunch Room
} O.K. no abnormal high readings.

Machine Shop — Top floor
Background — 8-10 micro R/hr
Brick on south wall — 18 micro R/hrs
Sinter block on East wall — 13 micro R/hrs
O.K. — Remainder of machine is good — no high readings.

Cont pg 20

RECORDED BY A.M. Gonas DATE 2/26/86
WITNESSED AND UNDERSTOOD BY Donald J. Hansen DATE 2/26/86

METALS DIVISION — UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey Cont. — 2/25/86

JOB NO 523-20311

Machine Shop — Ground floor — East side of building

Background - 8 1/0 mrem R/hr.

East Side — O.K. — No reading much above background were noted

Only one on the brick walls were the readings 8-5 mrem R/hr higher.

Survey was North to South on the East side

South to North in the Center area

West side

Background - 8-10 mrem R/hr

Survey was North to South thru center.

Under stairs at south end of building

25 mrem R/hr next to bricks

Lunch room O.K.

Bricks on west wall - 15 mrem R/hr.

Carpenter Shop - Back ground - 8-10 mrem R/hr

O.K. - No high reading observed

RECORDED BY Donald J. Hopper — DATE 2/26/86

WITNESSED AND UNDERSTOOD BY R M Greer — DATE 2/26/86

UCCNHT0001652

Niagara Falls, New York
July 13, 1983

Design Memo No. 1

File No. 11309

SUBJECT: Radiological Survey, Cleanup Options and Cost Estimates

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UCCNHT0001653

UC 149-2

UNION CARBIDE

INTERNAL CORRESPONDENCE

METALS DIVISION

P O BOX 97, NIAGARA FALLS, NEW YORK 14302

To (Name) Mr. R. J. Klotzbach
Division UCC-Metals Division
Location Niagara Falls, NY

Date July 13, 1983
Originating Dept Engineering Department
Answering letter date

Copy to See Attached Distribution

Subject Design Memo No. 1
Radiological Survey, Cleanup
Options and Cost Estimates
File No. 11309

Dear Bob:

Attached is Design Memo No. 1 "Radiological Survey, Cleanup Options and Cost Estimates".

Union Carbide Corporation presently is out of compliance with its New York Radioactive Materials License No. 950-0139 due to radioactive source concentrations in excess of 500 ppm behind Niagara Building 166, where access to employees is unrestricted. To identify the area and depth of contamination, the area south of Building 166 was surveyed by Mr. D. R. Brosnahan and the author. The results indicate that a soil volume of 5130 ft.^{3} must be restricted or removed for compliance with New York State regulations. An additional 1700 ft.^{3} must be removed for delicensing and unrestricted use.

The following five alternatives have been considered and cost estimates prepared as part of the design memo.

Alternative	Description	Cost
1	Fence in Place	$ 10,000
2	Remove & Fence on Elkem Property	65,000
3	Remove & Fence on UCC Property	120,000
4	Remove & Bury - UCC Niagara	175,000
5	Remove & Ship to a Repository	335,000

The recommendation is to proceed with Alternative No. 3, based primarily on the condition that the property will be deeded to Elkem Metals Company. The material remains available for implementing Alternative No. 4, "Bury on UCC Property", or Alternative No. 5, "Ship to an Approved Repository", in the future. An R & D effort can also proceed to investigate ways to reduce the volume. Far less expense is required for the alternative to "Fence in Place", which is recommended if property ownership does not change.

L. G. Evans

LGE/dac
Attachments

UCCNHT0001654

Union Carbide Corporation
Metals Division
Technology Department - Engineering
Niagara Falls, New York

File No. 11309

DESIGN MEMORANDUM
SPONSOR: T. J. KAGETSU

PROJECT: Soil Decontamination - South of Building 166, Niagara

BY: L. G. Evans/D. R. Brosnahan

DATE: May 20, 1983

Design Memo No. 1
Revision 0
Subject: Radiological Survey, Cleanup Options and Cost Estimates

1.0 INTRODUCTION

1.1 Scope

To include an engineering evaluation of the alternatives available for disposal of the radioactive contaminants from areas south of Building 166.

1.2 History

The U. S. Department of Energy performed surveys in 1976 to assess the radiological status of facilities utilized under Manhattan Engineer District contract during the period 1943-1946. UCC's Metals Division at Niagara was one of those sites. They discovered contamination South of Building 166 and notified Union Carbide and New York State.

As a result, New York State Department of Labor performed a follow up survey on December 1, 1981 and cited UCC for violation of its New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access to employees.

Later, thorium was found to be a major radioactive contaminate indicating that the radiation is unrelated to the Manhattan Engineer Project.

This problem is further complicated by the divestiture of the ferroalloys business and anticipated eventual ownership of the property by Elkem Metals Company.—

UCCNHT0001655

2.0 DISCUSSION

2.1 General

All phases of a waste clean up project are directly affected by the quantity of waste to be handled. Therefore, the first priority was to develop a reasonably good estimate of the volume.

A gamma radiation survey was performed over the entire fenced area behind Building 166 to determine the area of involvement excluding areas covered by asphalt or concrete. Soil samples were obtained from several areas and analyzed for % U_3O_8 and % ThO_2. Samples were extracted at various levels in five holes to determine depth of involvement. Samples were also taken to obtain a rough correlation between gamma readings and uranium/thorium content.

2.2 Cleanup Criteria

2.2.1 General

The cleanup criteria is dependent upon the use or future use of the property. New York State Regulations would apply with continuance of license. NRC Regulations would apply for delicensing.

2.2.2 New York State Regulations

NYS requires restriction of access to areas where the radioactive contaminants exceed 500 ppm of source materials. Below 500 ppm radioactive materials can be stored with unrestricted access.

To facilitate a comparison of this limit to the NRC limits a conversion to pCi/gm is made assuming a 2:1 (thorium:uranium) ratio. (See calculations attached).

These limits for unrestricted access are the total of the following:

≤36 pCi/gm Thorium
≤57 pCi/gm Uranium

These limits are used only for determination of compliance with our license for restricted or unrestricted access.

If the State is approached by UCC for criteria for delicensing they probably will require compliance with NRC Regulations due to Agreement State principles.

2.2.3 NRC Regulations

The NRC proposed regulations[1] provide four options for burial and delicensing. A fifth option deals with continuing the license.

(1) Federal Register/Vol. 46 No. 205/Friday Oct. 23, 1981, Notices (attached).

UCCNHT0001656

Option 1 ≤10 pCi/gm Thorium and/or 10 pCi/gm Uranium - unrestricted use and delicensing. (Burial not required).

Option 2&3 ≤50 pCi/gm Thorium and 40 pCi/gm Uranium - deed amendment and delicense, restricted access by burial with minimum four foot cover. No residential building. Option 2 specifies thorium and Option 3 uranium.

Option 4 ≤500 pCi/gm Thorium and 200 pCi/gm Uranium - much more restricted use of the land than Options 2 and 3. No excavation or building.

Option 5 of the Regulation deals with on-site storage of higher concentrations pending the availability of space at an approved repository. No burial is permitted.

2.3 Radiological Survey

2.3.1 Gamma Survey

The survey was performed with a portable gamma ray spectrometer, Model GR-410 manufactured by Geometries Exploranium and detector Model No. GPX-21 employing a sodium iodide thallium activated crystal as a scintillation phosphor.

All of the area south of Building 166 and bounded by the chain link fence was surveyed except areas covered by concrete or asphalt. The actual area surveyed was approximately 26,000 ft.^{2}. Concrete and asphalt cover 63,000 ft.^{2}.

A 10' x 10' grid was established and readings were taken at the intersection points. Extra readings were taken along the west track center line and near the edge of the concrete on both sides.

A resurvey of a 400 ft.^{2} area was done using a 2' x 2' grid to assess the reliability of the general survey. The location of this area is shown on Drawing SF-7902 as Detail 1. The data are also displayed in Figure I (attached).

All gamma meter readings were reduced to the number of times background and are reported on Drawing SF-7902.

2.3.2 Analytical Survey

Soil Samples - The physical samples were essentially 'grab' samples. No systematic sampling technique was used. The analytical work was performed by Elkem's laboratory at Niagara Falls. The results are shown in Table III (attached) and on Drawing SF-7902.

The chemical analyses of the surface soil samples ranged from 0.006% to 0.40% ThO_2 and from 0.002% to 0.17% U_3O_8.

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2.4 Survey vs Regulations

The following Table I is a comparison of the surface soil sample analyses converted to pCi/g and the gamma radiation readings (times background). Below the table is a guide comparing gamma readings to cleanup or storage criteria. The gamma range is estimated based on the analyses of Table III (attached).

TABLE I

GAMMA X BKG	URANIUM pCi/gm	THORIUM pCi/gm	SAMPLE NO.	CONTAMINANTS PPM
1	3	2	11	20
3	11	11	9	131
5	6	6	8	70
6	11	19	2	210
8	8	22	5	228
9	14	40	1	401
12	26	61	3	650
13	8	12	10	140
17	26	66	4	674
21	42	105	12	1094
26	57	164	14	1664
33	82	201	13	2091
83	466	382	5	4957

GAMMA RANGE	NYS/NRC REQUIREMENTS
1 - 5	Will meet NRC proposed regulations for delicensing and unrestricted land use. NRC Option 1 (Sec. 2.3.3) - no burial required.
6 - 9	NYS allows unrestricted access and continue license. NRC allows burial and delicensing. Options 2 and 3 - burial required.
10 - 60*	NYS requires restricted access. NRC allows burial and delicensing - Option 4.
>60	NYS requires restricted access. NRC requires restricted access and storage until space is available at an approved repository, e.g., Barnwell, SC.

*Interpolated

UCCNHT0001658

2.5 Contamination Volume

2.5.1 General

The gamma survey, surface and subsurface soil analyses and the guide above are combined to estimate the quantity of material of each class in each area.

The depth of contamination varies throughout the area of involvement, but is generally less than six inches. However, to expedite cleanup, the rails and ties must be removed, requiring a minimum removal depth of eight inches.

2.5.2 High Concentration Area

This area contains material which exceeds NRC burial limits and must be disposed of (eventually) at an approved repository. Gamma readings are above 60 times background. This area is the most heavily contaminated both in radiation level and depth of contamination. Contamination can be found 12 inches below the surface.

Volume = 400 $ft.^2$ x 1 ft. deep = 400 $ft.^3$

2.5.3 Medium Concentration Area

This area contains material which requires restricted access. Gamma readings are 10-60 times background.

Volume = 6400 $ft.^2$ x 2/3 ft. deep = 4267 $ft.^{3*}$

*Approximately 30% of the area found to be low concentration on the general survey (10' x 10' Grid) was found to be medium concentration upon resurvey (2' x 2' Grid). See Drawing SF-7902 or Figure I. This volume is included.

2.5.4 Low Concentration Area

This area contains material which must be removed to delicense but which can remain with unrestricted access under current license. Gamma readings are 6-9 times background.

Volume = 2200 $ft.^2$ x 2/3 ft. deep = 1467 $ft.^3$

2.5.5 Summary

The following summarizes the above volumes including a 15 percent contingency:

High Concentration	- 230 $ft.^3$
Medium Concentration	- 4900 $ft.^3$
Low Concentration	- 1700 $ft.^3$
TOTAL	6830 $ft.^3$

UCCNHT0001659

NOTE: No exploration was done beneath any of the concrete or asphalt pads. The depth of involvement and the location of contamination along the railroad tracks indicates the radioactive materials were spilled during handling from rail cars and contamination under the pads is unlikely.

3.0 DESCRIPTION OF CLEANUP ALTERNATIVES

3.1 Summary

Five cleanup alternatives are considered in this memorandum. The major factors influencing final selection of an alternative are: term of solution (short or long), delicensing, property transfer to Elkem, compliance with NYS Regulations, and cost.

Table II below summarizes the alternatives opposite these factors.

TABLE II

ALTER-NATIVE NO.	DESCRIPTION	TERM	DELICENSE*	TRANSFER PROPERTY TO ELKEM	COST $000
1	Fence in place	Short	No	No	10
2	Remove & fence on Elkem Property	Short	No	No	65
3	Remove & fence on UCC Property	Medium	No	Yes	120**
4	Remove & bury - UCC Niagara	Long	Yes	Yes	175
5	Remove & ship to repository	Permanent	Yes	Yes	335

* Assumes that this is the only contaminated area in the plant.

**If a concrete pad is available the cost would be $90,000.

3.2 Alternative No. 1 - Fence in Place

Simply enclose the contaminated area thus restricting access.

Requirements - 400 feet of fence.

Advantages - Quick solution to come into compliance with NYS.
- Minimum cost.

Disadvantages - Contamination remains requiring future action.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

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3.3 Alternative No. 2 - Remove and Fence on Elkem Property

As mentioned earlier, much of the area South of Building 166 is covered with concrete and asphalt. The material (soil) could be removed and stored on an existing pad in the Southeast corner of the property. The pad and a plastic covering would provide stability and a fence would provide restricted access until final disposal.

Requirements
- Removal of railroad tracks.
- Disposal of scrap and debris**.
- 100 ft. fence required - S & E corner site.
- Concrete/asphalt pad - already available.
- Replacement of railroad track.

Advantages
- Consolidation of contaminants.
- Access can be restricted.
- This work is required for ultimate disposal in any event.

Disadvantages
- Short term solution.
- 1/10 acres of land would not be available for Elkem use.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

**This includes
- Three flat-bed railroad cars loaded with induction furnaces.
- Stacks of deteriorating 55 gallon drums.
- Stacked wooden boxes containing steel shot, etc.
- Numerous 5' x 5' x 5' steel boxes.
- Various ladles, furnaces, carbon electrodes, etc.

3.4 Alternative No. 3 - Remove and Fence on UCC Property

The work required here is essentially the same as in 3.3 above. Costs increase and extra care must be taken to avoid contamination of other areas of the plant. However, the property can then be released for transfer to Elkem. An area in the Niagara Plant has been designated by plant personnel for possible use.

Requirement
- Same as 3.3 except more fence and a new concrete pad may be required.

Advantage
- Same as 3.3 except it has the additional advantage of not interfering with Elkem property use. Property can be transferred to Elkem.

Disadvantage
- Medium term solution.

UCCNHT0001661

3.5 Alternative No. 4 - Remove and Bury - UCC Niagara

Burial on Union Carbide owned property was explored for the Marietta TaCb cleanup project. The main problems are: finding a suitable burial site, getting State and Local approval, future use or transfer of the burial site is restricted, and long term monitoring of the site is necessary.

Requirements
- Remove and replace railroad tracks.
- Dispose of scrap and debris at approved repository.
- A suitable burial site.
- Containers (55 gallon drums) may be required.
- Dispose of 400 $ft.^3$ soil at approved repository.

Advantages
- Long term solution.
- Delicense.

Disadvantages
- Use of the burial site will be restricted - no construction.

3.6 Alternative No. 5 - Remove and Ship to Repository

This alternative is permanent. Once the material is received at the repository, the host state becomes owner and the licensee's accountability ends. However, this is the most expensive alternative.

Requirements
- Remove and replace railroad tracks.
- Disposal of scrap and debris at approved repository.
- Containers.
- Loading system.

Advantage
- Permanent solution.

Disadvantage
- Highest cost.

3.7 Remove and Ship to Uravan

This alternative was selected for the TaCb residue cleanup project in Marietta. The uranium content of the TaCb residue was 0.13% U_3O_8 and processing to recover uranium values was feasible and acceptable to the Colorado Department of Health. The material (soil) analyses at Niagara indicate 0.01% U_3O_8. Therefore, transfer to Uravan cannot be considered.

4.0 COST ESTIMATES

As discussed in Section 2.4, the radiological survey indicates three levels of contamination above NRC delicensing limits. They are: 6-9 x BKG (background), 10-60 x BKG and greater than 60 x BKG. Volumes were calculated

UCCNHT0001662

for each area with the thought that some alternatives would not require the removal of the combined total volume but only those areas with the highest concentrations. However, to simplify costings and cost comparison, only the total volume of Section 2.5.5 is considered. All medium and high concentration material requires fencing or removal. The low concentration material adds an additional 25% to the volume, but adds only 10% to the cost. The volume for cost estimating is then 6830 ft.^{3}.

Cost Estimates No. 6342 through 6346 are attached.

Cost Estimate No. 6342	Fence in Place	$ 10,000
Cost Estimate No. 6343	Remove and Fence - Elkem	$ 65,000
Cost Estimate No. 6344	Remove and Fence - UCC Niagara	$120,000
Cost Estimate No. 6345	Remove and Bury - UCC Niagara	$175,000
Cost Estimate No. 6346	Remove and Ship to Barnwell	$335,000

Note: Costs do not reflect removal of debris which is assumed to be Elkem's accountability.

5.0 RECOMMENDATIONS

Removal and relocation of the contaminated soil to the Niagara plant as described in Alternative No. 3 is recommended based on the following:

1. The property will be deeded to Elkem Metals Company.

2. Any restriction to the use of the property behind Building 166, or any potential cleanup liability to Elkem, is unacceptable.

3. EPA and NRC regulatory uncertainties exist concerning burial. (Perpetual maintenance costs are not included in the estimate for Alternative No. 4.) Burial also makes the material unavailable for disposal at an approved repository as discussed below. New York state may ban all burial within the state in the near future.

4. Disposal at Barnwell, SC is too costly and there is reason to believe that a new repository will be opened in the Northeast by 1986 which may reduce the cost of that option.

Any remedial effort must be approved by the State of New York, Department of Labor. For the material to be left on-site, Radioactive Materials License No. 950-0139 must be amended. This amendment or some form of approval should be received prior to the beginning of any cleanup.

UCCNHT0001663

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6342

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - FENCE IN PLACE (ALTERNATIVE 1)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	MATERIAL				
101	400' Fence (6 ft.) Along 1100N	-	8	8	-
	TOTAL		8	8	-
	TOTAL DIRECTS		8	8	-
	ENGINEERING			-	-
	CONTINGENCY			2	
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			-	-
	TOTAL			10	-

FRANGELORI/dac

cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001664

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6343

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE ELKEM (ALTERNATIVE 2)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3}	-	5	-	5
102	Fence 6 ft. - 100 ft.	-	2	-	2
	TOTAL		7		7
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
	TOTAL DIRECTS		40	23	17
	ENGINEERING			7	5
	CONTINGENCY			8	3
	RADIOLOGIST/HEALTH PHYSICS			2	-
	TOTAL			40	25

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001665

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6344

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

•FEASIBILITY STUDY COST ESTIMATE•
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE - UCC NIAGARA (ALTERNATIVE 3)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10 ✓
102	Concrete Pad - 60 cy.	-	30	30 ✓	-
103	Fence 6 ft. - 200 ft.	-	4	4 ✓	-
	TOTAL		44	34	10
200	RECLAMATION				
201	Backfill	-	5	5 ✓	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3 ✓	-
203	Replace RR Track	-	25	15 ✓	10 ✓
	TOTAL		33	23	-
	TOTAL DIRECTS		77	57	20
	ENGINEERING			9	6
	CONTINGENCY			10	2
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			14	2
	TOTAL			90	30

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001666

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6345

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND BURY - UCC NIAGARA (ALTERNATIVE 4)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Clay Lined Pit w/Drain System 40 ft.^{2} x 5 ft.	-	15	15	-
103	Clay Cap	-	15	15	-
	TOTAL		40	30	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation	-	1	-	1
302	Burial Fee (200 ft.^{3})	1	8	-	9
	TOTAL	1	9		10
	TOTAL DIRECTS	1	82	53	30
	ENGINEERING			8	8
	CONTINGENCY			15	5
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	SITE SELECTION			35	
	TOTAL			125	50

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001667

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6346

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND SHIP TO BARNWELL, SC (ALTERNATIVE 5)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove Soil 7000 ft.^{3} (haul)	-	5	-	5
102	Containers (80 boxes - 100 ft.^{3})	20	-	-	20 ✓
103	Loading Trucks (incl. Pallets, etc.)	5	4	-	9 ✓
	TOTAL	25	9		34
200	RECLAMATION				
201	Backfill	-	5	5 ✓	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3 ✓	-
203	Replace RR Track	-	25	15 ✓	10 ✓
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation 1000_3$ (10 loads)	-	10	-	10
302	Burial Fee (8000 ft.^{3} incl Container)	-	160	-	160
	TOTAL		170		170
	TOTAL DIRECTS	25	212	23	214
	ENGINEERING			5	28
	CONTINGENCY			3	46
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	TOTAL			45	290

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001668

CALCULATIONS

New York State regulations require that access be restricted to areas where the source material exceeds 500 ppm. For the purpose of comparison with NRC regulations a Thorium/Uranium ratio of 2:1 is assumed.

Therefore, the maximum activities for unrestricted access are:

NYS maximum Thorium activity equals:

$$330 \text{ parts/million} \times 1.09 \times 10^5 \text{ pCi/gm} = 36 \text{ pCi/gm}$$

NYS maximum Uranium activity equals:

$$170 \text{ parts/million} \times 3.33 \times 10^5 \text{ pCi/gm} = 57 \text{ pCi/gm}$$

UCCNHT0001669

The Assistant Secretary finds that good cause exists for not publishing the supplement to the Puerto Rico State Plan as a proposed change and making the Regional Administrator's approval effective upon publication for the following reasons:

1. The standards are identical to the Federal standards which were promulgated in accordance with Federal law meeting requirements for public participation.

2. The standards were adopted in accordance with the procedural requirement of State Law and further participation would be unnecessary.

The decision is effective October 23, 1981.

(Sec. 18 Pub L. 91-596, 84 Stat. 1608 (29 U.S.C. 667))

Signed at New York City, New York, this 15th day of June 1981.

Roger A. Clark,

Regional Administrator.

[FR Doc. 81-30745 Filed 10-22-81 8:45 am]

BILLING CODE 4510-26-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards, Subcommittee on Callaway Plant; Location Change

The ACRS Subcommittee on Callaway Plant will hold a meeting on November 4 and 5, 1981, at the HOLIDAY INN-WEST, 1900 I-70 Drive Southwest, Columbia, MO instead of the Hilton Inn.

Notice of this meeting was published in the Federal Register on October 19, 1981 (46 FR 51329), and all other items remain the same except for the location change as indicated above.

Dated: October 19, 1981.

John C. Hoyle,

Advisory Committee, Management Officer.

[FR Doc. 81-30733 Filed 10-22-81 8:45 am]

BILLING CODE 7590-01-M

Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Discussion of options for NRC approval of applications for disposal or onsite storage of thorium or uranium wastes; interim use and public comment.

SUMMARY: This notice discusses five options for NRC approval of disposal or onsite storage or thorium or uranium wastes from past nuclear operations. The options are contained in a Branch Technical Position for administration by the Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

DATES: Comments on the options for disposal or onsite storage of thorium or uranium are encouraged. Such comments will be considered in any subsequent revision of the Branch Technical Position. Comments are due December 22, 1981.

Note.—Comments received after the expiration date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments filed on or before that date.

FOR FURTHER INFORMATION CONTACT: Ralph G. Page, Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, telephone 301-427-4309.

SUPPLEMENTARY INFORMATION:

I. Introduction

Some of the sites formerly used for processing thorium and uranium are known today to be contaminated with residual radioactive materials. Some are currently covered by NRC licenses. Others were once licensed, but the licenses to possess and use material have expired. In many cases, the total amount of contaminated soil is large, but the activity concentrations of radioactive materials are believed sufficiently low to justify their disposal on privately owned lands or storage onsite rather than their transport to a licensed radioactive materials disposal (commercial) site. In many instances packaging and transporting these wastes to a licensed disposal site would be too costly and not justified from the standpoints of risk to the public health or cost-benefit. Furthermore, because of the total volume of these wastes, limited commercial waste disposal capacity, and restrictions placed on receipt of long-lived wastes at commercial sites, it is not presently feasible to dispose of these wastes at commercial low-level waste disposal sites.

Effective January 28, 1981, NRC regulations in 10 CFR 20, "Standards for Protection Against Radiation", were amended (45 FR 71761-71762) to delete § 20.304 which provided general authority for disposal of radioactive materials by burial in soil. Under the amended regulations, licensees must apply for and obtain specific NRC approval to dispose of radioactive materials in this manner under the provisions of 10 CFR 20.302. A case-by-case review was believed needed to assure that burial of radioactive wastes would not present an unreasonable health hazard at some future date.

The deleted provisions of § 20.304 previously permitted burial of up to 100 millicuries of thorium or natural uranium at any one time, with a yearly limitation of 12 burials for each type of material at each site. The only disposal standards specified were (1) burial at a minimum depth of four feet, and (2) successive burials separated by at least six feet. Thus a total of 1.2 curies of these materials were permitted to be disposed of each year by burial in a 12 foot by 18 foot or larger plot of ground.

Under the amended regulations, it is incumbent on an applicant who wants to bury radioactive wastes to demonstrate that local land burial is preferable to other disposal alternatives. The evaluation of the application takes into account the following information:

Types and quantities of material to be buried
Packaging of waste
Burial location
Characteristics of burial site
Depth of burial
Access restrictions to disposal site
Radiation safety procedures during disposal operations
Recordkeeping
Local burial restrictions, if any

For applications involving disposal of soils contaminated with low level concentrations of thorium and uranium (other than concentrations not exceeding EPA cleanup standards), the matters of principal importance are:

Concentrations of thorium and uranium (either in secular equilibrium with their daughters or without daughters present)
Volume of contaminated soil
Costs for offsite and onsite disposal
Availability of offsite burial space
Disposal site characteristics
Depth of burial and accessibility of buried wastes
State and local government views

II. Branch Technical Position

There are five acceptable options for disposal or onsite storage of thorium and uranium contaminated wastes. Applications for disposal or storage will be approved if the guidelines discussed under any option are met. Applications for other methods of disposal may be submitted and these will be evaluated on their own merits.

1. Disposal of acceptably low concentrations (which meet EPA cleanup standards) of natural thorium with daughters in secular equilibrium, depleted or enriched uranium, and

UCCNHT0001670

uranium ores with daughters in secular equilibrium with no restriction on burial me[illegible]

[illegible] this option, the concentrations of natural thorium and depleted or enriched uranium wastes are set sufficiently low that no member of the public is expected to receive a radiation dose commitment from the disposed materials in excess of 1 millirad per year to the lung or 3 millirads per year to the bone from inhalation and ingestion, under any foreseeable use of the material or property. These radiation dose guidelines were recommened by the Environmental Protection Agency (EPA) for protection against transuranium elements present in the environment as a result of unplanned contamination (42 FR 60956–60959). In addition, the concentrations are sufficiently low so that no individual may receive an external dose in excess of 10 microroentgens per hour above background. This is compatible with guidelines EPA proposed as cleanup standards for inactive uranium processing sites (46 FR 2556–2563).

For natural uranium ores having daughters in equilibrium, the concentration limit is equal to that set by the EPA (46 FR 2556–2563) for radium-226 (i.e., 5 pCi/gm, including ba[illegible]ound) and its decay products. [illegible] concentrations specified below are believed appropriate to apply. It is expected, however, that currently licensed operations will be conducted in such a manner as to minimize the possibility of soil contamination and when such occurs the contamination will be reduced to levels as low as reasonably achievable.

Kind of material	Concentration (pCi/gm)
Natural thorium (Th-232 plus Th-228) if all daughters are present and in equilibrium	10
Depleted Uranium	35
Enriched Uranium	30
Natural Uranium Ores (U-238 plus U-234) if all daughters are present and in equilibrium	10

The analysis upon which the Branch Technical Position is based is available for inspection at the Commission's Public Document Room at 1717 H St., N.W., Washington, D.C.

The concentrations specified under this option may be compared with naturally occurring thorium and uranium ore concentrations of 1.3 pCi/gm in ig[illegible]ous rock and uranium [illegible]ntrations of 120 pCi/gm in Florida phosphate rock and 50–80 pCi/gm in Tennessee bituminous shale Concentration limits for natural thorium and natural uranium ore wastes containing daughters not at secular equilibrium can be calculated on a case-by-case basis using the applicable isotopic activities data.

2. Disposal of certain low concentrations of natural thorium with daughters in secular equilibrium and depleted or enriched uranium with no daughters present when buried under prescribed conditions with no subsequent land use restrictions and no continuing NRC licensing of the material.

Under this option the concentrations of natural thorium and uranium are set sufficiently low so that no member of the public will receive a radiation dose exceeding those discussed under option 1 when the wastes are buried in an approved manner absent intrusion into the burial grounds. This option will require establishing prescribed conditions for disposal in the license, such as depth and distribution of material, to minimize the likelihood of intrusion. Burial will be permitted only if it can be demonstrated that the buried materials will be stabilized in place and not be transported away from the site.

Acceptability of the site for disposal will depend on topographical, geological, hydrological and meteorological characteristics of the site. At a minimum, burial depth will be at least four feet below the surface. In the event that there is an intrusion into the burial ground, no member of the public will likely receive a dose in excess fo 170 millirems to a critical organ. An average dose not exceeding 170 millirems to the whole body for all members of a general population is recommended by international and national radiation expert bodies to limit population doses With respect to limiting doses to individual body organs, the concentrations are sufficiently low that no individual will receive a dose in excess of 170 millirems to any organ from exposure to natural thorium, depleted uranium or enriched uranium.

The average activity concentration of radioactive material that may be buried under this option in the case of natural thorium (Th-232 plus Th-228) is 50 pCi/gm, if all daughters are present and in equilibrium; for enriched uranium it is 100 pCi/gm if the uranium is soluble and 250 pCi/gm if insoluble; for depleted uranium it is 100 pCi/gm if the uranium is soluble and 300 pCi/gm if insoluble. Natural uranium ores containing radium 226 and its daughters are not included under this option, because of possible radon 222 emanations and resultant higher than acceptable exposure of individuals in private residences if houses were built over buried materials.

3. Disposal of low concentrations of natural uranium ores, with all daughters in equilibrium, when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the specified land contains buried radioactive materials and are conditioned in a manner acceptable under state law to impose a covenant running with the land that the specified land may not be used for residential building. (There is no continuing NRC licensing of the material.)

Disposal will be approved if the burial criteria outlined in option 2 (including burial at a minimum of 4 feet) are met. Depending upon local soil characteristics, burials at depths greater than 4 feet may be required. In order to assure protection against radon 222 releases (daughter in decay chain of uranium 238 and uranium 234), it is necessary that the recorded title documents be amended to state in the permanent land records that no residential building should be permitted over specified areas of land where natural uranium ore residues (U-238 plus U-234) in concentrations exceeding 10 pCi/gm has been buried. Industrial building is acceptable so long as the concentration of buried material does not exceed 40 pCi/gm of uranium (i.e., Ra-226 shall not exceed 20 pCi/gm).

4. Disposal of land-use-limited concentrations of natural thorium or natural uranium with daughters in secular equilibrium and depleted or enriched uranium without daughters present when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the land contains buried radioactive material and are conditioned in a manner acceptable under state law to impose a covenant running with land that the land (1) may not be excavated below stated depths in specified areas of land unless cleared by appropriate health authorities, (2) may not be used for residential or industrial structures over specified areas where radioactive materials in concentrations higher than specified in options 2 and 3 are buried, and (3) may not be used for agricultural purposes in the specified areas. (There is no continuing NRC licensing of the disposal site.)

Under this option, conditions of burial will be such that no member of the public will receive radiation doses in excess of those discussed under option 1 absent intrusion into the burial ground Criteria for disposal under these conditions is predicated upon the assumption that intentional intrusion is less likely to occur if a warning is given

UCCNHT0001671

in land documents of record not to excavate below burial depths in specified areas of land without clearance by health authorities; not to construct residential or industrial building on the site; and not to use specified areas of land for agricultural purposes. Because of this, we believe it appropriate to apply a maximum critical organ exposure limit of 500 millirems per year to thorium and uranium buried under this restriction instead of 170 millirems as used in options 2 and 3. In addition, any exposure to such materials is likely to be more transient than assumed (essentially continual exposure) under those options. These two factors combine to increase the activity concentration limits calculated under option 2 by about 10. Thus, the average concentration that may be buried under this option for thorium (Th-232 plus Th-228) is 500 pCi/gm if all daughters are present and in equilibrium, for enriched uranium it is 1000 pCi/gm if the uranium is soluble and 2500 pCi/gm if insoluble, and for depleted uranium it is 1000 pCi/gm if the uranium is soluble and 3000 pCi/gm if insoluble.

With respect to natural uranium with daughters present and in equilibrium, the concentration that may be buried under this option is 200 pCi/gm of U-238 plus U-234, i.e., 100 pCi/gm Ra-226. This concentration is based on a limited exposure of 2.4 hours per day to limit the radon dose to less than 0.5 working level month (WLM) which is equivalent to continuous exposure to 0.02 working level (WL). Depending upon local soil characteristics, burials at depths greater than 4 feet may be required.

SUMMARY OF MAXIMUM CONCENTRATIONS PERMITTED UNDER DISPOSAL OPTIONS

Kind of Material	Disposal Options			
	1[1]	2[2]	3[3]	4[4]
Natural Thorium (Th-232 + Th-228) with daughters present and in equilibrium	10	50		500
Natural Uranium (U-238 + U-234) with daughters present and in equilibrium	10		40	200
Depleted Uranium:				
*Soluble	35	100		1,000
*Insoluble	35	300		3,000
Enriched Uranium:				
*Soluble	30	100		1,000
*Insoluble	30	250		2,500

[1] Based on EPA cleanup standards.
[2] Concentrations based on limiting individual doses to 170 mrem/yr.
[3] Concentration based on limiting equivalent exposure to 0.02 working level or less.
[4] Concentrations based on limiting individual doses to 500 mrem/yr and in case of natural uranium, limiting exposure to 0.02 working level or less.

5. Storage of licensed concentrations of thorium and uranium onsite pending the availability of an appropriate disposal site.

When concentrations exceed those specified in option 4, long term disposal other than at a licensed disposal site will not normally be a viable option under the provisions of 10 CFR 20.302. In such cases, the thorium and uranium may be permitted to be stored onsite under an NRC license until a suitable method of disposal is found. License conditions will require that radiation doses not exceed those specified in 10 CFR Part 20 and be maintained as low as reasonably achievable.

Before approving an application to dispose of thorium or uranium under options 2, 3, or 4, NRC will solicit the view of appropriate State health officials within the State in which the disposal would be made.

Dated at Silver Spring, Maryland this 19th day of October, 1981.

Richard E. Cunningham,

Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards

[FR Doc. 81-30808 Filed 10-22-81 8:45 am]

BILLING CODE 7590-01-M

OFFICE OF PERSONNEL MANAGEMENT

Postponement of Application Deadline for Fund-Raising Privileges Among Federal Employees by Private Voluntary Organizations

Section 5 43 of the "Manual on Fund-Raising Within the Federal Service for Voluntary Health and Welfare Agencies" sets December 1 of each year as the deadline by which national voluntary agencies must submit applications for participation in the Combined Federal Campaign (CFC) to be conducted in the fall of the following year. This year's deadline is being postponed from December 1, 1981, to February 1, 1982. In June 1981, the U.S. Office of Personnel Management (OPM) announced that the eligibility criteria for participation in the 1982-83 CFC are being reviewed. The deadline date is being postponed to avoid national voluntary agencies having to revise their applications to meet eligibility criteria which may be changed.

Donald J. Devine,

Director.

[FR Doc. 81-30730 Filed 10-22-81 8:45 am]

BILLING CODE 8325-01-M

OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

Resolution of Complaint of Price-Undercutting of Subsidized Cheese Imports

On October 1, 1981, the United States Trade Representative received a letter from the Secretary of Agriculture informing him of the Secretary's finding that imported Grade A Swiss type cheese produced in Finland has been offered for sale in the United States at duty-paid wholesale prices which are five cents per pound less than the domestic wholesale market price of similar cheese produced in the United States.

In accordance with Section 702(c)(2) of the Trade Agreements Act of 1979 (the Act) (19 U.S.C. 1202 note), the Office of the United States Trade Representative notified Finland of the price undercutting determination made by the Secretary of Agriculture, requested that corrective action be taken, and asked for appropriate assurances concerning the commitments made in the Arrangement Between the United States and Finland Concerning Cheese.

On October 14, 1981, Finland notified the United States Trade Representative that measures have been taken to ensure that the duty-paid wholesale price of imported Grade A Swiss type cheese produced in Finland will not be less than the domestic wholesale market price of similar cheese produced in the United States. In addition, Finland gave assurance that it will respect the price commitments in the Arrangement. Since the above notification by Finland has occurred within the 15-day period provided in Section 702(c)(3) of the Act, the United States Trade Representative has notified the Secretary of Agriculture of his belief that no further action is required.

William E. Brock,

United States Trade Representative

[FR Doc. 81-30684 Filed 10-22-81 8:45 am]

BILLING CODE 3190-01-M

SECURITIES AND EXCHANGE COMMISSION

[Release No. 22236; 70-6650]

Arkansas Power & Light Co.; Proposed Issuance and Sale of First Mortgage Bonds

October 19, 1981.

Arkansas Power & Light Company

UCCNHT0001672

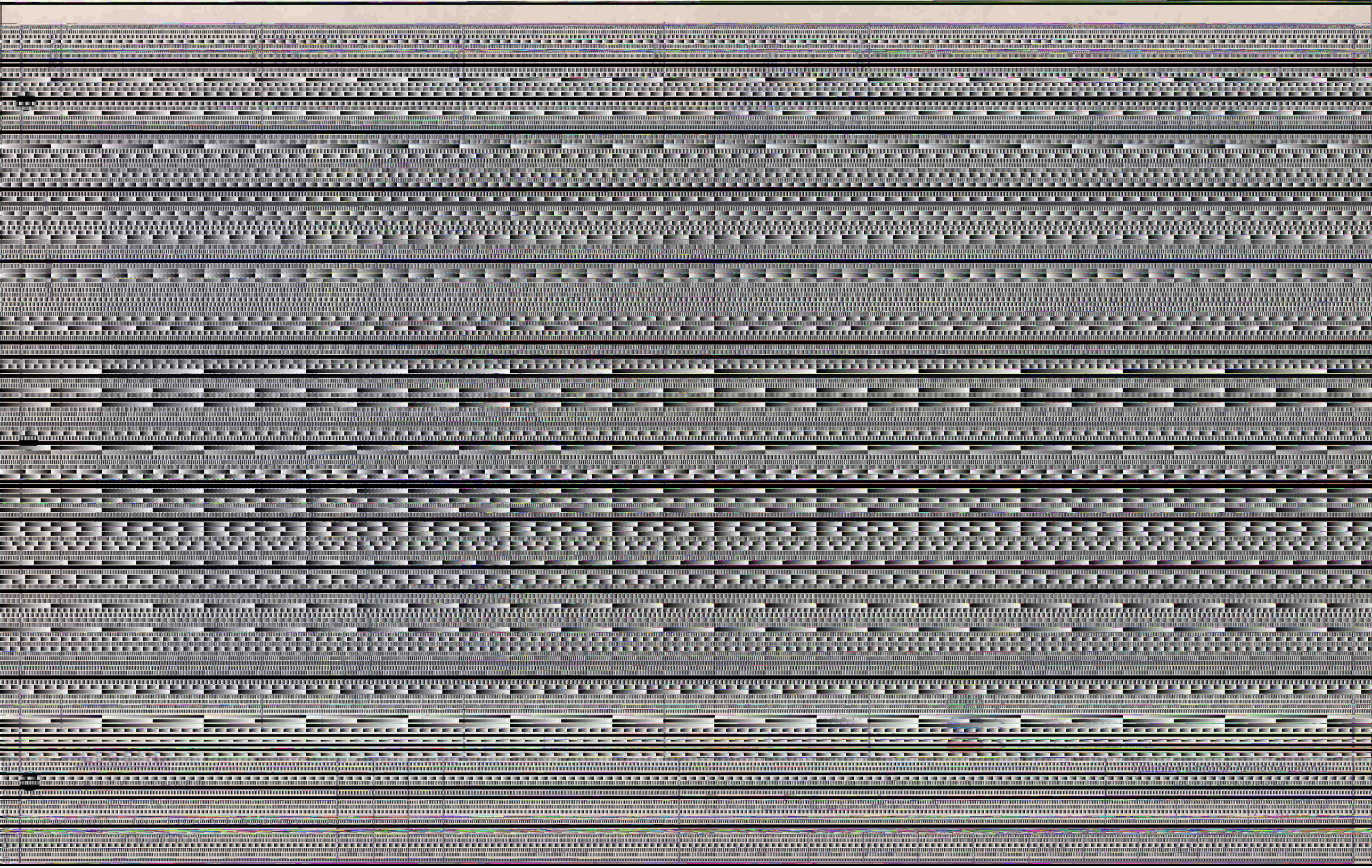

TABLE III

SAMPLE NO.	CHEMICAL ANALYSIS URANIUM/THORIUM pCi/gm DEPTH IN INCHES									GAMMA X BKg SURFACE
	0	3	6	9	12	15	21	24	26	
1	14/40									9
2	11/19									6
3	26/61									12
4	26/66									17
5	8/22	11/19								8
6	6/12									8
7	11/28									6
8	6/6									5
9	11/11									3
10	8/12									13
11		3/2		<3/3						1
12	42/105	<3/1		<3/3	<3/3					21
13	82/201		<3/<1		<3/2					33
14		57/164		<7/<8		<7/3	7/2		3/3	26
15	466/382		27/7	30/12		30/3		23/3		83

NEW YORK STATE REGULATIONS - LICENSE BUT UNRESTRICTED
URANIUM 57 pCi/gm
THORIUM 37 pCi/gm (See report for calc.)

NRC PROPOSED REGULATIONS - DELICENSE & UNRESTRICTED
URANIUM 10 pCi/gm
THORIUM 10 pCi/gm

UCCNHT0001674

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET, P O BOX 97, NIAGARA FALLS, N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710 524 1664

TECHNOLOGY DEPARTMENT
— ENGINEERING

October 1, 1984

South Carolina Department
Health Environmental Control
2600 Bull Street
Columbia, SC 29201

ATTENTION: HEYWARD G. SHEALY, CHIEF
BUREAU OF RADIOLOGICAL HEALTH

Dear Sir:

This letter is in response to your letter of September 18, 1984, which requires our submittal of corrective measures being taken to eliminate the stated violation of section 1.2, Department Regulation 61-83, and compliance with all applicable requirements and regulations.

There is, of course, no excuse for the omission of the package label "Class A," but an explanation of the circumstances under which it happened will clarify the problem.

We were making simultaneous shipments to Chem-Nuclear at Barnwell, South Carolina, and our plant at Uravan, Colorado. The material being shipped to both locations is from the same cleanup activity. Clean soil with higher concentrations (0.13%) of uranium is being shipped to Uravan for processing while soil with debris and low uranium concentrations is being shipped to Barnwell. Our contractor mistakenly labeled the Uravan shipments "Class A" and omitted the label on the Barnwell shipment. All shipping to Uravan is completed. Therefore, a mix up like this will not happen again.

We apologize for the inconvenience and appreciate that no further enforcement action is anticipated. If additional information is required, please contact the writer.

Sincerely,

Lee G Evans

Lee G. Evans
Project Engineer

lb

UCCNHT0001675

UNION CARBIDE

INTERNAL CORRESPONDENCE

LGC

UNION CARBIDE CORPORATION

METALS DIVISION

P O BOX 579 4625 ROYAL AVE
NIAGARA FALLS NEW YORK 14302

To (Name) Mr. W. C. Thurber
Division Umetco Minerals Corporation
Location Danbury, CT
Area

Date August 8, 1984

Originating Dept TECHNOLOGY

Area Niagara Falls, NY

Copy to

Subject Decontamination of Niagara Technology - Tiger Project

The latest estimate to complete the work is $700,000 vs an Engineering estimate of $360,000 and an actual budget request of $400,000 including management contingency. It is Marietta repeated, even though the area was thoroughly sampled over a three year period by UCC, New York State Department of Health and the DOE. Several things conspired to increase the cost.

1. Sampling indicated activity decreased with depth and an 8" excavation would remove the pyrochlor ore. This was not true. We have hit several bad spots. One in particular is an area 30' long and 3' wide where the activity hasn't decreased but rather increased. It extends under the concrete pads on both sides. It is a hard agglomerate which has required hammers to break it up. The source is unknown but obviously could not have fallen off rail cars and had to be there before the concrete unloading pads were poured. At a depth of 3' we are still 15 times background with no signs of abatement. The backfill will cut surface gamma radiation to background but we don't dare go any deeper. There are other spots that required going down to a meter in depth including holes and trenches in the concrete pads not shown on the drawings. Our total shipping volume is now estimated at 15,700 ft^3 vs a budget estimate of 7,000 ft^3.which included a contingency.

2. Barnwell increased it's burial costs by 3.00$/$ft^3$.

3. The Engineering estimate based on the surface to volume ratio of the Marietta boxes included a 15% add on total box volume vs actual excavated volume. The actual boxes designed for the load increased the volume by 30%.

These three things jointly caused the overrun. We may have trouble getting to background and really have nothing left for future work which may be mandated, as was the case at Marietta. I will give you a complete rundown at the end of the month but for now it is bad news.

R. J. Klotzbach

/mau

815 149 880

Mailed to W. C. Thurber 8/8/84 [illegible]

C Neal Carpenter
President
N Kent Baker
Eugene R Brauer
Gordon W Bruchner
Patrick C Dwyer
Robert J Shreve
Dale J Steichen
Robert D Thomas
Gary R Windolph

ARIX

A Professional Corporation

Engineers Architects Planners

1005 North 12th Street
Suite 202
Grand Junction Colorado 81501
303 242 6203

Date September 20, 1984

Project No.

To Mr. Lee Evans
Umetco Minerals Corporation
137 47th Street
Niagara Falls, New York 14302

Project Radiation Survey of Haulage Trucks

Gentlemen

We are transmitting Herewith X Under Separate Cover ____

No of Copies	Description or Remarks
1	Radiological Resease, Load. No. 615-4009
1	Radiological Release, Load No. 615-4010

- [ ] No Exceptions Taken
- [ ] Make Corrections Noted
- [ ] Amend & Resubmit
- [ ] Rejected - Resubmit
- [ ] As Indicated on Each Submittal

- [X] As Requested
- [ ] For Approval
- [ ] For Your Records
- [ ] _____

Respectfully,

ARIX, A Professional Corporation

By _____
J. Tell Tappan, Director
Radiological Assessments Dept.

UCCNHT0001677

C Neal Carpenter
President
N Kent Baker
Eugene R Brauer
Gordon W Bruchner
Patrick C Dwyer
Robert J Shreve
Dale J Steichen
[illegible]bert D Thomas
[illegible]y R Windolph

ARIX

RADIOLOGICAL RELEASE FOR UNRESTRICTED USE OF EQUIPMENT

A Professional Corporation
Engineers Architects Planners

1005 North 12th Street
Suite 2B
Grand Junction Colorado 81501
303 242 6203

To Whom It May Concern:

The services of ARIX are governed by the legal doctrine of reasonable skill and care in the performance of our work. In the professional opinion of ARIX staff members, the equipment and associated radioactivity measurements listed below meet the criteria set forth by the U.S. Nuclear Regulatory Commission (ANNEX A, Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unrestricted Use, dated November 1976) and adopted by the Colorado Department of Health.

VEHICLE

Operator's Name: HAROLD Williams Truck I.D. 886

Load No. 615-4009 Trailer I.D. 253159

ALPHA RADIOACTIVITY (dpm/100cm^2)

Average: None detected (5,000 allowable) Maximum: None detected (15,000 allowable) Removable: None detected (1,000 allowable)

Inst. Type Eberline Gas Proportional α Probe S/N 4076

Removable. Eberline SPA-2 Zinc Sulfide Detector

BETA-GAMMA RADIOACTIVITY (dpm/100cm^2)

Average: 714 (1,000 allowable) Maximum: 1428 (3,000 allowable) Removable: None detected (200 allowable)

Inst. Type Ludlam Pancake Probe S/N 17723

Surveyed By ARIX, A Professional Corporation

Rick Sartain — Signature
Rad Tech — Title
9-17-84 — Date

C Neal Carpenter
President
N Kent Baker
Eugene R Brauer
Gordon W Bruchner
Patrick C Dwyer
Robert J Shreve
Dale J Steichen
[illegible]rt D Thomas
[illegible] R Windolph

ARIX RADIOLOGICAL RELEASE

FOR

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To Whom It May Concern·

The services of ARIX are governed by the legal doctrine of reasonable skill and care in the performance of our work. In the professional opinion of ARIX staff members, the equipment and associated radioactivity measurements listed below meet the criteria set forth by the U S Nuclear Regulatory Commission (ANNEX A, Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unrestricted Use, dated November 1976) and adopted by the Colorado Department of Health.

VEHICLE

Operator's Name: Virgil Starchuc Truck I.D. 84068

Load No. 615-4010 Trailer I.D. 254075

ALPHA RADIOACTIVITY (dpm/100cm^2)

Average: None detected (5,000 allowable) Maximum: None detected (15,000 allowable) Removable: None detected (1,000 allowable)

Inst. Type Eberline Gas Proportional ∝ Probe S/N 4076

Removable. Eberline SPA-2 Zinc Sulfide Detector

BETA-GAMMA RADIOACTIVITY (dpm/100cm^2)

Average: 714 (1,000 allowable) Maximum: 2857 (3,000 allowable) Removable: None detected (200 allowable)

Inst. Type Ludlam Pancake Probe S/N 17723

Surveyed By ARIX, A Professional Corporation

Rick Sartain — Signature

Rad Tech — Title

Sept 17, 1984 — Date

UCCNHT0001679

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE. NIAGARA FALLS, N Y 14302
METALS DIVISION

August 6, 1984

Mr. John Oxaal
Elkem Metals Company
Niagara Falls, NY

Subject: Decontamination of Technology Property

Dear John:

We are decontaminating the south portion of the railroad tracks shown in Figure 2, "Location of Elevated Gamma-Ray Levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY", appended to Tiger Project letter in conjunction with closing June 30, 1981, signed by F. C. Kroft, Jr. Our purpose is to cancel New York State License No. 950-0139 which allows us to possess and process natural radioactive thorium-bearing pyrochlore ore used for the production of ferrocolumbium and meet NRC proposed regulations for delicensing and unrestricted land use.

To accomplish these ends we are backfilling the area excavated with clay because our experience at Marietta shows we must provide a covered area suitable for soil sampling. Elkem's position is the backfilling with clay is inappropriate cover for access and full use of the loading pads in the area which they intend to use for bulk storage.

Accordingly, after our license has been cancelled and full and unrestricted use of the area is allowed, without reservations regarding ground cover or New York State imposed restrictions concerning future work, Union Carbide at its sole cost and expense will perform the following work:

(1) Reexcavate the area to a minimum depth of six inches, but not to the original depth of the excavation which ranges from nine inches to over two feet in some areas.

Fabric

(2) Install a permeable liner over the remaining clay as a free draining support for crushed stone.

(3) Backfill the newly excavated area with gravel to a depth to be determined by your engineers but not exceeding six inches.

(4) Dispose of the approximately 300 yards of clay which is excavated.

UCCNHT0001680

The work as outlined is contingent on Union Carbide receiving permission for unrestricted access without conditions imposed by New York State Department of Labor, Division of Safety and Health or the Federal Nuclear Regulatory Commission or the Federal Environmental Protection Agency.

If the foregoing correctly sets forth the understanding and agreement of the parties, kindly execute this letter agreement in the space provided below.

Very truly yours,

Union Carbide Corporation

By: _____

Title: _____

Agreed To and Accepted:

Elkem Metals Company

By: _____

Title: _____

cc: Mr. R. F. X. Fusaro
Mr. W. C. Thurber

Note to Fusaro and Thurber:

I made this agreement with Oxaal but it probably requires Thurber's signature.

UCCNHT0001681

NUS PROCESS SERVICES

August 3, 1984

Mr. Lee G. Evans
Umetco Minerals Corporation
P.O. Box 97
Niagara Falls, NY 14302
Cornelius, NC 29031

Dear Lee:

This is to advise you that NUS Process Services, acting as your agent at the Barnwell, South Carolina Waste Disposal Site First Come/First Serve Volume Allocation Plan, has obtained 1859 ft^3 of burial space for use in the month of November, 1984.

Thank you for utilizing our services, and if I can be of any further service, please do not hesitate to contact me at (803) 256-4355.

Sincerely,

Earl E. Reagan, Jr.

Earl E. Reagan, Jr.
Supervisor
Transportation Services

EERjr/fmw
cc: R. Voit

UCCNHT0001682

NUS PROCESS SERVICES

June 7, 1984

Mr. Lee Evans
UMETCO Minerals Corporation
P.O. Box 97
Niagara Falls, New York 14302

Dear Mr. Evans:

This is to advise you that NUS Process Services, acting as your agent at the Barnwell, South Carolina Waste Disposal Site First Come/First Serve Volume Allocation Plan, has obtained 1916 ft^3 of burial space for use in the month of September, 1984.

Thank you for utilizing our services, and if I can be of any further service, please do not hesitate to contact me at (803) 256-4355.

Sincerely,

Earl E. Reagan, Jr.

Earl E. Reagan, Jr.
Supervisor
Transportation Services

EER/fmw

UCCNHT0001683

South Carolina Department of Health and Environmental Control

2600 Bull Street
Columbia, S C 29201

Commissioner
Robert S Jackson, M D

Board
Moses H Clarkson, Jr , Chairman
Leonard W Douglas, M D , Vice-Chairman
Gerald A Kaynard, Secretary
Barbara P Nuessle
Oren L Brady, Jr
James A Spruill, Jr
William H Hester, M D

September 18, 1984

Mr. Lee G. Evans, Project Engineer
Union Carbide Corporation
Metals Division
P.O. Box 97
Niagara Falls, New York 14302

Dear Mr. Evans:

As a result of an investigation conducted by the South Carolina Department of Health and Environmental Control on September 13, 1984, of your radioactive waste shipment upon its arrival at the Chem-Nuclear burial facility in Barnwell, South Carolina, certain violations of applicable state and federal regulations were determined.

The violation is identified as follows:

Radioactive Waste Shipment No. 0984-214-A, classified as Radioactive Material, LSA, n.o.s., described as solid metal oxides of soil, rubble, and hardware, and contained in 6 wooden crates was found not to have the waste classification marked on the packages. This is contrary to the requirement of Condition 31 of S.C. Radioactive Material License No. 097, issued to Chem-Nuclear Systems, Inc. and constitutes a violation of Section 1.2, Department Regulation 61-83.

Please be advised that this is a warning communication. The Department does not anticipate further enforcement action for this particular violation. However, repeat offenses of this nature will result in stricter sanctions. Therefore, you are required to submit to the Department no later than October 8, 1984, your corrective measures to ensure full compliance with all applicable requirements and regulations.

UCCNHT0001684

Should you have any questions, please contact Mr. Virgil R. Autry at (803) 758-7951.

Very truly yours,

Heyward G. Shealy

Heyward G. Shealy, Chief
Bureau of Radiological Health

HGS:kn

UCCNHT0001685

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

May 4, 1984

Mr. H. Michaels
New York State Department of Labor
Division of Safety & Health
69th Floor
2 World Trade Center
New York, NY 10047

212-488-[illegible] TTP

Subject: Radioactive Materials License 950-0139

Dear Mr. Michaels:

Attached is a plot plan of the area you wish to sample. Gamma readings on 10-foot centers are shown as times background.

The center lines of the railroad tracks are shown. This plan should give you a good basis for planning your sampling and estimate the amount of time involved.

"Ball Field Area" is a phrase which should be ignored in that it is 60-years old terminology used for internal descriptive orientation. It has not been a ball field since before World War II.

Grab sample areas are shown as circled numbers. Uranium and thorium analysis converted to pCi/gram are indicated in the box on the right with reference to the sample locations.

Please inform me of your schedule.

Very truly yours,

R. J. Klotzbach

/mau
Attachment

cc: Messrs: L.G. Evans
W.C. Thurber
R.A. Crago/R.E. DeWeese - Elkem

UCCNHT0001686

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

May 2, 1984

Ref'd to TJK / File
For

REC'D MAY 3

Noted by
File
Subject 11309

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139 - Status Report

Dear Mr. Kelly:

We have obtained burial allocation at Barnwell, SC for August 1984 in the amount of 1900 ft^3.

Based on our volume estimate of 7000 ft^3, it will take us all of 1984 and into 1985 to complete the burial because competition for space tends to intensify at the end of the year.

However, your verbal request to delay the work pending a New York State Department of Health survey, not scheduled by H. Michaels until the end of May, will seriously delay the project resulting in loss of allocated burial space. Future schedules depend on the rapidity with which you receive analytical results, make your judgements and issue approval to proceed.

We cannot commit any manpower or funding to a project which has not received the approval of your department. That is the nature of any endeavor involving a state or federal license where a clear cut approved end result is projected which must receive prior approval from the regulatory agency. I would be remiss in my accountability for our limited resources if I acted otherwise.

Up to this point we had your verbal approval as Health Department Representative to proceed with the action plan transmitted to you on April 4, 1984. Since this is not the case, when your department completes its investigation, written approval for the contemplated actions is necessary for the commitment of Union Carbide resources. I now doubt we can complete the work before July 31 and the schedule transmitted to you in my April 4 reply to your March 29, 1984 reissue of your notice of inspection findings, based on a previous New York State survey, is voided.

UCCNHT0001687

UC 149 2

UNION CARBIDE

INTERNAL CORRESPONDENCE

UNION CARBIDE CORPORATION 137-47th Street PO BOX 97 NIAGARA FALLS NY 14302
METALS DIVISION

To (Name) Mr. R. J. Klotzbach
Division
Location Umetco Minerals Corporation
Area Niagara Falls, NY

Date May 1, 1984

Originating Dept. TECHNOLOGY DEPARTMENT — ENGINEERING

Area

Copy to Messrs. T. J. Kagetsu
F. T. Temple
G. E. Walck
File: 11309

Subject Soil Decontamination - South of Bldg. 166, Niagara

We have obtained a burial allocation at Barnwell, SC, for August 1984 of 1900 ft.^{3}. Competition for space tends to intensify toward the end of each year. (WE REQUESTED 3000 ft^3)

Based on our volume estimate of 7000 - 8000 ft.^{3}, it will take us all of 1984 and maybe into 1985 to complete the burial.

All of the soil, however, will be excavated and packaged by August 1 and stored in the Niagara Plant. I have contacted Frank Temple regarding a suitable storage site. This should bring us into compliance with our NYS Radioactive Material License (950-D139).

I'll keep you posted.

L J Evans

cc: L. G. Evans

/dac8

UCCNHT0001688

Since our meeting in the first week of April we have performed the following:

April 6	1.	Hired agents at Barnwell, SC.
April 13	2.	Applied for shipping permit.
April 17	3.	Released $33,000 of engineering funds and started detail work.
April 18	4.	Began preparation of work descriptions and purchase orders.
April 25	5.	Cleaned up the area for equipment access.
April 25	6.	Received shipping permit.
May 1	7.	Received partial burial space allocation.

As you can see, in a period of three weeks we have actively pursued every phase of the project and acted in good faith by issuing documented status reports to you covering each of those items. Nobody has raised any question until the request for "holdup of cleanup." If you issue written approval to proceed, as planned, we will not hold up anything pending your survey except the actual excavation which we must be prepared to begin by June 15.

We will await your advice and approval for this corrective action.

Very truly yours,

R. J. Klotzbach

R. J. Klotzbach
Director of Technology

/mau

cc: Messrs. W. C. Thurber
L. G. Evans
R. A. Crago/R. E. DeWeese - Elkem

UCCNHT0001689

cc TJK
FILE 11309

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

April 30, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139

Dear Mr. Kelly:

As you requested on this date I am forwarding the survey data we made to define our problem in the area contaminated by ore unloading operations.

You should have in your files the result of the New York State survey made in December 1981 which resulted in a citation for failure to meet licensing requirements. Your survey may be more accurate than ours.

In order to expedite this matter, I am attaching our internal design memo describing the problem and our alternates for solution. This memo should be considered Union Carbide confidential information released to your department in answer to questions which you have raised related to the citation.

The detailed cost estimates have been deleted from this copy but are summarized on Page 9. You can see we have adopted the permanent solution alternative requiring the highest expenditure of funds, contrary to the engineers' recommendation. In addition, our costs have escalated to $400,000 from the $335,000 estimate in the memo.

The information you require for the gamma probes is on Page 3. A drawing of the entire suspect area is enclosed with gamma survey readings on 10 foot centers.

Chemical analysis of "grab" samples were made and a table is displayed converting to pCi/gram. These samples were taken primarily to determine the extent and depth of both thorium and uranium contamination since, at the time, we did not know the source of the original spillage. The high thorium is a definite signature that the source was primarily columbium bearing ores.

UCCNHT0001690

Table III shows that sampling for chemical analysis was done at depth for the areas displaying the highest surface contamination. Activity decreases dramatically with depth so we are certain we have no long standing problem and a fix can be made.

We intend to do in-house monitoring while the work is in progress. We will not complete our efforts until (1) an independent survey is made, and (2) your department conducts it's own survey on the decontaminated area. Our independent surveyors have not as yet been hired but the paper work for purchase and work scope agreements is in preparation. We will keep you informed.

Please feel free to call me about our progress or any other details you require. I will continue to send you status reports.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber w/a
L. G. Evans
R. A. Crago/R. E. DeWeese - Elkem

UCCNHT0001691

cc TSK
FILE 11309

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

April 26, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139 - Status Report

Dear Mr. Kelly:

The area around the railroad tracks which contains low level radioactive ore contamination has been cleared permitting work to proceed. Clearance of railroad flat cars and other stored materials was completed on April 25, 1984.

Detailed engineering for contractor work has begun with the release of engineering funding to an active project on April 17, 1984.

Very truly yours,

R J Klotzbach

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber w/a
L. G. Evans
R. E. DeWeese - Elkem w/a

UCCNHT0001692

4-25-89

MEMO TO LEE EVANS:

WENT OUT TO SITE SOUTH OF BLDG 166 (1:30 - 2:30 PM)

MET KLOTZ & MURPHY - LATER DICK CRAGO.

ELKEM IS SEPARATING MATERIAL TO REMAIN IN STORAGE AND SCRAP.

THE SCRAP WILL BE DISPOSED OF SHORTLY - OTHER MATERIAL STORED ON SOUTH END OF MAIN CONCRETE PAD.

DON HANSEN KNOWS HISTORY OF MATERIALS, WHICH UMTCO NEEDS TO MARK OR DISPOSE OF - SUCH AS K-R (Low Chrome) PELLETS IN WOODEN SKIPS (POSSIBLE FOR USE AS BACKFILL) AND FERROPHOS; IN RUSTY STEEL DRUMS - CONDITION OF SKIPS & DRUMS MAKE MOVEMENT OF THE MATERIALS VERY DIFFICULT.

IT WAS AGREED WITH KLOTZ & MURPHY AND AGAIN LATER WITH CRAGO THAT THE TRACKS TO BE TAKEN UP ~~HERE~~ ARE NOT TO BE REPLACED - RAILS ARE ELKEM PROPERTY (PER KLOTZ) AND ~~THEY~~ CAN BE CUT-UP AND STORED ON A PAD AND IF CLEAN BE SOLD BY ELKEM AS SCRAP, THE TIES CHECKED FOR RADIOACTIVITY AND IF AFTER CLEANING FOUND TO BE CLEAN CAN BE GIVEN AWAY, IF NOT, SHIP OUT IN BOXES.

KLOTZ WOULD LIKE BOXES LINED WITH A SUITABLE LINER TO INSURE NO LEAKAGE.

MURPHY SUGGESTED A LINER SIMILAR TO WHAT THEY USE IN THEIR 4' SKIP BOXES (THESE ARE SIMILAR TO THE "BAGS" WE USED)

WE WILL HAVE TO SEE HANSEN ABOUT MOVING "OUR" MATERIALS.

RAILROAD FLAT CARS HAVE BEEN MOVED TO A LOCATION NEAR BLDG 105 OUT OF OUR WAY.

BUILDING 105 NOT AVAILABLE FOR STORAGE.

COPY TO: T.J.K
FILE 11309.

GIL

UCCNHT0001693

UNION CARBIDE CORPORATION P O BOX 579 4625 ROYAL AVE NIAGARA FALLS N Y 14302
METALS DIVISION

April 27, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 550-0139

Dear Mr. Kelly:

Attached is a copy of our permit to transport wastes in South Carolina, dated April 23, 1984, applicable to the disposal of wastes at Barnwell.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber
L. G. Evans
R. A. Crago/R. E. DeWeese - Elkem

UCCNHT0001694

RJK

Refr'd to _____
For _____
RECD APR 27 1984 RJK
Noted by _____
File _____
Subject _____

Form RHA-P
(10/80)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

SOUTH CAROLINA RADIOACTIVE WASTE TRANSPORT PERMIT

Pursuant to Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act, a Radioactive Waste Transport Permit is hereby issued to the below-named applicant (shipper). This permit shall not, in itself, be construed as authorizing a shipper to dispose of radioactive waste within the State of South Carolina. This permit shall not be transferred, assigned or in any manner disposed of, either voluntarily or involuntarily, directly, or indirectly, through transfer of control to any person, unless the Department shall, after securing full information, find the transfer is in accordance with the provisions of Act No. 429 and shall give written consent.

1. Name and Address of Applicant (Shipper): Union Carbide Corporation Metals Division P.O. Box 97 Niagara Falls, New York 14302 (Marietta, Ohio)	2. Permit Number: 0211-31-84-X 3. Expiration Date: December 31, 1984

1984

For the South Carolina Department of Health and Environmental Control

April 23, 1984
Date of Issuance
DHEC 801 (10/80)

By Heyward G. Shealy
Heyward G. Shealy, Chief
Bureau of Radiological Health

UCCNHT0001695

UNION CARBIDE CORPORATION P O BOX 579, 4625 ROYAL AVE, NIAGARA FALLS, N Y 14302
METALS DIVISION

April 18, 1984

Mr. Robert F. Kelly
Senior Radiologist
New York State Department of Labor
State Office Building
65 Court Street
Buffalo, NY 14202

Subject: Radioactive Materials License 950-0139

Dear Mr. Kelly:

My program for decontamination of the Union Carbide, Niagara, Royal Avenue Site outlined a two step program. Nevertheless we are proceeding on the basis of a one step program, without intermediate storage, provided our agents can obtain readily available burial space at Barnwell, South Carolina. We decided on this course of action on the assumption that Barnwell would not be accessible to a Northeastern zone client after 1985. Attached is a copy of our first step to insure proper channels to secure burial space. This is in accordance with my promise to keep you informed of new developments and possible changes in the program.

I assume that you are taking steps to modify or issue a new license for the unknown quantity radium source we examined on your last visit. Since I intend to dispose of that source at the same time as the radioactive ground cover I would appreciate receiving your advise on proper disposal containers and methods.

Very truly yours,

R. J. Klotzbach
Director of Technology

/mau
Attachment

cc: Messrs. W. C. Thurber
L. G. Evans
R. E. DeWeese - Elkem

UCCNHT0001696

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET, P O BOX 97 NIAGARA FALLS N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710 524 1664

TECHNOLOGY DEPARTMENT
— ENGINEERING

April 6, 1984

Chem-Nuclear Systems, Inc.
P.O. Box 726
Barnwell, SC 29813

Attn: Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

This letter authorizes Messrs. Earl Reagan, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space at the Chem-Nuclear site in Barnwell, South Carolina.

If there are any questions regarding this matter, please contact Mr. L. G. Evans at Telephone No. (716) 278-3462 or Mrs. S. C. Zambotti at Telephone No. (716) 278-3232.

Sincerely,

S C Zambotti
Mrs. S. C. Zambotti
Purchasing Agent

SCZ/jl
cc: Earl Reagan
R. J. Klotzbach

UCCNHT0001697

INTERNAL CORRESPONDENCE

UNION CARBIDE CORPORATION
METALS DIVISION

P O BOX 578 4625 ROYAL AVE
NIAGARA FALLS NEW YORK 14302

To (Name) Mr. F. V. McMillen
Division Metals Division
Location Danbury, CT
Area

Date March 20, 1984
Originating Dept. TECHNOLOGY
Area Niagara Falls, NY

Copy to Messrs:
L. G. Evans
F. T. Temple
W. C. Thurber

Subject Cleanup of Radioactive Contamination Building 166

We should accrue $400,000 of corporate money to bring the Niagara site into compliance for delicensing of the New York State Radioactive Materials License No. 950-0139 because of radioactive source concentrations in excess of 500 ppm behind Niagara Building 166. We are also obligated to do this in accordance with the Tiger agreement for unrestricted use of the area by Elkem.

The volume to be removed and eventually shipped to a burial repository is 6800 ft^3. The cost covers removal, shipping and burial.

The preferred action plan is to relocate the waste temporarily on Niagara Plant property, in a fenced area for restricted access, and then ship and bury at a later date. The relocation cost for Phase 1 is $125,000 and the shipping and burial cost is $275,000 in Phase 2. The cost assumes burial at Barnwell, South Carolina.

Access to the repository at Barnwell will be restricted after 1985 to regional member states. New York will not be a regional member and at this time there is no Northeast Regional Repository. Also, we can't just ship any volume, at any time, to Barnwell but must fit into their schedule with definite specified volumes over a time frame. It seems unlikely this could be done in 1985. Phase 1 can proceed as soon as the area is sufficiently cleaned of interfering stored materials.

R. J. Klotzbach

/MAU

615 149 680

UCCNHT0001698

March 19, 1984

To RJK

From LSE

Subject: Clean Up Options - Niagara

Attached is the design memo which is unchanged since being issued July 13, 1983. All estimates are in 1983 dollars. The following comments are offered in connection with money requests.

1) The contaminant volume reported 6800 ft^3 in confined to the area behind Bldg 166 Contamination may exist elsewhere in the Niagara Plant

2) Access to the repository at Barnwell, SC. will be restricted after 1985. to regional member states. NE states not incl.

3) The cost to relocate to Niagara Plant $120,000

4) Cost to dispose at Barnwell, SC $335,000

5) Cost to relocate to Niagara Plant & later ship to repository $390,000

cc TSK

UCCNHT0001699

UNION CARBIDE CORPORATION
METALS DIVISION
P O BOX 579 4625 ROYAL AVE NIAGARA FALLS NEW YORK 14302

July 7, 1982

Mr. R. F. Kelly
Occupational Safety and Health
65 Court Street
Buffalo, NY 14202

Dear Mr. Kelly

We would appreciate an extention to the 90-day deadline we received with your Notice of Inspection Findings concerning concentrations of source material Our intention at this time is to decontaminate the areas and store the material on site until disposal alternatives are fully investigated. I will be applying for a license amendment once we have determined details such as volume, storage site location, fencing, etc.

Very truly yours,

D. R Brosnahan
Radiation Safety Officer

DRB smn

cc: Dr. D J. Hansen

UCCNHT0001700

August 11, 1982

To: Dr. T. J. Kagetsu
Mr. L. G. Evans

From: F. A. Rutledge

Subject: Contaminated Area South of Building 166 -
Letter D. R. Brosnahan to D. J. Hansen, 6/17/82

I met with Lee Evans and Dave Brosnahan on Tuesday afternoon, August 10, 1982, to review decontamination requirements for the subject area. The following was discussed and may be used as a basis for an action plan:

1. Develop a sampling plan to firmly establish the area of contamination; i.e., pattern of sample holes and depth to check, etc. - Most sample → Dave & Coo - Start Last week Draft

2. Establish degree of clean-up required:

Try → a. Comply with State of New York requirements--55 pCi/g?
b. Comply with EPA regulations for unrestricted use--10 pCi/g?
c. Something in between?

3. Determine volume of material to be disposed of based on degree of clean-up established--2a, 2b, or 2c.

4. Determine disposal location:

a. Load and ship to approved repository?
b. Load and ship to Uravan for processing?
Try → c. Load and move to another area of UCC Niagara Plant, and fence?
d. Some other approved disposal method?

5. Develop cost estimate based on degree of clean-up required and method of disposal agreed upon.

Scrap w/ ck w/ Murphy → 6. Develop plan to dispose of scrap and remove railroad tracks that interfere with removal of residue. Check scrap for contamination prior to disposal, especially embedded railroad ties.

7. Award contract to excavate material to satisfy conditions of 2a, 2b, or 2c and ship or relocate as determined by 4a, 4b, 4c, or 4d.

8. Check area for compliance.

9. Replace railroad tracks. ?

I recommend that a meeting be held to reach an agreement on options outlined in Items 2 and 4 above and also to establsh a general time frame for the project.

FAR/cep

F. A. Rutledge

UCCNHT0001701

August 11, 1982

To: Dr. T. J. Kagetsu
Mr. L. G. Evans

From: F. A. Rutledge

Subject: Contaminated Area South of Building 166 -
Letter D. R. Brosnahan to D. J. Hansen, 6/17/82

I met with Lee Evans and Dave Brosnahan on Tuesday afternoon, August 10, 1982, to review decontamination requirements for the subject area. The following was discussed and may be used as a basis for an action plan:

1. Develop a sampling plan to firmly establish the area of contamination; i.e., pattern of sample holes and depth to check, etc.

2. Establish degree of clean-up required:

   a. Comply with State of New York requirements--55 pCi/g?
   b. Comply with EPA regulations for unrestricted use--10 pCi/g?
   c. Something in between?

3. Determine volume of material to be disposed of based on degree of clean-up established--2a, 2b, or 2c.

4. Determine disposal location:

   a. Load and ship to approved repository?
   b. Load and ship to Uravan for processing?
   c. Load and move to another area of UCC Niagara Plant, and fence?
   d. Some other approved disposal method?

5. Develop cost estimate based on degree of clean-up required and method of disposal agreed upon.

6. Develop plan to dispose of scrap and remove railroad tracks that interfere with removal of residue. Check scrap for contamination prior to disposal, especially embedded railroad ties.

7. Award contract to excavate material to satisfy conditions of 2a, 2b, or 2c and ship or relocate as determined by 4a, 4b, 4c, or 4d.

8. Check area for compliance.

9. Replace railroad tracks.

I recommend that a meeting be held to reach an agreement on options outlined in Items 2 and 4 above and also to establsh a general time frame for the project.

FAR/cep

F. A. Rutledge

UCCNHT0001702

AAXON INDUSTRIES INC
P O BOX 1317 GREENWICH CT 06830 · (203) 661-4712 · (212) 686-2670

Dear Sir,

Would you like to:

- Reduce your radioactive or hazardous waste removal costs by as much as 80%?
- Meet stricter disposal requirements?
- Achieve these benefits immediately, using a new disposal system that operates on standard 110-volt electricity and occupies less floor space than a household refrigerator or less than 6½ square feet?

Then you should investigate the PAX compaction systems, the most economical devices available that can provide these important services.

Simplicity and design efficiency form the basis for PAX compactors. A powerful ram-generating 14,000 pounds of thrust over a 30-second cycle-reduces most laboratory wastes to one-fifth its original volume. That means five times as much material can be packed into a standard 55-gallon drum. Since most waste removal companies charge by the number of drums removed, your savings begin immediately. At some institutions, PAX compactors have paid for themselves in less than a year.

You can wheel it in and start compacting-and saving-immediately. No special installation is required. Best of all, the basic PAX system costs only $6500 and comes backed by the technical support of Aaxon Industries' engineering staff.

May I invite you to call or write us directly concerning any questions you may have about the PAX hazardous waste compaction systems.

Sincerely,

Robert J. Roth
President

UCCNHT0001703

The PAX combines safe, easy operation with low price Just plug the unit into any standard 20 amp, 110-volt electrical outlet Place the 55-gallon drum into clips on dolly Add waste materials and you are ready to start compacting

Insert and turn the key to unlock the controls and activate the powerful ram that will crush your wet or dry wastes with as much as 14,000 pounds of thrust When you reach your preselected unloading weight, slide the cart back and seal the drum That's all there is to it!

Technical support

Aaxon's engineering staff will assist you in designing a PAX system to meet your individual institution's needs

PAX options extend the systems

Satellite carts

55-gallon containers mounted on dollies with rugged casters can be stationed, at various satellite locations where waste originates When filled, the carts are rolled to the central compactor, then returned to the station, avoiding the purchase of compactors for each location

Venting systems, explosion proof systems, and remote controls

The PAX can be equipped with an exhaust system for venting hazardous aerosols or vapors generated during compaction When venting to the outside is impractical, the unit can be equipped with filter systems For applications involving flammable wastes, an explosion-proof system is available Remote controls are also available for isolated operation

AAXON DISPOSAL SYSTEMS

UCCNHT0001704

PAX systems handle wastes safely, efficiently, and saves money

Powerful compacting ram reduces most laboratory wastes to one-fifth original volume Since most waste removal companies charge by the number of drums removed, you start saving immediately In some institutions the compactor has paid for itself in less than a year

Flexible guard seals waste chamber when ram is activated, minimizing dispersion of compacted materials Total ram enclosure is standard Available options include collar for venting, explosion—proof systems and remote controls

PAX systems run on standard 110-volt electric current, so no special installation is needed

Simple, efficient design provides trouble-free compacting The PAX system requires less floor space than the average refrigerator and fits through a standard doorway

Key-locked controls prevent tampering and unauthorized operation

Performance has been rated and certified by the National Solid Wastes Management Association (NSWMA)

Performance data and specifications

Compaction performance:

Total compaction thrust 14,000 pounds for 30-second cycle
Compaction thrust 50 PSI
Variable Compacted Weight 50 to 550 pounds with visual indicator to tell when to unload

Hydraulic specifications·

Hydraulic pump gear type
Maximum operating pressure 3,000 PSI
Average Cycle Time 30 seconds
Cylinder 3" bore, 25" stroke

Electrical specifications:

Motor One horsepower, totally enclosed, 1725 RPM
Operates on 110 volt, 60 cycle current, 20 amp
Grounded outlet
Components UL approved

Controls:

Key activated control with locked "power-off" position
Safety stop button

Structure:

Upright, rigid C-frame configuration
heavy steel base integrally welded
Upright column is 6" x 8" rectangular tube of 3/16" thick steel for maximum rigidity and strength
Corrosion-resistant compacting ram is rigidized by internal grid pattern and fastened to a ½" steel support plate

Dimensions:

Width 26½" Length 34½" Height 78½"

Shipping weight Approximately 950 pounds

PAX

HAZARDOUS WASTE COMPACTOR

Safely Compacts Low L Radioactive and Oth Hazardous Wastes

Compacts Directly in an Approved 55-Gall Shipping Drum

Immediate Savings of to 80% in Waste Removal Cos

Requires Less Than 6½ of Floor Space

AAXON DISPOSAL SYSTEMS

P O BOX 1317 · GREENWICH, CT 06830

AAXON DISPOSAL SYSTEMS

UCCNHT0001705

UC 149 2

UNION CARBIDE INTERNAL CORRESPONDENCE

METALS DIVISION

P O BOX 579 4625 ROYAL AVE, NIAGARA FALLS, NEW YORK 14302

To (Name) Dr. D. J. Hansen
Division
Location Niagara Falls, NY

Date May 7, 1982
Originating Dept Mineral Technology
Answering letter date

Copy to Messrs. L. G. Evans
R. J. Klotzbach
R. G. Woolery

Subject Technology Ball Field Area Cleanup

An inspection of the ball field area behind Building 166 by the New York State Department of Labor revealed four areas containing radioactive source material above limits for uncontrolled areas, as established by the State Labor Law. I crudely estimate, with little knowledge of the depth, the volume to be ∿200 cu. ft. Proposed cleanup actions will require the following:

1. Purchase of three Department of Transportation approved 70 cu. ft. caulked wooden boxes.
2. Backhoe and two to three man crew for one to two days.
3. Stone or topsoil backfill.
4. Burial space at Barnwell, S.C. ($14/cu. ft.).
5. Permit for direct shipment to Barnwell.
6. Transport by exclusive use truck.

Total estimated cost is ∿$10,000 plus contingency. Costs for burial at Barnwell are justified on the basis of low volume and unknown legal consequences of entering material into Ohio and Colorado. Burial space cannot be obtained until September 1, requiring storage to meet the present state deadline of July 2.

It must be emphasized that the above likely will not permit termination of license or release for unrestricted use, as may be required for transfer of property ownership. Large areas reported as 20 to 50 times background were within limits set by the State Department of Labor only. Nuclear Regulatory Commission guidelines for decontamination, which I have been referred to by the State concerning a license cancellation, require levels of two to three times background. In this case burial volume will increase tremendously necessitating reevaluation of place of burial, and costs will be astronomical.

D. R. Brosnahan
Radiation Safety Officer

DRB:jk

UCCNHT0001706

Lee,

Thought you might enjoy the enclosed. I would like to have it back, as I would like to have the copies of Mining Engineering back.

Why would you volunteer to clean the waste @ Marietta to background? If you have to clean up to background levels you may as well have Bob Beverly inform the State of Colorado that you plan on processing the Elmers building at Uravan to extract the uranium.

The answer to your question yesterday, which I'm sure your very interested in given that you never called back, is 105 ppm. This is calculated as follows:

$$U_3O_8 = 3.33 \times 10^{-7} \text{ Ci/gm} = 333{,}000 \text{ pCi/gm}$$

$$\frac{35 \text{ pCi/gm}}{333{,}000 \text{ pCi/gm}} = .0105\% = 105 \text{ ppm}$$

I would not increase the activity of U_3O_8 by taking the no. of Ci's/gm x 14 isotopes as you do in your calculations. I have a number from a quotable reference that shows that the activity of U_3O_8 ~~is 3.26×10^{-7}~~ in equilibrium with daughters is 3.26×10^{-7} Ci/gm. By increasing the activity of U_3O_8 you are decreasing the value to which you will clean @ Marietta. Given that the enclosed states that the evidence is indisputable that cancer incidences are lower where background radiation levels are higher, you may be responsible for an

UCCNHT0001707

increased risk of death because you went too far in cleaning up the residue. I can see it now -

Marietta Gazette

LEE EVANS - KILLER ON THE LOOSE

Mad inan Lee Evans.....

Dan

One other thing I just remembered. At technology here we are allowed to pour 3 g/l V_2O_5 down the drain - be it dissolved or in particulate form. This cannot average more than 92 ppm over the year - based on permitted concentrations in water above natural background in OH State Industrial Code Rule 35 - Ionizing Radiation Protection. A study as to whether a sewer of sufficient gallonage exists in Marietta to permit disposal by way of the Ohio River may be warranted. I may be clear out to lunch on this but it is worth a look-see. (Dilution may be the solution to your pollution).

UCCNHT0001708

UC 149-2

UNION CARBIDE INTERNAL CORRESPONDENCE

METALS DIVISION

P O BOX 579 4625 ROYAL AVE , NIAGARA FALLS, NEW YORK 143

To (Name) Dr. D. J. Hansen
Division
Location NIAGARA

Date June 17, 1982
Originating Dept Minerals Technology
Answering letter date

Copy to Messrs. R. G. Beverly
L. G. Evans
T. K. Kagetsu
R. J. Klotzbach
F. T. Temple
R. G. Woolery

Subject Technology Decontamination Requirements

In pursuing the State of New York for more of their radiological analyses, I have learned that in fact all nine areas sampled behind Bldg. 166 are out of compliance - not just the four cited. The inspector had assumed that the source material was natural uranium, allowing a maximum activity of 200 pCi/g. The source material is thorium, which due to a lower activity per unit weight, must be reduced to 55 pCi/g to be in compliance with the <0.05% (<500 ppm) requirement.

The state's analyses are as follows:

Area	Gross Activity - Raw pCi's		pCi/g	
	Surface	2 - 2-1/2" Deep	Surface	2 - 2-1/2" Deep
1	5.8	9.5	31.4	132.0
2	2.6	41.7	25.4	107.5
3	6.3	9.5	101.1	136.8
4	47.0	15.2	215.9	108.5
5	37.4	6.0	176.3	45.9
6	1400.6	861.2	3413.3	4056.5
7	34.6	35.8	312.3	207.8
8	17.3	72.9	154.7	249.5
9	9.6	16.6	50.6	98.9

Chemical analyses of surface samples I removed from Areas 5 and 8 are as follows:

	% U_3O_8	% ThO_2
Area 5	0.021	0.23
Area 8	0.039	0.48

Spectrographic analyses of these two areas and Area 6 are attached. The Ta, Cb, and Th contents indicate that the contamination is a residue of ferrocolumbium production and not from the former Area Plant.

Listed below are four possible actions which may bring us into compliance with state regulations:

UCCNHT0001709

Case	Action
1	Decontaminate east track to permit track usage requeste by Elkem. Relocate residue within west track and Area Fence and post to control access.
2	Decontaminate along both tracks and Area 6. Relocate residue to neighboring UCC property. Fence and post.
3	Decontaminate as in 2. Ship residue to Barnwell, SC for burial.
4	Decontaminate as in 2. Ship residue to Uravan, CO for processing and disposal as tailings.

Case 1 is the least expensive, but also a short term arrangement due to the chan in property ownership. Case 2 offers the following: 1) Intermediate term solution allowing time to fully investigate disposal alternatives, including the possibility of a dump in the Northeast necessary by 1986 when present dumps can ban waste from outside states. 2) Frees Technology property for change in ownership. 3) Any additional material, such as may be found during any follow-up surveys, can be handled. This case, however, is subject to approval by the State Department of Labor by amendment of our Radioactive Materials License No. 950-0139 - the license authorizing possession of 6000 lb of thorium obtained for ferrocolumbium production.

Cases 3 and 4 would result in a permanent solution, but would be very expensive.

To obtain preliminary cost information, Lee Evans was consulted. Based on an assumption of 2000 cubic feet of contaminated material, the ballpark costs for Case 2 would be on the order of $100,000. Cases 3 and 4 both would be rough double this figure. The burial costs at Barnwell in Case 3 approximately equal the increased costs of transportation to Uravan for Case 4. Scrap such as railroad ties must go to Barnwell in any event. It must be emphasized that these values are dependent upon the volume to be relocated, which at present is unknown A program to delineate the surface areas and depths of contamination is necessary for a realistic estimate.

The deadline for cleanup is July 2, 1982, though I was informed by the state inspector that we can request an extention at that time. A statement of our decontamination plan will be appropriate with such a request.

D. R. Brosnahan
Radiation Safety Officer

DRB:jk

Attach.

UCCNHT0001710

OPTICAL EMISSION SPECTROGRAPHIC ANALYSES OF SAMPLES

FROM SELECTED AREAS SOUTH OF BLDG 166 - %*

	Al	B	Ba	Be	Ca	Cb	Ce	Co	Cr	Cu	Fe	Ga	Hf	La	Mg	Mn	Mo
Area 5, Surface	2.4	.024	.03	.0024	2.4	.6	.9	.03	2.4	.03	3	.03	.024	.24	2.4	.3	.024
Area 6, Surface	.6	.012	.024	.0024	.6	M	1.2	.012	.12	.006	6	-	.03	.24	.12	.24	-
Area 6, 6" Deep	3	.009	.006	.0012	.6	.6	-	.024	.9	.009	3	-	-	-	M	.12	-
Area 8, Surface	2.4	.03	.06	.0024	2.4	2.4	2.4	.06	.24	.03	3	.06	.03	.24	.6	6	.012

	Na	Ni	P	Pb	Sc	Si	Sn	Sr	Ta	Th	Ti	U	V	W	Y	Yb	Zr
Area 5, Surface	.24	.06	.06	.06	-	M	.6	.03	3	.24	.6	-	.06	.9	.06	-	.24
Area 6, Surface	-	.009	-	.3	.24	2.4	.9	.024	M	2.4	M	2.4	.024	.24	3	.24	.06
Area 6, 6" Deep	.12	.024	-	.09	.024	M	.6	-	M	.24	.6	-	.024	-	.6	.06	.03
Area 8, Surface	.3	.06	.24	.024	-	M	.6	.024	3	.3	.6	-	.06	2.4	.06	-	.6

* The following elements were looked for but not detected: - Ag, As, Au, Bi, Cd, Ge, Hg, In, Ir, Li, Os, Pd, Pt, Re, Rh, Ru, Sb, Te, Tl, Zn.

To include probable error, divide by three for lower limit, and multiply lower limit by ten for upper limit.

Dash indicates none detected; M indicates >10%.

UCCNHT0001711

X Pls F.J. Sibley
ecw 10/28/81

OC
TJK
RJK
DJH
DRB

Elkem Metals Company
4625 Royal Avenue, P O Box 1344
Niagara Falls, New York 14302
☎ (716) 286-7400

October 27, 1981

Mr. Stephen G. Moorhead
Sullivan & Worcester
200 Park Avenue
New York, NY 10166

Dear Mr. Moorhead:

You requested our comment on the following items mentioned in your letter of October 22, 1981.

Chain Link Fence

The fence has been erected. A small section is down at the moment, to satisfy a Linde maintenance project. Mr. Temple assures me this will be replaced.

Contrary to your parenthetical note, we, at Niagara, assume that the fence belongs to Union Carbide Corporation. Please let us know if we are mistaken.

Frame Garage

It has been demolished.

Building 163 and Surrounding Area

Mr. Brosnahan's letter of October 13 summarizes the current status. Messrs. C. R. Allenbach (Elkem) and D. J. Hansen (UCC) are cooperating on this item. We foresee no problem, but will have to await the final survey.

Building 169 (Asbestos Pilot Plant)

Our Dr. Allenbach sees no problem in this area and we believe it is time to sign off. Mr. Temple's note of July 24, 1981, and attached memo cover the situation.

Very truly yours,

W. Chynoweth
Manager - Administration
and Technical Services

WC:cjb
Attachment

CC: E. W. Kantz
J. G. Oxaal
F. T. Temple

UCCNHT0001712

cc to C.R.A. - 10-23

OCT 23 1981

SULLIVAN & WORCESTER
200 PARK AVENUE
NEW YORK, NEW YORK 10166
(212) 599-7910
TELECOPIER NO. 212-599-7922
TWX: 710-581-0322

IN BOSTON, MASSACHUSETTS
100 FEDERAL STREET
BOSTON, MASSACHUSETTS 02110
(617) 338-2800
TELECOPIER NO. 617-338-2880
TWX: 710-321-1976

IN WASHINGTON, D. C.
1025 CONNECTICUT AVENUE, N. W.
WASHINGTON, D. C. 20036
(202) 293-6170
TELECOPIER NO. 202-293-2275

October 22, 1981

FEDERAL EXPRESS

Mr. William Chynoweth
Manager, Administration and
Technical Services
Elkem Metals Company Technical Center
4625 Royal Avenue
Niagara Falls, NY 14302

Dear Bill:

As we discussed on the telephone yesterday, I am enclosing a copy of the agreement signed on the closing date, covering Plant Operations at Niagara Falls.

As you can see from the agreement, Union Carbide has agreed that according to item Number 1 on Page 1, within 120 dyas, or October 31, Union Carbide will:

No. - UCC - ?

1) erect a chain link fence (which shall belong to you) along the common boundary between the Technology Center and your Niagara Plant, including any necessary gates for access to Buildings 88 and 99 and we shall both have keys for such gates; and,

Done

2) demolish a frame garage which extends from the south-easterly corner of the Technology Center onto your plant property.

Done

In addition, according to item Number 2 on Page 2 of the enclosed agreement, Union Carbide has agreed to take such actions, within a reasonable time after June 30, 1981, as may be necessary in order to decontaminate:

1) Building 163 and the area shown on Figure 2 attached to the enclosed letter agreement of such radiation as may be reasonably practicable in order to meet acceptable levels under applicable Federal standards; and,

one more survey - some work may be needed

2) Building 169 of asbestos in order to meet current Occupational Safety and Health Administration standards.

should be no problem

I would appreciate it if you would send me a letter, detailing Union Carbide's progress in fulfilling its obligations.

Sincerely,

Stephen G. Moorhead/ee

Stephen G. Moorhead

SGM/ee
Enclosure

cc: Harry W. Fawcett, Esq. (w/encl.)

UNION CARBIDE CORPORATION
270 PARK AVENUE, NEW YORK, N.Y. 10017

June 30, 1981

Elkem Metals Company
19th Floor
270 Park Avenue
New York, New York 10017

Re: Tiger Project - Plant Operations
Niagara Falls, New York

Gentlemen:

In conjunction with the closing of even date herewith as to the sale by Union Carbide Corporation ("Union Carbide") to Elkem Metals Company ("Elkem") of Union Carbide's alloys business and in particular the execution of a Lease Agreement (the "Lease Agreement") for the Niagara Falls Technology Center ("Technology Center"), Union Carbide and Elkem agree as follows:

1. Within 120 days after the date hereof, at its sole cost and expense, Union Carbide shall (i) erect a chain link fence (which shall belong to it) along the common boundary between the Technology Center and Union Carbide's Niagara Plant, including any necessary gates for access to Buildings 88 and 99; and (ii) demolish a frame garage which extends from the southeasterly corner of the Technology Center onto Union Carbide's plant property. Union Carbide and Elkem shall both have keys to such gates, which shall be maintained in a closed and locked position except when they are in active use. In the event that Union Carbide fails to maintain and repair said fence, upon ten (10) days' prior written notice to Union Carbide, Elkem shall have the right to make any necessary repairs thereto at its sole cost and expense, provided that it assumes all risks attendant with such work; except that if the requirement for repair arises solely out of the actions of Union Carbide, then Union Carbide shall reimburse Elkem the reasonable cost of any necessary repairs.

UCCNHT0001715

2. Within a reasonable period after the date hereof, at its sole cost and expense, Union Carbide shall take such actions as may be necessary in order to decontaminate (i) Building 163 and the area shown on Figure 2 attached hereto of such radiation as may be reasonably practicable in order to meet acceptable levels under applicable Federal standards; and (ii) Building 169 of asbestos in order to meet current Occupational Safety and Health Administration standards.

3. Union Carbide hereby grants to Elkem a non-exclusive easement of access to Building 88 over that part of 47th Street located within plant boundaries for as long as the the Lease Agreement of even date herewith shall remain in effect. Such easement shall be for the sole purpose of permitting deliveries and shipments as to nickel boron production and any other ferroalloy products produced in Building 88. Elkem shall indemnify and hold harmless Union Carbide from all claims, damages, loss and liability, including reasonable attorneys' fees, due to any personal injury, death or property damage (including without limitation any damage to the subject land and property of Union Carbide), arising out of Elkem's exercise of such easement rights, except where such claims, damages, loss and liability arise out of the gross negligence of Union Carbide. Elkem shall be liable for the cost of any repairs to Union Carbide's 47th Street roadway and adjoining paved surfaces due to Elkem's exercise of these easement rights. In the event Elkem exercises its option to purchase the Technology Center, simultaneously with the conveyance thereof, Union Carbide shall deliver to Elkem a permanent non-exclusive roadway easement incorporating provisions of this Paragraph 3 and in the same form (to the extent applicable) as Schedule G of the said Lease Agreement.

4. Union Carbide has assigned to Elkem certain sewage rights from the City of Niagara Falls (the "City") applicable to the Technology Center. The City has indicated that it is willing, subject to City Council approval, to increase the total allocation to Union Carbide's Niagara Plant (including the Technology Center) up to 125 pounds per day of suspended solids (SS) and 93 pounds per day of chemical oxygen demand (COD). In the event of any such increased allocation as to SS and COD, if Elkem does not receive 70% of any additional SS or COD rights, Union Carbide shall make a further assignment in order that Elkem will receive 70% of the total SS and COD allocated to the Technology Center and the Niagara Plant. Elkem reserves the right to make any claims or demands against Union Carbide as to the transferred sewage rights due to any infiltration or related problems affecting the Technology Center.

5. Anything to the contrary contained in the Lease Agreement notwithstanding, (i) if Union Carbide vacates any part of the Licensed Space at the Technology Center in order to accommodate the removal of Elkem personnel from Building 149, Elkem shall accept the surrender of such space and the Lease Agreement shall be modified accordingly; (ii) at the request of Elkem and subject to availability and Union Carbide's prior written consent, which shall not be unreasonably withheld, and consistent with past practices over the last five (5) years, Union Carbide shall deliver to Elkem additional electricity (hydroelectric power only), in excess of the limitations as set forth in Schedule C of the Lease Agreement, for Elkem's use at the Technology Center.

If the foregoing correctly sets forth the understanding and agreement of the parties, kindly execute this letter agreement in the space provided below.

Very truly yours,

UNION CARBIDE CORPORATION

By _____

Title _____

AGREED TO AND ACCEPTED:

ELKEM METALS COMPANY
By ELKEM INVEST, INC.
A General Partner

By _____

Title _____

UCCNHT0001717

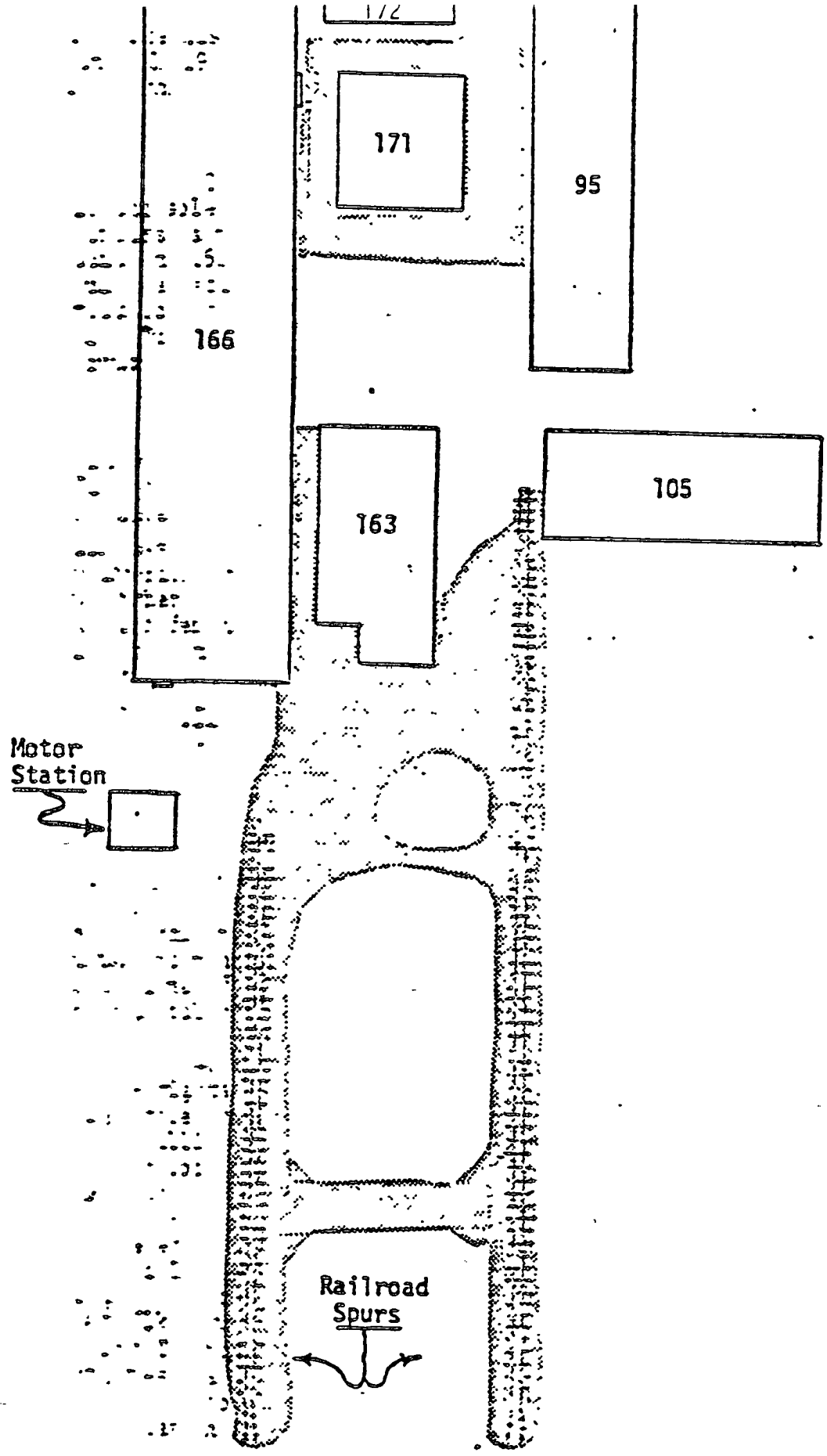

Fig. 2. Location of elevated surface gamma-ray levels (indicated by shading) in the Technology Area at UCC-MD, Niagara Falls, NY.

UCCNHT0001718

UNION CARBIDE

INTERNAL CORRESPONDENCE

C.R Allenbach

RECEIVED

OCT 1 0 1981

D. J. HANSEN

FILE

METALS DIVISION

P O BOX 579 - 4625 ROYAL AVE., NIAGARA FALLS, NEW YORK 1430.

o (Name) Dr.D. J. Hansen
ivision Building 94
ocation NIAGARA

Date October 13, 1981

Originating Dept. Minerals Technology

Answering letter date

opy to Mr. H. J. O'Hear
Mr. R. G. Woolery

Subject Radiation Survey of Technology Area

RECEIVED

OCT 14 1981

SHEA DEPT.

The attached figure shows the results of a radiation survey performed on October 5, 1981 along the east side of Building 166 to 95 building and the "ball field" behind 166. The values were obtained with a Geiger-Müller type survey meter manufactured by Victoreen of Cleveland, Ohio and are estimates of millirems per hour measured at 1" from the surface. It was observed during the survey that the map is not precisely to scale. As a result, the readings along 166 were taken relative to the location of the buildings, though they do approximate 50' centers. The readings within the railroad tracks are spaced ∿30' apart east to west and ∿50' apart north to south. The readings outside the tracks are ∿50' from the nearest reading just inside the tracks.

In general, levels exceeding background occur on all but the western side of Building 171, between Buildings 166 and 163, and along the railroad tracks. Most of these values are only marginally above background, and all those in the regular grid are less than the 0.25 mrem/hr limit for uncontrolled areas applicable to property that remains subject to the jurisdiction of the State Labor Law and Part 38 of the Industrial Code Rule, Ionizing Radiation Protection. (The 0.25 mrem/hr is from Table 5, attached, of Part 38, and is for fixed alpha or beta-gamma emitters. Also given is a value of 0.05%, or 500 ppm, for the limit of concentrations of source material in soil). However, a previously known area yielding higher emissions was reexamined and an estimated 4 mrem/hr was observed. The attached spectrographic analysis indicates that ∿2.4% of uranium and thorium exists at the surface of this area, and ∿.24% Th is detected at a depth of 6".

Based on the above information, the following is recommended:

1. Remove the surface material of >500 ppm U+Th and >.25 mrem/hr in the area of the ∿4 mrem/hr reading.

2. Survey the ball field area thoroughly as the ∿4 mrem/hr would not have been detected by obtaining readings at 30-50' intervals.

3. Analyze the material at the 0.13 mrem/hr areas to check that it does not contain >500 ppm U+Th.

DRB/rmm
Attachments

UCCNHT0001719

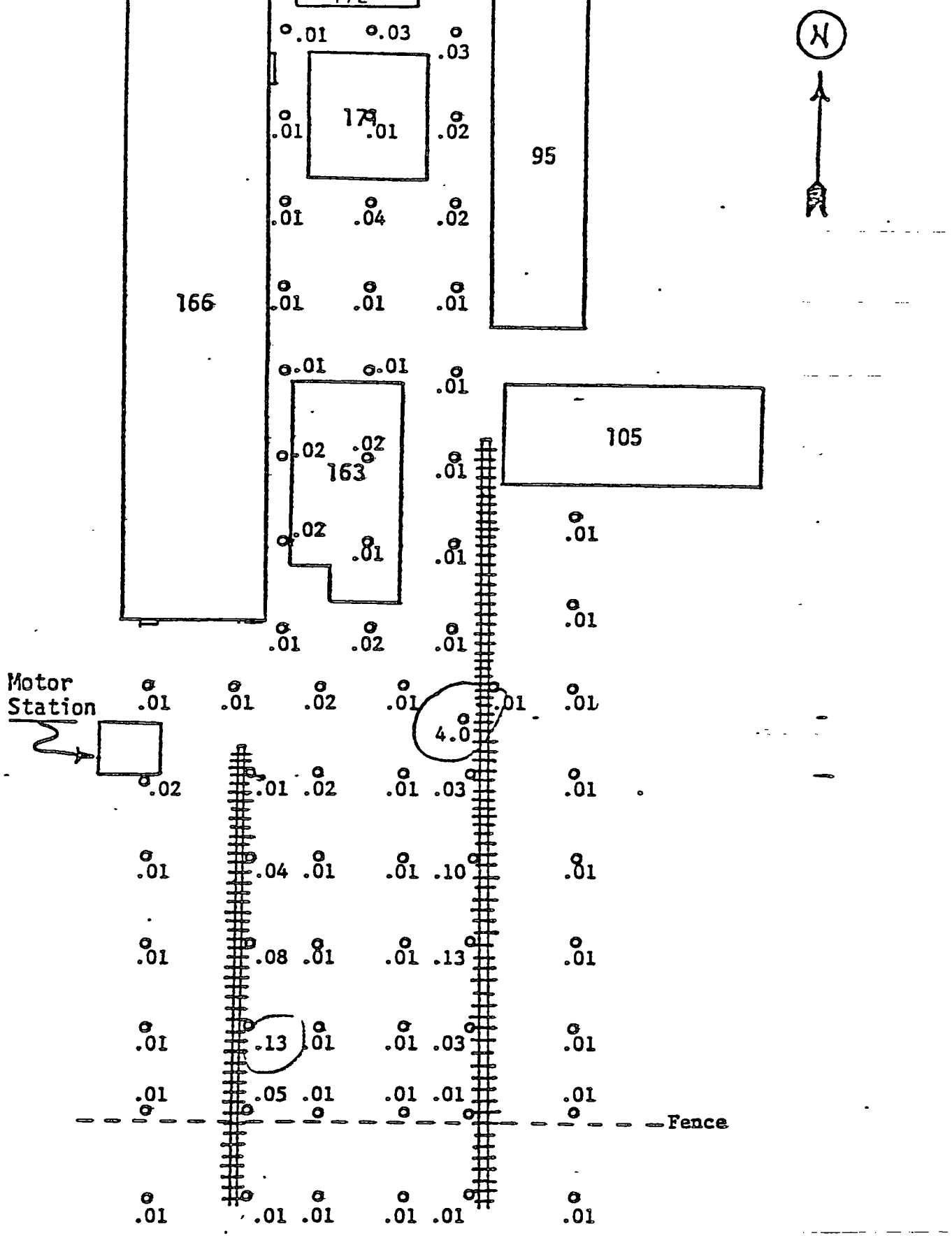

FIGURE 1. Radiation levels in mR/hr at the Technology Department noted during survey of 10/5/81. Natural background was ~.01 mR/hr.

UCCNHT0001720

ed)
E'S)

	Microcuries
.....	100
.....	100
.....	10
.....	10
.....	10
.....	10
.....	10
.....	10
.....	10
.....	100
.....	10
.....	1,000
.....	100
.....	100
.....	100
.....	10
.....	10
.....	10
.....	100
.....	100
.....	10
.....	100
.....	1,000
.....	10
.....	10
.....	10
.....	0.1

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is Part (rule). The sum of such

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:
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ile). The sum of such quotients

1

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits.

(1) Alpha emitters.

(i) Removable:

$\frac{15\ pCi}{100\ cm^2}$	=	$\frac{33\ dpm}{100\ cm^2}$	average over any one surface
$\frac{45\ pCi}{100\ cm^2}$	=	$\frac{100\ dpm}{100\ cm^2}$	maximum

(ii) Total (fixed):

$\frac{450\ pCi}{100\ cm^2}$	=	$\frac{1000\ dpm}{100\ cm^2}$	average over any one surface
$\frac{2250\ pCi}{100\ cm^2}$	=	$\frac{5000\ dpm}{100\ cm^2}$	maximum
$\frac{0.25\ mrem\ at\ 1\ cm}{hr}$			

(2) Beta-Gamma emitters.

(i) Removable: (all beta-gamma emitters except Hydrogen 3)

$\frac{100\ pCi}{100\ cm^2}$	average over any one surface
$\frac{500\ pCi}{100\ cm^2}$	maximum

Removable: (Hydrogen 3)

$\frac{1000\ pCi}{100\ cm^2}$	average over any one surface
$\frac{5000\ pCi}{100\ cm^2}$	maximum

(ii) Total (fixed): $\frac{0.25\ mrem}{hr}$ at 1 cm from surface.

(b) Concentrations in air and water: Table 6, Schedule II.

(c) Concentrations in soil and other materials except water:

(1) Radioactive material except source material: Table 2, Column 2.

(2) Source material: 0 05 per cent by weight.

Note: Jurisdictional limits. The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule).

UCCNHT0001721

UCC METALS DIVISION
R&D DEPT. ANALYTICAL LABORATORY
REPORT OF SPECTROGRAPHIC ANALYSIS

Plate No. 5717
Date 9 Sept 80
By [illegible]

Submitted by W.R. Pioli Values in %
Chymometh, C.R. Allenbach
A.R. Brosnal

537-70

On Sample Basis
SEP 9 1980

Sample No.	009433	009434			
Material	8610 @ #1 surface	8611 @ #2 [illegible]			
Ag	—	—			
Al	.2-2.	1-10			
As	—	—			
Au	—	—			
B	.004-.04	.003-.03			
Ba	.008-.08	.002-.02			
Be	.0008-.008	.0004-.004			
Bi	—	—			
Ca	.2-2.	.2-2.			
Cb	M	.2-2.			
Cd	—	—			
Co	.004-.04	.008-.08			
Cr	.04-.4	.3-3.			
Cu	.002-.02	.003-.03			
Fe	2-20	1-10			
Ga	—	—			
Ge	—	—			
[illegible]	.01-.1	—			
In	—	—			
Ir	—	—			
Mg	.04-.4	M			
Mn	.08-.8	.04-.4			
Mo	—	—			
Na	—	.04-.4			
Ni	.003-.03	.008-.08			
Os	—	—			
P	—	—			
Pb	.1-1.	.03-.3			
Pd	—	—			
Pt	—	—			
Rh	—	—			
Sb	—	—			
Si	.8-8.	M			
Sn	.3-3.	.2-2.			
Sr	.008-.08	—			
Ta	M	M			
Th	.8-8.	.08-.8			
Ti	M	.2-2.			
Tl	—	—			
U	.8-8.	—			
V	.008-.08	.008-.08			
W	.08-.8	—			
Zn	—	—			
Zr	.02-.2	.01-.1			
Yttrium	1-10	.2-2.			
Ytterbium	.08-.8	.02-.2			
Lanthanum	.08-.8	—			
Scandium	[illegible]	[illegible]			

UCCNHT0001722

LGE 4/14/88

Niagara Cleanup.

1. Prepare Spec for cleanup.
   Option 3 Move to new property
   Option 5 Remove & ship to a repository

2. Option 3 –
   Need to resolve sale w/ Temple.
   Plant property may remain w/ new Powerhouse
   If no pad – plastic liner?

3. Option 5
   How is material shipped (box), bags?

4. Cleanup 5, 6
   Railroad track (ties) – removal / replacement
   Backfill Ferruginous vs Clean Fill
   Blacktop
   Fence

5. Review Plans w/ Temple Klotzbach
   Include Dubay Const on Bid List

UCCNHT0001723

TECHNOLOGY DEPARTMENT

REQUEST FOR SPECIAL ORDER

R&D	
Non-R&D	X

COPIES TJK
RJK

Dept. No.		Project Charge No.
520		20319

TITLE: SOIL DECONTAMINATION - SOUTH OF BLDG 166, NIAGARA

SPECIFIC OBJECTIVE: REMOVE CONTAMINATED SOIL & SHIP TO AN APPROVED REPOSITORY

$ 33,000 ENGINEERING

Estimated By: FRA

REQUESTED BY: L. EVANS Date 4/17/84

APPROVED BY: [signature] Date

Accounting Use Only

BUDGET CLASSIFICATION:

CHECKED BY: Timothy J. Whelan Date 4/17/84

INVOICE TO:

CLEAR TO:
84-615-885-10-100

DATE JOB CLOSED

UCCNHT0001724

LCE

Form RHA-P
(10/80)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

SOUTH CAROLINA RADIOACTIVE WASTE TRANSPORT PERMIT

Pursuant to Act No. 429 of 1980, the South Carolina Radioactive Waste Transportation and Disposal Act, a Radioactive Waste Transport Permit is hereby issued to the below-named applicant (shipper). This permit shall not, in itself, be construed as authorizing a shipper to dispose of radioactive waste within the State of South Carolina. This permit shall not be transferred, assigned or in any manner disposed of, either voluntarily or involuntarily, directly, or indirectly, through transfer of control to any person, unless the Department shall, after securing full information, find the transfer is in accordance with the provisions of Act No. 429 and shall give written consent.

1. Name and Address of Applicant (Shipper):	2. Permit Number: 0211-31-84-X
Union Carbide Corporation Metals Division P.O. Box 97 Niagara Falls, New York 14302 (Marietta, Ohio)	3. Expiration Date: December 31, 1984

1984

For the South Carolina Department of Health and Environmental Control

April 23, 1984
Date of Issuance
DHEC 801 (10/80)

By Heyward G. Shealy
Heyward G. Shealy, Chief
Bureau of Radiological Health

UCCNHT0001725

LSE

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET, P O BOX 97, NIAGARA FALLS, N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710 524 1664

TECHNOLOGY DEPARTMENT
— ENGINEERING

April 6, 1984

Chem-Nuclear Systems, Inc.
P.O. Box 726
Barnwell, SC 29813

Attn: Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

This letter authorizes Messrs. Earl Reagan, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space at the Chem-Nuclear site in Barnwell, South Carolina.

If there are any questions regarding this matter, please contact Mr. L. G. Evans at Telephone No. (716) 278-3462 or Mrs. S. C. Zambotti at Telephone No. (716) 278-3232.

Sincerely,

S C Zambotti
Mrs. S. C. Zambotti
Purchasing Agent

SCZ/jl
cc: Earl Reagan
R. J. Klotzbach

UCCNHT0001726

AUTHORIZATION FOR OPERATING ACCOUNT DISBURSEMENT

Attach Original Documents
To be paid here

DATE April 9, 1984

Please Draw a Check in the Amount of $ 500.00

Payable to: S. Carolina Department of Health and Environmental Control, Bureau of Finance

Address: 2600 Bull Street
Columbia, S.C. 29201

In Payment of: Radioactive Waste Transportation Permit

Charge to: TaCb Relocation 740-885-1167-13
Marietta, Ohio

Requested by: L.G. Evans

Approved for Payment: R.J. Klotzbach

[XX] Return CHECK to requisitioner for mailing.

[ ] Mail to above address.

This file to be attached to voucher copy of check.
All individual items attached are to be stamped "PAID".

UCCNHT0001727

AUTHORIZATION FOR OPERATING ACCOUNT DISBURSEMENT

Attach Original Documents
To be paid here

DATE April 9, 1984

Please Draw a Check in the Amount of $ 500.00

Payable to: S. Carolina Department of Health and Environmental Control, Bureau of Finance

Address: 2600 Bull Street
Columbia, S.C. 29201

In Payment of: Radioactive Waste Transportation Permit

Charge to: TaCb Relocation 740-885-1167-13
Marietta, Ohio

Requested by: L.G. Evans

Approved for Payment: R.J. Klotzbach
R.J. Klotzbach

[XX] Return CHECK to requisitioner for mailing.

[ ] Mail to above address.

This file to be attached to voucher copy of check.
All individual items attached are to be stamped "PAID".

UCCNHT0001728

L. G Evans

UNION CARBIDE CORPORATION PO BOX 66, 137 - 47th STREET
METALS DIVISION NIAGARA FALLS, NEW YORK 14302

July 25, 1983

Chem-Nuclear Systems, Inc.
P.O. Box 726
Barnwell, SC 29813

Attn: Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

EARL REAGAN

This letter authorizes Mssrs. Mike Anderson, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space a the Chem-Nuclear site in Barnwell, South Carolina.

If there are any questions regarding this matter, please contact Mr. L.G. Evans at Telephone No. (716) 278-3462 or Mr. D.H. McGuire at Telephone No. (716) 278-3232.

MRS SC ZAMBOTTI

Sincerely,

D H McGuire

Mr. D.H. McGuire SC ZAMBOTTI
Purchasing Agent

DHM:db
cc: Mike Anderson, NUSPSC
EARL REAGAN
RJK

UCCNHT0001729

LGE * To: Betty Linville From: L.G. Evans
Grand Junction
9.84
Lee - * This copy not approved
Please have original request approved
by R.J. Klotzbach & returned to me
Thanks -
Betty

N.F.
x 3462

AUTHORIZATION FOR OPERATING ACCOUNT DISBURSEMENT

Attach Original Documents
To be paid here

DATE April 9, 1984

Please Draw a Check in the Amount of $ ~~500.00~~ 500.00

Payable to: S. Carolina Dept. of Health & Environmental Control, Bureau of Finance

Address: 2600 Bull Street
Columbia, SC ~~29201~~ 29201

In Payment of: Radioactive Waste Transportation Permit

~~740~~ 02 885-88-0167-13

Charge to: TaCo Relocation ~~740-885-1167-13~~
Marietta, OH

Requested by: L. G. Evans

Approved for Payment: * R. L. Rogers

☒ Return CHECK to requisitioner for mailing.
☐ Mail to above address.

This file to be attached to voucher copy of check.
All individual items attached are to be stamped "PAID".

rec 4/9 lc 12.50p

UCCNHT0001730

UNION CARBIDE CORPORATION
METALS DIVISION
137 47TH STREET, P O BOX 97, NIAGARA FALLS, N Y 14302
TELEPHONE 716 278 3000
CABLE TWIX NO 710 524 1664

TECHNOLOGY DEPARTMENT
– ENGINEERING

April 6, 1984

Chem-Nuclear Systems, Inc.
P.O. Box 726
Barnwell, SC 29813

Attn: Mr. James Purvis
Director of Regulatory Affairs

Dear Mr. Purvis:

This letter authorizes Messrs. Earl Reagan, Anthony Chavis, or Doug McLean of NUS Process Services Corporation to act as our agent to obtain burial space at the Chem-Nuclear site in Barnwell, South Carolina.

If there are any questions regarding this matter, please contact Mr. L. G. Evans at Telephone No. (716) 278-3462 or Mrs. S. C. Zambotti at Telephone No. (716) 278-3232.

Sincerely,

S C Zambotti
Mrs. S. C. Zambotti
Purchasing Agent

SCZ/jl
cc: Earl Reagan
R. J. Klotzbach

UCCNHT0001731

11309
Design Memo

Niagara Falls, New York
July 13, 1983

Design Memo No. 1

File No. 11309

SUBJECT. Radiological Survey, Cleanup Options and Cost Estimates

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R. G. Woolery

UCCNHT0001732

UC 149 2

UNION CARBIDE

INTERNAL CORRESPONDENCE

METALS DIVISION

P O BOX 97, NIAGARA FALLS, NEW YORK 14302

To (Name) Mr. R. J. Klotzbach
Division UCC-Metals Division
Location Niagara Falls, NY

Date July 13, 1983

Originating Dept. Engineering Department

Answering letter date

Copy to See Attached Distribution

Subject Design Memo No. 1
Radiological Survey, Cleanup
Options and Cost Estimates
File No. 11309

Dear Bob:

Attached is Design Memo No. 1 "Radiological Survey, Cleanup Options and Cost Estimates".

Union Carbide Corporation presently is out of compliance with its New York Radioactive Materials License No. 950-0139 due to radioactive source concentrations in excess of 500 ppm behind Niagara Building 166, where access to employees is unrestricted. To identify the area and depth of contamination, the area south of Building 166 was surveyed by Mr. D. R. Brosnahan and the author. The results indicate that a soil volume of 5130 ft.^{3} must be restricted or removed for compliance with New York State regulations. An additional 1700 ft.^{3} must be removed for delicensing and unrestricted use.

The following five alternatives have been considered and cost estimates prepared as part of the design memo.

Alternative	Description	Cost
1	Fence in Place	$ 10,000
2	Remove & Fence on Elkem Property	65,000
3	Remove & Fence on UCC Property	120,000
4	Remove & Bury - UCC Niagara	175,000
5	Remove & Ship to a Repository	335,000

The recommendation is to proceed with Alternative No. 3, based primarily on the condition that the property will be deeded to Elkem Metals Company. The material remains available for implementing Alternative No. 4, "Bury on UCC Property", or Alternative No. 5, "Ship to an Approved Repository", in the future. An R & D effort can also proceed to investigate ways to reduce the volume. Far less expense is required for the alternative to "Fence in Place", which is recommended if property ownership does not change.

L. G. Evans

LGE/dac
Attachments

UCCNHT0001733

Union Carbide Corporation
Metals Division
Technology Department - Engineering
Niagara Falls, New York

File No. 11309

DESIGN MEMORANDUM
SPONSOR: T. J. KAGETSU

PROJECT: Soil Decontamination - South of Building 166, Niagara

BY: L. G. Evans/D. R. Brosnahan

DATE: May 20, 1983

Design Memo No. 1
Revision 0
Subject: Radiological Survey, Cleanup Options and Cost Estimates

1.0 INTRODUCTION

1.1 Scope

To include an engineering evaluation of the alternatives available for disposal of the radioactive contaminants from areas south of Building 166.

1.2 History

The U. S. Department of Energy performed surveys in 1976 to assess the radiological status of facilities utilized under Manhattan Engineer District contract during the period 1943-1946. UCC's Metals Division at Niagara was one of those sites. They discovered contamination South of Building 166 and notified Union Carbide and New York State.

As a result, New York State Department of Labor performed a follow up survey on December 1, 1981 and cited UCC for violation of its New York Radioactive Materials License No. 950-0139 by storing source concentrations in excess of 500 ppm without restricting access to employees.

Later, thorium was found to be a major radioactive contaminate indicating that the radiation is unrelated to the Manhattan Engineer Project.

This problem is further complicated by the divestiture of the ferroalloys business and anticipated eventual ownership of the property by Elkem Metals Company.

UCCNHT0001734

2.0 DISCUSSION

2.1 General

All phases of a waste clean up project are directly affected by the quantity of waste to be handled. Therefore, the first priority was to develop a reasonably good estimate of the volume.

A gamma radiation survey was performed over the entire fenced area behind Building 166 to determine the area of involvement excluding areas covered by asphalt or concrete. Soil samples were obtained from several areas and analyzed for % U_3O_8 and % ThO_2. Samples were extracted at various levels in five holes to determine depth of involvement. Samples were also taken to obtain a rough correlation between gamma readings and uranium/thorium content.

2.2 Cleanup Criteria

2.2.1 General

The cleanup criteria is dependent upon the use or future use of the property. New York State Regulations would apply with continuance of license. NRC Regulations would apply for delicensing.

2.2.2 New York State Regulations

NYS requires restriction of access to areas where the radioactive contaminants exceed 500 ppm of source materials. Below 500 ppm radioactive materials can be stored with unrestricted access.

To facilitate a comparison of this limit to the NRC limits a conversion to pCi/gm is made assuming a 2:1 (thorium:uranium) ratio. (See calculations attached).

These limits for unrestricted access are the total of the following:

$\leq$36 pCi/gm Thorium
$\leq$57 pCi/gm Uranium

These limits are used only for determination of compliance with our license for restricted or unrestricted access.

If the State is approached by UCC for criteria for delicensing they probably will require compliance with NRC Regulations due to Agreement State principles.

2.2.3 NRC Regulations

The NRC proposed regulations[1] provide four options for burial and delicensing. A fifth option deals with continuing the license.

[1] Federal Register/Vol. 46 No. 205/Friday Oct. 23, 1981, Notices (attached).

UCCNHT0001735

Option 1 ≤10 pCi/gm Thorium and/or 10 pCi/gm Uranium - unrestricted use and delicensing. (Burial not required).

Option 2&3 ≤50 pCi/gm Thorium and 40 pCi/gm Uranium - deed amendment and delicense, restricted access by burial with minimum four foot cover. No residential building. Option 2 specifies thorium and Option 3 uranium.

Option 4 ≤500 pCi/gm Thorium and 200 pCi/gm Uranium - much more restricted use of the land than Options 2 and 3. No excavation or building.

Option 5 of the Regulation deals with on-site storage of higher concentrations pending the availability of space at an approved repository. No burial is permitted.

2.3 Radiological Survey

2.3.1 Gamma Survey

The survey was performed with a portable gamma ray spectrometer, Model GR-410 manufactured by Geometries Exploranium and detector Model No. GPX-21 employing a sodium iodide thallium activated crystal as a scintillation phosphor.

All of the area south of Building 166 and bounded by the chain link fence was surveyed except areas covered by concrete or asphalt. The actual area surveyed was approximately 26,000 ft.^{2}. Concrete and asphalt cover 63,000 ft.^{2}.

A 10' x 10' grid was established and readings were taken at the intersection points. Extra readings were taken along the west track center line and near the edge of the concrete on both sides.

A resurvey of a 400 ft.^{2} area was done using a 2' x 2' grid to assess the reliability of the general survey. The location of this area is shown on Drawing SF-7902 as Detail 1. The data are also displayed in Figure I (attached).

All gamma meter readings were reduced to the number of times background and are reported on Drawing SF-7902.

2.3.2 Analytical Survey

Soil Samples - The physical samples were essentially 'grab' samples. No systematic sampling technique was used. The analytical work was performed by Elkem's laboratory at Niagara Falls. The results are shown in Table III (attached) and on Drawing SF-7902.

The chemical analyses of the surface soil samples ranged from 0.006% to 0.40% ThO_2 and from 0.002% to 0.17% U_3O_8.

UCCNHT0001736

2.4 Survey vs Regulations

The following Table I is a comparison of the surface soil sample analyses converted to pCi/g and the gamma radiation readings (times background). Below the table is a guide comparing gamma readings to cleanup or storage criteria. The gamma range is estimated based on the analyses of Table III (attached).

TABLE I

GAMMA X BKG	URANIUM pCi/gm	THORIUM pCi/gm	SAMPLE NO.	CONTAMINANTS PPM
1	3	2	11	20
3	11	11	9	131
5	6	6	8	70
6	11	19	2	210
8	8	22	5	228
9	14	40	1	401
12	26	61	3	650
13	8	12	10	140
17	26	66	4	674
21	42	105	12	1094
26	57	164	14	1664
33	82	201	13	2091
83	466	382	5	4957

GAMMA RANGE	NYS/NRC REQUIREMENTS
1 - 5	Will meet NRC proposed regulations for delicensing and unrestricted land use. NRC Option 1 (Sec. 2.3.3) - no burial required.
6 - 9	NYS allows unrestricted access and continue license. NRC allows burial and delicensing. Options 2 and 3 - burial required.
10 - 60*	NYS requires restricted access. NRC allows burial and delicensing - Option 4.
>60	NYS requires restricted access. NRC requires restricted access and storage until space is available at an approved repository, e.g., Barnwell, SC.

*Interpolated

UCCNHT0001737

2.5 Contamination Volume

2.5.1 General

The gamma survey, surface and subsurface soil analyses and the guide above are combined to estimate the quantity of material of each class in each area.

The depth of contamination varies throughout the area of involvement, but is generally less than six inches. However, to expedite cleanup, the rails and ties must be removed, requiring a minimum removal depth of eight inches.

2.5.2 High Concentration Area

This area contains material which exceeds NRC burial limits and must be disposed of (eventually) at an approved repository. Gamma readings are above 60 times background. This area is the most heavily contaminated both in radiation level and depth of contamination. Contamination can be found 12 inches below the surface.

Volume = 400 ft.^{2} x 1 ft. deep = 400 ft.^{3}

2.5.3 Medium Concentration Area

This area contains material which requires restricted access. Gamma readings are 10-60 times background.

Volume = 6400 ft.^{2} x 2/3 ft. deep = 4267 ft.^{3*}

*Approximately 30% of the area found to be low concentration on the general survey (10' x 10' Grid) was found to be medium concentration upon resurvey (2' x 2' Grid). See Drawing SF-7902 or Figure I. This volume is included.

2.5.4 Low Concentration Area

This area contains material which must be removed to delicense but which can remain with unrestricted access under current license. Gamma readings are 6-9 times background.

Volume = 2200 ft.^{2} x 2/3 ft. deep = 1467 ft.^{3}

2.5.5 Summary

The following summarizes the above volumes including a 15 percent contingency:

High Concentration	- 230 ft.^{3}
Medium Concentration	- 4900 ft.^{3}
Low Concentration	- 1700 ft.^{3}
TOTAL	6830 ft.^{3}

UCCNHT0001738

NOTE: No exploration was done beneath any of the concrete or asphalt pads. The depth of involvement and the location of contamination along the railroad tracks indicates the radioactive materials were spilled during handling from rail cars and contamination under the pads is unlikely.

3.0 DESCRIPTION OF CLEANUP ALTERNATIVES

3.1 Summary

Five cleanup alternatives are considered in this memorandum. The major factors influencing final selection of an alternative are: term of solution (short or long), delicensing, property transfer to Elkem, compliance with NYS Regulations, and cost.

Table II below summarizes the alternatives opposite these factors.

TABLE II

ALTERNATIVE NO.	DESCRIPTION	TERM	DELICENSE*	TRANSFER PROPERTY TO ELKEM	COST $000
1	Fence in place	Short	No	No	10
2	Remove & fence on Elkem Property	Short	No	No	65
3	Remove & fence on UCC Property	Medium	No	Yes	120**
4	Remove & bury - UCC Niagara	Long	Yes	Yes	175
5	Remove & ship to repository	Permanent	Yes	Yes	335

* Assumes that this is the only contaminated area in the plant.

**If a concrete pad is available the cost would be $90,000.

3.2 Alternative No. 1 - Fence in Place

Simply enclose the contaminated area thus restricting access.

Requirements - 400 feet of fence.

Advantages - Quick solution to come into compliance with NYS.
- Minimum cost.

Disadvantages - Contamination remains requiring future action.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

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3.3 Alternative No. 2 - Remove and Fence on Elkem Property

As mentioned earlier, much of the area South of Building 166 is covered with concrete and asphalt. The material (soil) could be removed and stored on an existing pad in the Southeast corner of the property. The pad and a plastic covering would provide stability and a fence would provide restricted access until final disposal.

Requirements
- Removal of railroad tracks.
- Disposal of scrap and debris**.
- 100 ft. fence required - S & E corner site.
- Concrete/asphalt pad - already available.
- Replacement of railroad track.

Advantages
- Consolidation of contaminants.
- Access can be restricted.
- This work is required for ultimate disposal in any event.

Disadvantages
- Short term solution.
- 1/10 acres of land would not be available for Elkem use.
- Transfer of property to Elkem is not possible unless Elkem obtains a license or UCC removes the material.

**This includes
- Three flat bed railroad cars loaded with induction furnaces.
- Stacks of deteriorating 55 gallon drums.
- Stacked wooden boxes containing steel shot, etc.
- Numerous 5' x 5' x 5' steel boxes.
- Various ladles, furnaces, carbon electrodes, etc.

3.4 Alternative No. 3 - Remove and Fence on UCC Property

The work required here is essentially the same as in 3.3 above. Costs increase and extra care must be taken to avoid contamination of other areas of the plant. However, the property can then be released for transfer to Elkem. An area in the Niagara Plant has been designated by plant personnel for possible use.

Requirement
- Same as 3.3 except more fence and a new concrete pad may be required.

Advantage
- Same as 3.3 except it has the additional advantage of not interfering with Elkem property use. Property can be transferred to Elkem.

Disadvantage
- Medium term solution.

UCCNHT0001740

3.5 Alternative No. 4 - Remove and Bury - UCC Niagara

Burial on Union Carbide owned property was explored for the Marietta TaCb cleanup project. The main problems are: finding a suitable burial site, getting State and Local approval, future use or transfer of the burial site is restricted, and long term monitoring of the site is necessary.

Requirements
- Remove and replace railroad tracks.
- Dispose of scrap and debris at approved repository.
- A suitable burial site.
- Containers (55 gallon drums) may be required.
- Dispose of 400 $ft.^3$ soil at approved repository.

Advantages
- Long term solution.
- Delicense.

Disadvantages
- Use of the burial site will be restricted - no construction.

3.6 Alternative No. 5 - Remove and Ship to Repository

This alternative is permanent. Once the material is received at the repository, the host state becomes owner and the licensee's accountability ends. However, this is the most expensive alternative.

Requirements
- Remove and replace railroad tracks.
- Disposal of scrap and debris at approved repository.
- Containers.
- Loading system.

Advantage
- Permanent solution.

Disadvantage
- Highest cost.

3.7 Remove and Ship to Uravan

This alternative was selected for the TaCb residue cleanup project in Marietta. The uranium content of the TaCb residue was 0.13% U_3O_8 and processing to recover uranium values was feasible and acceptable to the Colorado Department of Health. The material (soil) analyses at Niagara indicate 0.01% U_3O_8. Therefore, transfer to Uravan cannot be considered.

4.0 COST ESTIMATES

As discussed in Section 2.4, the radiological survey indicates three levels of contamination above NRC delicensing limits. They are: 6-9 x BKG (background), 10-60 x BKG and greater than 60 x BKG. Volumes were calculated

UCCNHT0001741

for each area with the thought that some alternatives would not require the removal of the combined total volume but only those areas with the highest concentrations. However, to simplify costings and cost comparison, only the total volume of Section 2.5.5 is considered. All medium and high concentration material requires fencing or removal. The low concentration material adds an additional 25% to the volume, but adds only 10% to the cost. The volume for cost estimating is then 6830 ft.^{3}.

Cost Estimates No. 6342 through 6346 are attached.

Cost Estimate No. 6342	Fence in Place	$ 10,000
Cost Estimate No. 6343	Remove and Fence - Elkem	$ 65,000
Cost Estimate No. 6344	Remove and Fence - UCC Niagara	$120,000
Cost Estimate No. 6345	Remove and Bury - UCC Niagara	$175,000
Cost Estimate No. 6346	Remove and Ship to Barnwell	$335,000

Note. Costs do not reflect removal of debris which is assumed to be Elkem's accountability.

5.0 RECOMMENDATIONS

Removal and relocation of the contaminated soil to the Niagara plant as described in Alternative No. 3 is recommended based on the following

1. The property will be deeded to Elkem Metals Company.

2. Any restriction to the use of the property behind Building 166, or any potential cleanup liability to Elkem, is unacceptable.

3. EPA and NRC regulatory uncertainties exist concerning burial. (Perpetual maintenance costs are not included in the estimate for Alternative No. 4.) Burial also makes the material unavailable for disposal at an approved repository as discussed below. New York state may ban all burial within the state in the near future.

4. Disposal at Barnwell, SC is too costly and there is reason to believe that a new repository will be opened in the Northeast by 1986 which may reduce the cost of that option.

Any remedial effort must be approved by the State of New York, Department of Labor. For the material to be left on-site, Radioactive Materials License No. 950-0139 must be amended. This amendment or some form of approval should be received prior to the beginning of any cleanup.

UCCNHT0001742

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6342

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - FENCE IN PLACE (ALTERNATIVE 1)

1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100 MATERIAL				
101 400' Fence (6 ft.) Along 1100N	-	8	8	-
TOTAL		8	8	-
TOTAL DIRECTS		8	8	-
ENGINEERING			-	-
CONTINGENCY			2	
RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			-	-
TOTAL			10	-

FRANGELORI/dac

cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001743

Niagara Falls, New York
May 19 983

Cost Estimate No. 6343

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
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FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE ELKEM (ALTERNATIVE 2)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3}	-	5	-	5
102	Fence 6 ft. - 100 ft.	-	2	-	2
	TOTAL		7		7
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
	TOTAL DIRECTS		40	23	17
	ENGINEERING			7	5
	CONTINGENCY			8	3
	RADIOLOGIST/HEALTH PHYSICS			2	-
	TOTAL			40	25

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001744

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6344

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND FENCE - UCC NIAGARA (ALTERNATIVE 3)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Concrete Pad - 60 cy.	-	30	30	-
103	Fence 6 ft. - 200 ft.	-	4	4	-
	TOTAL		44	34	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	-
	TOTAL DIRECTS		77	57	20
	ENGINEERING			9	6
	CONTINGENCY			10	2
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			14	2
	TOTAL			90	30

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001745

Niagara Falls, New York
May 19, 1983

Cost Estimate No. 6345

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND BURY - UCC NIAGARA (ALTERNATIVE 4)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove & Relocate Soil 7000 ft.^{3} (haul)	-	10	-	10
102	Clay Lined Pit w/Drain System 40 ft.^{2} x 5 ft.	-	15	15	-
103	Clay Cap	-	15	15	-
	TOTAL		40	30	10
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation	-	1	-	1
302	Burial Fee (200 ft.^{3})	1	8	-	9
	TOTAL	1	9		10
	TOTAL DIRECTS	1	82	53	30
	ENGINEERING			8	8
	CONTINGENCY			15	5
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	SITE SELECTION			35	
	TOTAL			125	50

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

UCCNHT0001746

Niagara Falls, New York
May 1[redacted]1983

Cost Estimate No. 6346

File No. 11309

Revised: July 6, 1983

UNION CARBIDE CORPORATION
METALS DIVISION
TECHNOLOGY DEPARTMENT - ENGINEERING
SPONSOR: T. J. KAGETSU

FEASIBILITY STUDY COST ESTIMATE
DECONTAMINATION BUILDING 166 - REMOVE AND SHIP TO BARNWELL, SC (ALTERNATIVE 5)

	1983 DOLLARS	MATERIAL $000	LABOR $000	CAPITAL $000	NON-CAPITAL $000
100	SOIL REMOVAL				
101	Remove Soil 7000 ft.^{3} (haul)	-	5	-	5
102	Containers (80 boxes - 100 ft.^{3})	20	-	-	20
103	Loading Trucks (incl. Pallets, etc.)	5	4	-	9
	TOTAL	25	9		34
200	RECLAMATION				
201	Backfill	-	5	5	-
202	Equipment Decontamination (Loader & Trucks)	-	3	3	-
203	Replace RR Track	-	25	15	10
	TOTAL		33	23	10
300	DISPOSAL				
301	Transportation 1000_3 (10 loads)	-	10	-	10
302	Burial Fee (8000 ft.^{3} incl Container)	-	160	-	160
	TOTAL		170		170
	TOTAL DIRECTS	25	212	23	214
	ENGINEERING			5	28
	CONTINGENCY			3	46
	RADIOLOGIST/HEALTH PHYSICS (1 Mo.)			4	2
	TOTAL			45	290

FRANGELORI/dac
cc: TJK(2): CGR: AJC: LGE: RGH: FRA(4)

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CALCULATIONS

New York State regulations require that access be restricted to areas where the source material exceeds 500 ppm. For the purpose of comparison with NRC regulations a Thorium/Uranium ratio of 2:1 is assumed.

Therefore, the maximum activities for unrestricted access are:

NYS maximum Thorium activity equals:

$$330 \text{ parts/million} \times 1.09 \times 10^5 \text{ pCi/gm} = 36 \text{ pCi/gm}$$

NYS maximum Uranium activity equals:

$$170 \text{ parts/million} \times 3.33 \times 10^5 \text{ pCi/gm} = 57 \text{ pCi/gm}$$

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