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Union Carbide Corporation
A Subsidiary of The Dow Chemical Company
PO Box 8361
3200/3300 Kanawha Turnpike
South Charleston, WV 25303
U.S.A

December 11, 2008

Q-9
MS-16

Docket No. 03006652 License No. 47-00260-02
Control No. 142221

Mr. Stephen Hammann
Nuclear Regulatory Commission - Region 1
475 Allendale Road
King of Prussia, Pennsylvania 19406-1415

RECEIVED
REGION 1
2008 DEC 15 AM 11:59

Subject: Union Carbide Corporation, Request for additional information concerning application for amendment to terminate license, Control No. 142221

This correspondence is in response to your letter dated April 30, 2008. Union Carbide Corporation was requested by the United States Nuclear Regulatory Commission (US-NRC) to provide additional information regarding the radiological activities within specific locations in order to satisfy the NRC requirements in Subpart E of 10 CFR Part 20 for unrestricted release. The site has addressed those locations noted by the US-NRC, as well as included additional locations where our records indicate that radioactive materials storage and/or usage might have taken place.

BUILDING 701

During the early 1960's, Building 701 of the South Charleston Technology Park, specifically rooms 234 and 236, was used to conduct work with Carbon-14 in loose form. Approximately 161 millicuries of Carbon-14 were purchased in order to use to tag organic compounds. The compounds were synthesized by introducing microcurie quantities of Carbon-14 into a vacuum system with other materials. The entire system was contained in a stainless steel hood, which had a separate exhaust system from the remainder of the laboratory. In the end, the Carbon-14 was converted to barium carbonate and reclaimed. Activities ceased in 1965 and the rooms were wiped and surveyed for residual Carbon-14. Results of this decommissioning survey showed that fixed and removable residual contamination levels were well below the acceptable screening levels. See Attachment 1 to this letter for a copy of the decommissioning survey conducted on October 18, 1965. In addition, the site was also able to locate a radiation survey for rooms 234 and 236 in Building 701 conducted on December 03, 1973. The purpose of this survey was to confirm the lack of Carbon-14 contamination prior to removing the hoods and sink as part of a remodeling project. See Attachment 2 to this letter for a copy of this radiation survey.

142221
NRC/REGI MATERALS-002

Building 701 was also used for storage and use of the following types of sealed sources:

- Cadmium-109
 - X-ray Fluorescence Analyzer (Niton)
- Cesium-137
 - Electron Capture Detector in Gas Chromatograph (Hewlett Packard)
- Nickel-63
 - Electron Capture Detector in Gas Chromatograph (Hewlett Packard, Varian)
- Polonium-210
 - Static Elimination Device
- Radium-226
 - Detector Cell in Gas Chromatograph

There are no records that would indicate that any sealed sources in this building had leaked their radioactive contents. Building 701 is no longer in existence as it has been demolished.

BUILDING 704

In regards to Building 704 of the South Charleston Technology Park, the site has found no evidence that the building was utilized for storage and/or usage of radioactive materials. Interviews with two individuals who had worked in Building 704 for more than twenty years (starting in the 1970's) confirmed this information. The building was constructed in the late 1940's as a maintenance shop and later added an expansion which contained multiple boilers. The use of the building has remained unchanged and is currently still in existence.

BUILDING 707

A review of past records revealed that Building 707 of the South Charleston Technology Park was used for storage and use of the following types of sealed sources:

- Cesium-137
 - Nuclear Gauges (Ohmart)
- Radium-226
 - Detector Cell in Gas Chromatograph

There are no records that would indicate that any sealed sources in this building had leaked their radioactive contents.

BUILDING 712

A review of past records revealed that Building 712 of the South Charleston Technology Park was used for storage of the following type of sealed source:

- Nickel-63
 - Electron Capture Detector in Gas Chromatograph (Hewlett Packard)

There are no records that would indicate that this source in this building had leaked any radioactive contents.

BUILDING 720

A review of past records revealed that Building 720 of the South Charleston Technology Park was used for storage of the following types of sealed sources:

- Nickel-63
 - Electron Capture Detector in Gas Chromatograph (Varian)
- Radium-226
 - Detector Cell in Gas Chromatograph

There are no records that would indicate that any sealed sources in this building had leaked their radioactive contents.

BUILDING 722

During the 1950's and 1960's, Building 722 of the South Charleston Technology Park was used as an irradiation laboratory utilizing Cobalt-60. A letter dated September 17, 1956 was submitted to the United States Atomic Energy Commission (AEC) which included an application for Byproduct Material License for use of Cobalt-60 in the form of metal slugs. The application letter contains a description of the activities and dose rates expected in and near the facility. See [Attachment 3](#) to this letter for a copy of the application letter. The site was able to locate a radioactive survey of the Cobalt-60 lab conducted on February 19, 1961 which showed no significant levels in stray radiation levels in and around the building. See [Attachment 4](#) for a copy of this radiation survey. Per the license agreement, the site was required to analyze the water from the Cobalt-60 storage pool located in Building 722 at a frequency of 6 months in order to determine whether leakage had developed in any of the Cobalt-60 pencils. The site was able to locate the analytical reports from April 21, 1961 to January 22, 1969. All results from the well water were within the limit of 5.0×10^{-5} microcuries per millimeter as required by the license. See [Attachment 5](#) for a copy of the analytical report from the January 22, 1969 well water samples. The Cobalt-60 pencils were removed from the site shortly after the last well water sample analysis. The Technical Center Radiation Inventory conducted on February 24, 1969 did not show the Cobalt-60 pencils listed.

In addition to the irradiation studies, the site found documentation that Building 722 was also used as a temporary storage location for radioactive materials in the loose form, specifically Carbon-14. The site is unable to locate any records stating when the building was no longer used for radioactive materials storage and use, and formally decommissioned. An interview with Charlie Armstead, an operator who worked in Building 722, revealed that as of November of 1984 the building was not being used for radioactive storage and/or use when he had inhabited building solely as an office. Mr. Armstead stated that he did request a radiological survey be conducted of the building because radioactive warning signs were still posted in the building. He recalled none of the survey results above background levels. In addition, Mike Green (Radiation Safety Officer from 1974-2001) was contacted regarding the decommissioning of Building 722. Mr. Green did not recall any radioactive materials being stored and/or used while he was an employee at the site. He did communicate confidence that his predecessors were fanatical about keeping any contamination controlled and cleaned to back ground levels before release.

Because a formal decommissioning report could not be located, a survey was conducted in 2008 to confirm the lack of contamination in this building. Per NUREG 1757, Volume 1, Appendix B, all areas must have less than 3.7×10^6 dpm/100 cm² of contamination to be released for unrestricted use. As an ALARA goal, it is preferable to reduce levels of removable contamination to well below these acceptable release levels. Results of this decommissioning survey showed that fixed and removable residual contamination levels were well below the acceptable license termination screening levels. See Attachment 6 to this letter for a copy of the decommissioning report, which includes a summary of the results from the wipe analyses.

BUILDING 725

A review of past records revealed that Building 725 of the South Charleston Technology Park was only used for storage and use of the following type of sealed source:

- Radium-226
 - Pipe Wall Thickness Gauge

There was no evidence of this source leaking and/or being damaged in this building.

BUILDING 727

Building 727 of the South Charleston Technology Park at one time utilized two level gauge devices which contained Cesium-137 sealed sources. These devices were installed on November 1, 1989. In 2000, the two radioactive sources were transferred from Union Carbide US-NRC License No. 47-00260-02 to a Bayer Corporation License number 47-25529-01 (Reference Control No. 258999; Docket No. 030-35442). See Attachments 7, 8, and 9 for the documentation describing the transfer of ownership of these radioactive sources. A review of past records revealed no evidence of these sources leaking and/or being damaged in this building.

BUILDING 740

In regards to activities involving radioactive materials in loose form in Building 740, details can be found in the initial request for USNRC License Termination from the facility dated March 7, 2008.-

A review of past records revealed that Building 740 of the South Charleston Technology Park was also used for storage and/or use of the following types of sealed sources:

- Cadmium-109
 - X-ray Fluorescence Analyzer (Niton)
- Cesium-137
 - Nuclear Gauges (Ohmart)
- Iron-55
 - X-ray Fluorescence Analyzer (Oxford)
- Nickel-63
 - Electron Capture Detectors in Gas Chromatographs (Hewlett Packard, Varian, and Ohmart)
- Hydrogen-3
 - Static Meter (Custom Materials)
 - Gas Chromatograph cell (Varian Aerograph)
- Radium-226
 - Detector Cell in Gas Chromatograph

There are no records that would indicate that any sealed sources in this building had leaked their radioactive contents.

BUILDING 741

Building 741 was released for unrestricted use as part of License Amendment No. 50 Control No. 138832 (dated June 20, 2006). At that time, Carbon-14, which was used in Building 741-Greenhouse was removed from the site's NRC license. Please note that Building 741 was demolished prior to its official release from the US-NRC.

BUILDINGS 747 and 745

Buildings 747 and 745 (associated storage shed) were released for unrestricted use as part of License Amendment No. 51, Control No. 139239 (dated October 10, 2006). Both buildings were demolished following the release.

BUILDING 770

In regards to activities involving radioactive materials in loose form in Building 770, details can be found in the initial request for US-NRC License Termination from the facility dated March 7, 2008.

A review of past records revealed that Building 770 of the South Charleston Technology Park was also used for storage and/or use of the following types of sealed sources:

- Cadmium-109
 - X-ray Fluorescence Analyzer (Niton)
- Cobalt-60
 - Radiation Detection Instrument (Tracerlab)
- Nickel-63
 - Electron Capture Detectors in Gas Chromatographs (Hewlett Packard, Varian, Bendix, Perkin Elmer, and Ohmart)
- Hydrogen-3
 - Electron Capture Detectors and Detector Cells in Gas Chromatographs (Barber Coleman, Bendix, and AID)
 - Static Meter (3M)
- Radium-226
 - Detector Cell in Gas Chromatograph
- Strontium-90
 - Detector Cell in Gas Chromatograph

There are no records that would indicate that any of sealed sources in this building had leaked their radioactive contents.

BUILDING 771

A review of past records revealed that Building 771 of the South Charleston Technology Park was used for storage and use of the following types of sealed sources:

- Nickel-63
 - Ion Mobility Spectrometer (Environmental Technologies Group)
- Cesium-137
 - Nuclear Gauges (Ohmart)

There are no records that would indicate that any of sealed sources in this building had leaked their radioactive contents.

BUILDING 773

During October and November of 1964, a study consisting of three experiments using Krypton-79 was performed in order to determine distributed residence time for ethylene in a high pressure reactor at Building 773. The radioisotope was injected into the inlet of the reactor and measured by a detector at the outlet of the reactor. There were no known personnel exposure, neither was there radiation contamination of the quench water and product during the study. However, there were controlled releases of Krypton-79 to the atmosphere that approached the established limits. See [Attachment 10](#) for a copy of the summary of Radiation Surveys and Health Protection Plan. Krypton-79 has a 35 hour half-life, so there is no potential for any residual Krypton-79 contamination to remain in the building due to radioactive decay.

A review of past records revealed that Building 773 of the South Charleston Technology Park was also used for storage and/or use of the following types of sealed sources:

- Cadmium-109
 - X-ray Fluorescence Analyzer (Asoma)
- Cesium-137
 - Nuclear Gauges (Texas Nuclear and Ohmart)

There are no records that would indicate that any sealed sources in this building had leaked their radioactive contents.

BUILDING 776

A review of past records revealed that Building 776 of the South Charleston Technology Park was used for storage and use of the following type of sealed source:

- Hydrogen-3 (sealed source)
 - Static Meter (3M)

There was no evidence of this source leaking and/or being damaged in this building.

BUILDING 777

A review of past records revealed that Building 777 of the South Charleston Technology Park was used for storage and use of the following types of sealed sources:

- Cesium-137
 - Nuclear Gauges (Texas Nuclear and Ohmart)
- Iron-55
 - Chemical Analyzer (Princeton Gamma Tech)

There are no records that would indicate that any sealed sources in this building had leaked their radioactive contents.

BUILDING 778

A review of past records revealed that Building 776 of the South Charleston Technology Park was used for storage and use of the following type of sealed source:

- Hydrogen-3
 - Static Meter (3M)

There was no evidence of this source leaking and/or being damaged in this building.

BUILDING 785

A review of past records revealed that Building 785 of the South Charleston Technology Park was only used for storage and use of the following type of sealed source:

- Nickel-63
 - Electron Capture Detectors in Gas Chromatographs (Hewlett Packard)

There was no evidence of this source leaking and/or being damaged in this building.

BUILDING 795

In regards to Building 795 of the South Charleston Technology Park, the site has found no evidence that the building was utilized for usage and/or storage of radioactive materials. In addition, interviews with two individuals who had worked in Building 795 for more than twenty years confirmed this information. The two individuals stated that sealed sources were at one time in possession and used at nearby Building 773 of the South Charleston Technology Park. Both buildings are located within the same Pilot Plant.

BUILDING 2000

A review of past records revealed that Building 2000 of the South Charleston Technology Park was only used for storage and use of the following type of sealed source:

- Radium-226
 - Pipe Wall Thickness Gauge

There was no evidence of this source leaking and/or being damaged in this building.

Mr. Stephen Hammann (NRC)
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December 11, 2008

SOUTH CHARLESTON PLANT

In a letter submitted to Mr. Paul R. Guinn of the U.S. Nuclear Regulatory Commission (US-NRC) dated August 18, 1989, Union Carbide Corporation (UCC) notified the US-NRC that the South Charleston Plant, at that time under US-NRC License No. 47-00260-07, had transferred all remaining licensed material to US-NRC License 47-00260-02 (UCC South Charleston Technology Park) and requested the termination of US-NRC license No. 47-00260-07. The radioactive materials transferred to US-NRC License 47-00260-02 consisted of 15 Cesium-137 sealed sources. See Attachment 11 to this letter for the license termination request letter from UCC to the US-NRC, which includes a completed NRC Form 314 and copies of the radioactive material shipment data for the transfer of materials from the UCC South Charleston Plant License to the UCC South Charleston Technology Park License.

US-NRC License 47-00260-02 at one time was a broad scope license which authorized the storage and use of specific sealed sources at the South Charleston Plant. This license was later amended in 2003 to change from Broad scope to Specific. However, the license still authorized the storage and use of specific sealed sources at the South Charleston Plant. After the termination of US-NRC license No. 47-00260-07, only the following sealed sources were utilized for storage and use at the South Charleston Plant:

- Iron-55
 - X-ray fluorescence analyzer (Oxford Lab-X100)
- Cadmium-109
 - Portable X-ray fluorescence analyzer (Niton)

There are no records that would indicate that any sealed sources had leaked their radioactive contents at the South Charleston Plant.

Based on the exhaustive search of the records and personnel interviews conducted, UCC feels that appropriate evidence exists for documenting residual levels of radioactivity in order to satisfy the NRC requirements in Subpart E of 10 CFR Part 20 for unrestricted release of locations that used or stored radioactive materials authorized under US-NRC License No. 47-00260-02. It was observed during the review of past records (i.e. radiation safety committee minutes, project reviews and reports, letters and email communications, AEC and NRC inspection reports) that the site displayed strong adherence to the site radiation control program to assure radiological safety of all employees and the public, to guarantee that radiation sources are procured and used in accordance with Federal and State regulations, and to assure that radiation exposures are as low as reasonably achievable.

Mr. Stephen Hammann (NRC)
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If you need additional information or clarification, please contact Mr. Brian Proper, Radiation Safety Officer, at 304-747-1766.

Thank you for your assistance regarding our request to terminate the facility's radiation license. We appreciate the opportunity to provide appropriate responses and corrections.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. L. Blatt', with a long horizontal flourish extending to the right.

J. L. Blatt
Responsible Care Leader
West Virginia Operations

Summary of Attachments

- Attachment 1
 - Decommissioning survey for **Building 701** Laboratory (October 18, 1965)
- Attachment 2
 - Confirmatory Decommissioning survey for **Building 701** Laboratory (December 3, 1973)
- Attachment 3
 - Application for Byproduct Material License for use of Cobalt-60 in **Building 722**. (September 17, 1956)
- Attachment 4
 - Radiation Survey of the Cobalt-60 Radiation Laboratory in **Building 722** (February 19, 1961)
- Attachment 5
 - Well water sample analysis report from Cobalt-60 Storage Pool in **Building 722** (January 17, 1969)
- Attachment 6
 - Decommissioning Report for **Building 722** (November 17, 2008)
- Attachment 7
 - Union Carbide Corporation letter to US-NRC regarding use of radioactive sources in **Building 727** (June 29, 2000)
- Attachment 8
 - Bayer Corporation letter to US-NRC regarding use of radioactive sources in **Building 727** (October 3, 2000)
- Attachment 9
 - Union Carbide Corporation letter to Bayer Corporation regarding license transfer of radioactive sources in **Building 727** (October 5, 2000)
- Attachment 10
 - Radiation Survey for experiments using Krypton-79 in **Building 773** (December 30, 1964)
- Attachment 11
 - **South Charleston Plant** transfer of radioactive sources to License No. 47-00260-02 and License No. 47-00260-07 termination(August 18, 1989)

MEMORANDUM

Distribution:

Mr. K. H. Anderson
Mr. N. H. Ketcham
Mr. J. J. Lehr
R. J. Sexton, M.D.
Dr. S. W. Tinsley
Mr. H. B. Walker

Subject: Radiation Survey
Building 701 - 234 and 236

Mr. W. J. Skraba and Mr. Tie Steele recently transferred to the Nuclear Division, vacating an office and laboratory in which work was done with Carbon¹⁴ in Building 701 - 234 and 236.

To comply with AEC and State regulations, areas no longer used for work with radioisotopes must be essentially free of radiation before the signs are removed and restrictions no longer required. A survey was conducted October 18, 1965 to assure that the rooms were "radiation clean."

All drawers and cabinets were checked both visually and by wipe test to assure the rooms were clean with respect to radiation. A beaker of bottles containing Carbon¹⁴ was found in the cabinet located in the hood. This material was taken to Building 722 for storage with other Carbon¹⁴.

The attached table shows the results of the survey. All radiation signs should be removed and the rooms can be cleaned and used as a non-radiation area.

On the basis of the survey, there is no radiation hazard in rooms 234 and 236, however, as a precaution, rubber gloves should be worn when cleaning the inside of the hood.


Fred Williams

FW/ae
10/22/65

Radiation Wipes

Instrument:

Model 440 Victoreen Survey Meter, Number 595 (lower limit .01 mr./hr.)

Survey Date: October 18, 1965

Location: Building 701

By: Fred Williams

Rooms 234 and 236

Wipe tests were made with a paper towel by wiping an area in excess of one square foot. The radiation activity picked up in the dust on the towel was measured with the survey meter.

Room 236 (Lab Area)	Mr./hr.
1. Large soap stone slab, right side of hood	<.01
2. Large soap stone slab, left side of hood	<.01
3. Small soap stone slab, right rear of hood	.01
4. Small soap stone slab, left rear of hood	.01
5. Inside sink in hood	<.01
6. On duct opening in rear of hood	<.01
7. Top of pump in right cabinet in hood	<.01
8. On shelves in left cabinet in hood	<.01
9. Beaker of materials that was in left cabinet	150.
10. Inside cabinet adjacent to hood	<.01
11. Four drawers	<.01
12. Seven drawers	<.01
13. Two drawers	<.01
14. Double door cabinet	<.01
15. Top of lab bench composed of 10 - 14	<.01
16. On shelf above lab bench	<.01
17. Inside wall cabinet	<.01
18. Small and large storage shelves near window	<.01
19. On shelf below equipment frame	<.01
20. On large shelf between variac and frame	<.01
21. On variac control panel	<.01
22. Inside large sink	<.01
Room 234 (Office Area)	
23. Top of work bench in office, near door	<.01
24. Top of work bench in office, near window	<.01

RADIATION SURVEY DATA SHEET

SURVEY DATE
12-3-73

SOURCE INFORMATION

SOURCE TYPE Carbon-14	ACTIVITY - millicuries	TYPE HOLDER	REQUIRED SURVEY FREQUENCY
PLANT LOCATION Tech Center	BUILDING NUMBER 701	ROOM NUMBER 236-237	PERSON RESPONSIBLE

SURVEY INFORMATION

TYPE METERS USED Nuclear-Chicago Corp Model 2650		
SOURCE POSITION <input type="checkbox"/> ON <input type="checkbox"/> OFF	WIPE TEST	SURVEYED BY Williams-Roth-Wilson
METER READINGS		
LOCATION	DISTANCE FROM SOURCE HOLDER TO METER	MR/HR
236-Hood	0	<10
236-Top of Hood	0	<10
236-SINK	0	<10
236-SINK DRAIN	0	<10
236-Exhaust Fan	0	<10
237 Hood	0	<10
237 Top of Hood	0	<10
237 Floor of Hood	0	<10
237 Sink Drain	0	<10

REMARKS

Recheck Hood & Sink Area in Labs 236-237 Bldg. 701 For any C-14 Contamination. Survey Exhaust Fan for Lab 236 For any possible contamination so maintenance can remove hoods, sinks etc. (Remodeling)

Fred Williams

47-260-4^b

CARBIDE AND CARBON CHEMICALS COMPANY

A DIVISION OF
UNION CARBIDE AND CARBON CORPORATION



SOUTH CHARLESTON 3, W. VA.

September 17, 1956

United States Atomic Energy Commission
Isotopes Division
Post Office Box E
Oak Ridge, Tennessee

Subject: Cobalt-60

Gentlemen:

Please find attached two (2) copies of our "Application for Byproduct Material License", Form AEC-313, and one (1) copy of Form AECL-247, which is an "Application for Radioactive Isotopes", for use outside of Canada. According to procedure A-4 (R), these forms are to be sent to you and in turn you will issue Form AEC-374 entitled "By-Product Material Licence". The firm from which we are purchasing this material is the Atomic Energy of Canada, Ltd., Commercial Products Div., P. O. Box 93, Ottawa, Canada.

Our Purchase Order No. 514-19227-R is being issued today, therefore, your prompt processing of our application will be appreciated.

Very truly yours,

Works Purchasing Department

G.S. Givens/gh
Encl. *AKW*

47-260-4

INSTRUCTIONS: Complete Items 1 through 19 if this is a new application. If renewals requested, complete only Items 1 through 11 provided that with respect to the other items there has been no change in the information previously submitted. Mail two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee; Attention: Isotopes Extension, Division of Civilian Applications. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. General requirements for issuance of an AEC Byproduct Material License are contained in Title 10, Code of Federal Regulations, Part 30.

1. (a) NAME AND SHIPPING ADDRESS OF APPLICANT (Institution, firm, hospital, person, etc.)
**Carbide and Carbon Chemicals Co.
 Research Center
 South Charleston 3, West Virginia**

(b) ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (If different from shipping address)

2. DEPARTMENT TO USE BYPRODUCT MATERIAL
Research

3. INDIVIDUAL USER (Name and title of individual(s) who will use or directly supervise use of byproduct material)
Dr. Frank G. Young, Group Leader

4. RADIOLOGICAL SAFETY OFFICER (Name of person qualified in radiological safety, if other than individual user)
Mr. Walter J. Skraba

5. PREVIOUS LICENSE OR AUTHORIZATION NUMBER (If this is an application for renewal of a license for byproduct material obtained under a prior license or authorization for radioisotope procurement)
Not Applicable

BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED

6. BYPRODUCT MATERIAL (Element and mass number) Cobalt-60	7. CHEMICAL AND/OR PHYSICAL FORM (Or catalog number) Metal Slugs	8. MAXIMUM AMOUNT OF RADIOACTIVITY IN MILLICURIES THAT YOU WILL POSSESS AT ANY ONE TIME 1,200,000
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9. IF IRRADIATION SERVICE IS DESIRED, STATE PERTINENT DETAILS SUCH AS: CHEMICAL COMPOSITION AND WEIGHT IN GRAMS OF TARGET MATERIAL, RADIOACTIVITY, IRRADIATION TIME IN DAYS, AND NEUTRON FLUX

STATEMENT OF USE

10. (a) DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (If material is for "human use" complete Supplement A in lieu of this item. If material is to be used in or manufactured as a "sealed source" complete Supplement B in addition to this item.)
Radiation Chemistry Studies

(b) DESCRIBE PROCEDURES WHICH WILL BE OBSERVED TO MINIMIZE HAZARD FROM HANDLING, STORAGE, AND DISPOSAL OF THE BYPRODUCT MATERIAL.
 Attached: (1) Description of facility
 (2) Drawing of facility
 (3) Dose rates expected in and near facility.

CERTIFICATE

11. The applicant and any official executing this certificate on behalf of the applicant named in Item 1, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and do solemnly swear (or affirm) that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

State of West Virginia
 County of Kanawha
 Subscribed and sworn to before me this 31st day of August 1956

By Frank G. Young
Group Leader; Radiation Chemistry
 Title of Certifying Official

Date August 31, 1956

Robert W. Sanford
 Notary Public

ROBERT W. SANFORD, NOTARY PUBLIC WARNING
 18 U. S. C., Section 1001, June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.
 My Commission Expires Oct. 28, 1962

INSTRUCTIONS: Complete Items 12 through 19 if this is a new application. This information may be omitted from subsequent applications provided there is no change in the information previously submitted, and reference is made in Item 5 to the application on which this information appears.

TRAINING AND EXPERIENCE WITH RADIOACTIVITY OF INDIVIDUAL USER NAMED IN ITEM 3

12. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)		FORMAL COURSE (Circle answer)	
1. Principles and practices of radiological health safety.	ORINS - Carbide and Carbon	Orins - 4 wks. C&C - 7 yrs.	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Yes	<input type="radio"/> No
2. Radioactivity measurement standardization and monitoring techniques and instruments	Same	Same	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Yes	<input type="radio"/> No
3. Mathematics and calculations basic to the use and measurement of radioactivity.	Same	Same	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Yes	<input type="radio"/> No
4. Biological effects of radiation.	Same	Same	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input checked="" type="radio"/> Yes	<input type="radio"/> No
5. Actual use of radioisotopes in the types and quantities for which application is being made, or equivalent experience	Same	Same	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Yes	<input checked="" type="radio"/> No

13. ISOTOPE HANDLING EXPERIENCE				
ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Co-60	1000 c	ORNL	2 years	Rad. Chem.
C-14	10 mc	Carbide and Carbon Chemicals Co.	7 years	Tracer

14. If Radiological Safety Officer named in Item 4 is different from individual user named in Item 3, use supplementary sheet to provide equivalent information on "Training and Experience With Radioactivity of Radiological Safety Officer." Supplementary sheet is attached (Circle answer) Yes No

PHYSICAL FACILITIES, EQUIPMENT, AND RADIATION INSTRUMENTATION

15. RADIATION DETECTION INSTRUMENTS (Use separate sheet if necessary)					
TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)
Cutie Pie-Tracerlab SU1F	1	gamma	0-2500	2-3	Surveying
Samson-Nuclear 2582	1	"	0-12.5		Monitoring
Area Monitor Jordan RAMS-1	3	"			Monitoring

16. FILM BADGES, DOSIMETERS, AND OTHER PERSONNEL MONITORING DEVICES INCLUDING BIO-ASSAY PROCEDURES
 Minometer - Victoreen V1; 8-Pocket chamber V2.
 Dosemeter - Landsverk L24K; 4-Pocket electrometer L28
 Film Badge Service

17. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE (For film badges specify method of calibration and processing, or name supplier)
 Bench standardization - against Co-60 standard. Quarterly
 film badge Nuclear - Chicago

18. (a) DESCRIBE BRIEFLY REMOTE HANDLING EQUIPMENT, STORAGE CONTAINERS, SHIELDING, AND LABORATORY FACILITIES (Working areas, fume hoods, etc.)
 Attached - See Item 10(b) 1 Description of Facility

(b) SKETCHES OF SUCH FACILITIES ARE ATTACHED (Circle answer) Yes No

19. DESCRIBE BRIEFLY RADIATION SURVEYING PROCEDURES AND METHODS OF DISPOSING OF RADIOACTIVE WASTES
 Attached - See Item 10(b) 1

DUPLICATE
FOR DIV. OF INSP.

47-260-7

Item 10(b)

(1) Description of Facility

The housing for the cobalt-60 will consist of a chamber surrounded on all sides by 4 feet of concrete of density 2.37, or its equivalent in shielding value for cobalt-60 gamma rays. The source will be stored at the bottom of a water-filled pool 12 feet deep in the floor of this chamber. The source will be assembled by lowering the shipping container into the filled pool, removing the cover under water, and then removing the source proper, under water at all times, to a platform whose position is controlled by an elevator operated remotely. This assembly will be done by means of a gripping tong at least 12 feet long. The water provides more than adequate shielding for the operation.

Entry to the radiation chamber is by a labyrinthine passage terminated by a steel gate which will be locked when the source is raised. Mirrors will permit observation of experiments under way in the chamber when the source is raised to its operating position. The barrier-gate lock and source-raising mechanism will be electrically interlocked so that the source cannot be raised except when the gate is locked nor can the gate be opened until the source is lowered into the water pool. The gate will also be interlocked with the water-level in the pool so that, if it is inadvertently drained, the cell cannot be entered. When the source is elevated, a flashing red light visible in the control room and an audible alarm in the cell will be activated. The barrier-gate will open easily from the inside at all times. A telephone inside the gate connected to the main laboratory switchboard will also be provided.

In the event of mechanical failure of the source elevator, means will be provided for transferring the source to a shielded storage box at the bottom of the pool. This will be covered with a lead plug and the water drained to permit safe access to the elevator mechanism.

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FOR DIV. OF...

Item 10(b)

Continuous check on the exposure of staff to radiation and a permanent record of exposure will be provided by a conventional film badge service. For immediate checking of exposure, pocket dosimeters will be worn by all personnel while in the radiation laboratory. Visitors will be provided with pocket ionization chambers. Persons entering the radiation cell will be required to carry a hand monitor which gives a continuous and sensitive indication of dose rate. Further protection will be provided by a continuous area monitoring system. This will provide permanent record of the radiation intensity in the control room area, and in the cell when the gate is raised. The latter ionization chamber will provide warning if the radiation level in the cell is above 20 mr./hr. It will be provided primarily to cover the unlikely contingency of the source pencils becoming detached from their holders and being left behind when the source is lowered. Fusible links will provide for automatic lowering of the source and operation of a fire-extinguishing system in the cell, which may also be operated manually from outside the shield.

(3) The calculated gamma ray dose in areas designated by numbered points in shield drawing, accessible only to radiation workers.

<u>Number</u>	<u>Location</u>	<u>Dosage, mr/hr</u>
1	Directly against outer shield wall in control room and outside building to East	0.65
2	At laboratory bench in control room	less than 0.1
3	At office desk	less than 0.08
4	At gate to labyrinthine entrance	less than 0.08
5	Area adjacent to SW side of radiation shield	0.65
6	Area adjacent to S side of radiation shield	0.36

continued next page

47-260
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<u>Number</u>	<u>Location</u>	<u>Dosage, mr/hr</u>
7	At surface of water above source in lowered position	0.001
8	At bottom of pool, source in emergency storage	less than 0.6
9	"	less than 0.9
10	"	less than 0.8

A plot plan of the proposed site for the radiation laboratory to house the cobalt-60 source is shown on Figure No. 2, attached. The area, inhabited on a 40 hour per week schedule, nearest to the radiation laboratory is the NE corner of the building marked High Pressure Laboratory. The calculated gamma ray dose rates here and in other areas accessible to other than radiation workers at points indicated on the plot plan are:

<u>Number</u>	<u>Location</u>	<u>Dosage, mr/hr</u>
11	NE corner High Pressure Laboratory	0.00006
12	Incinerator (manned approx. 2 hrs/week)	0.0003
13	Cooling tower (unmanned)	0.00038
14	Outside fence enclosing Rad. Lab.	0.0014

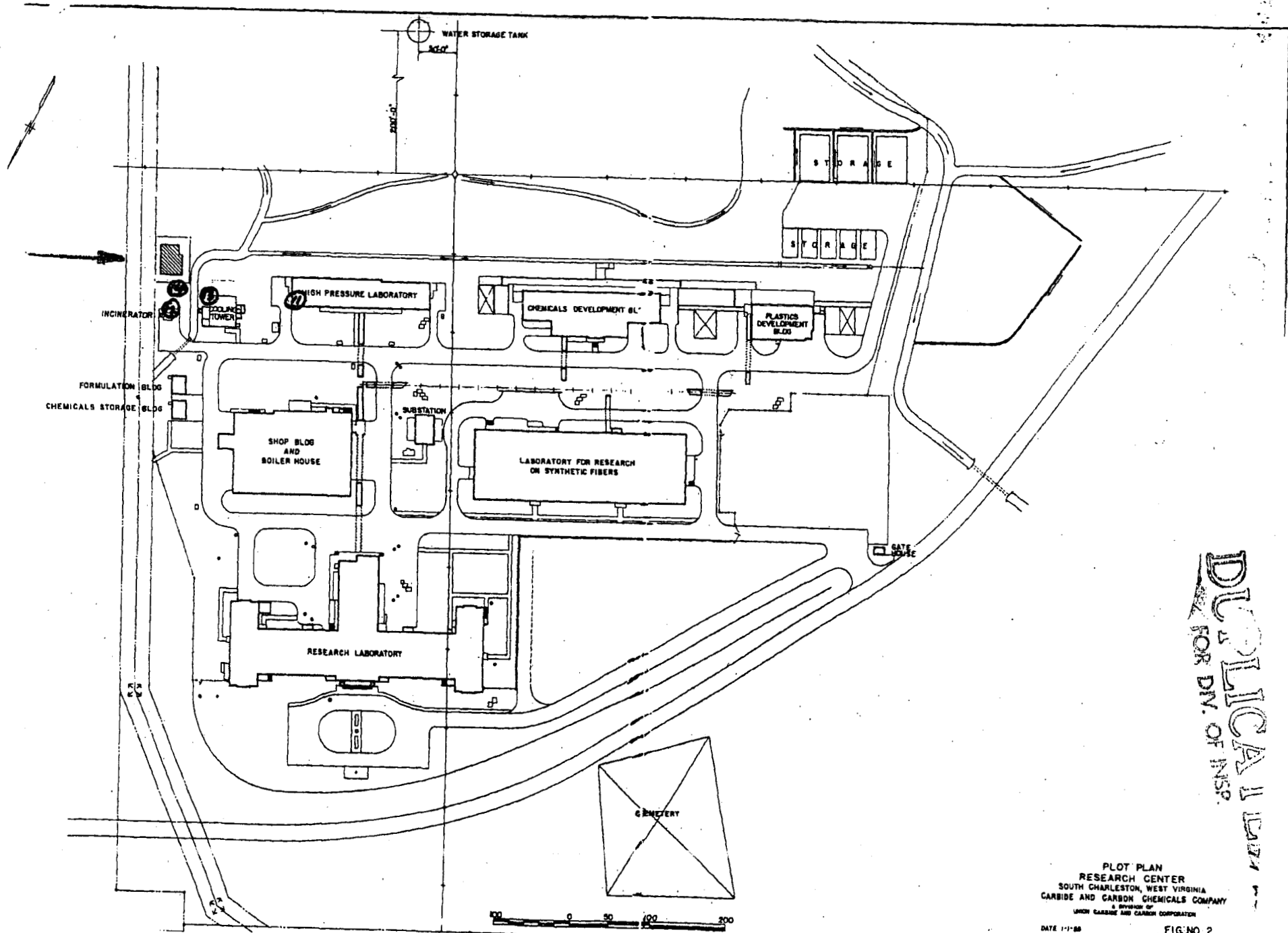
The area to the South and East of the proposed site is private property belonging to Carbide and Carbon Chemicals Company.

DUPLICATE

Item 14

"Training and Experience with Radioactivity of Radiological Safety Officers"

<u>Type of Training</u>	<u>Where Trained</u>	<u>Duration</u>	<u>On the Job</u>	<u>Formal Course</u>
1	ORNL	2 yrs.	yes	yes
2	ORNL- C & CCC	13 "	yes	yes
3	ORNL	6 mos.	no	yes
4	ORNL	6 "	no	yes
5	ORNL	2 yrs.	yes	no



DUPLICATION
 FOR DIV. OF INSP.

PLOT PLAN
 RESEARCH CENTER
 SOUTH CHARLESTON, WEST VIRGINIA
 CARBIDE AND CARBON CHEMICALS COMPANY
 A DIVISION OF
 UNION CARBIDE AND CARBON CORPORATION
 DATE 1-1-58

FIG. NO. 2



INTERNAL CORRESPONDENCE

UNION CARBIDE CHEMICALS COMPANY

SOUTH CHARLESTON 3, WEST VIRGINIA

To (Name) Company Location	Mr. W. J. Skraba Building 701	Date Originating Dept. Answering letter date	February 19, 1961 DEVELOPMENT
Copy to	Dr. E. M. Best, Jr. Mr. N. E. Bolton Mr. R. E. Gothard Mr. E. F. Hillenbrand, Jr. Dr. Franklin Johnston Mr. N. H. Ketcham Mr. J. J. Lehr Mr. A. E. Montagna Mr. H. E. Persinger Mr. H. T. Sessions	Subject File	Radiation Monitoring 212H

Dear Mr. Skraba:

On February 1, 1961, Mr. N. H. Ketcham and the writer made a radiation survey of the Cobalt⁶⁰ Radiation Laboratory, Building 722. This survey will be repeated at yearly intervals to ascertain that there have been no major changes in the stray radiation levels, either inside or immediately outside of the building. This survey was made by using the Universal Atomics Model 700 and the Jordan Model AGB 10KG SR survey meters. The report of this work is attached.

Very truly yours,

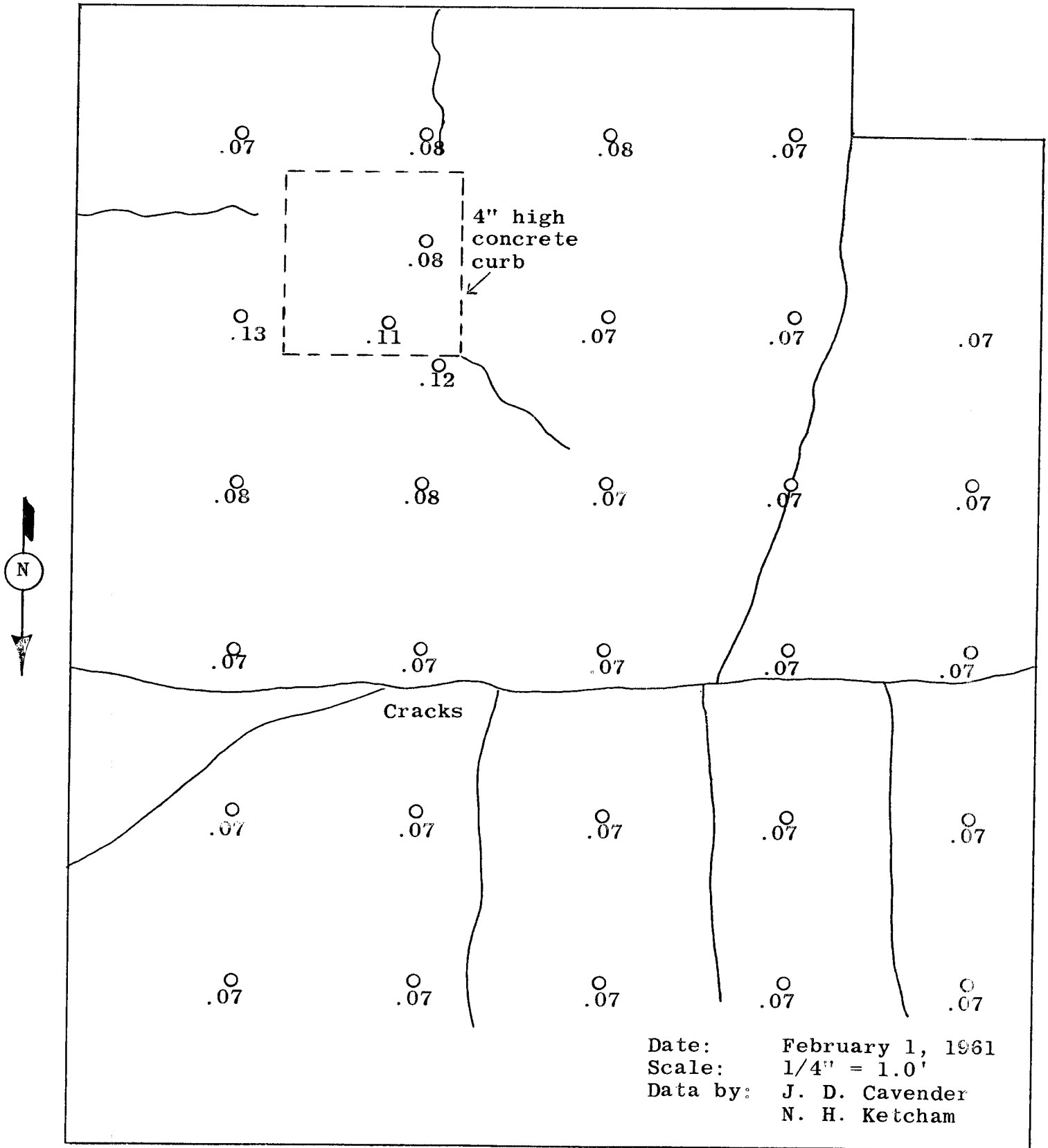
J. D. Cavender

JDC/dww
 Attachment:
 4 Figures

FIGURE I

ROOF VIEW - BUILDING 722

Background Count = 0.07 mr/hr



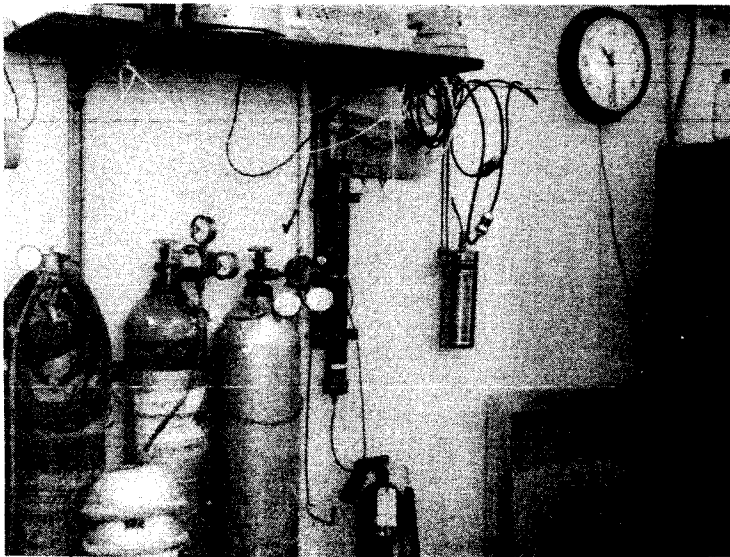


PHOTO 1

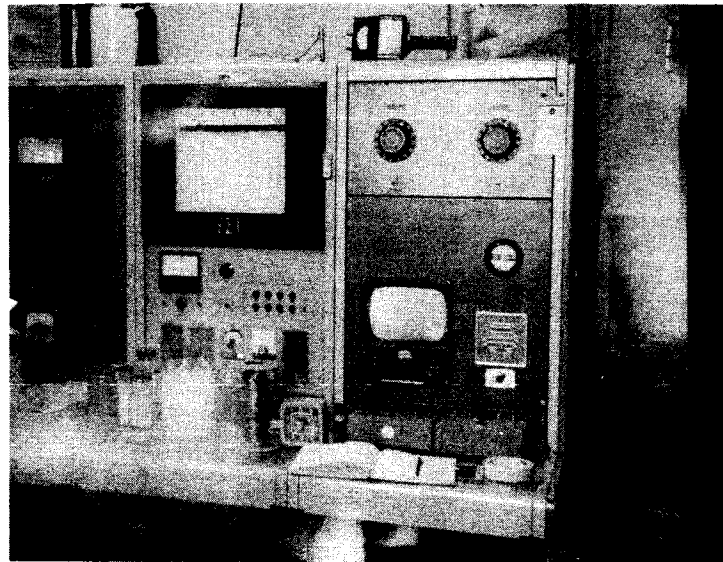
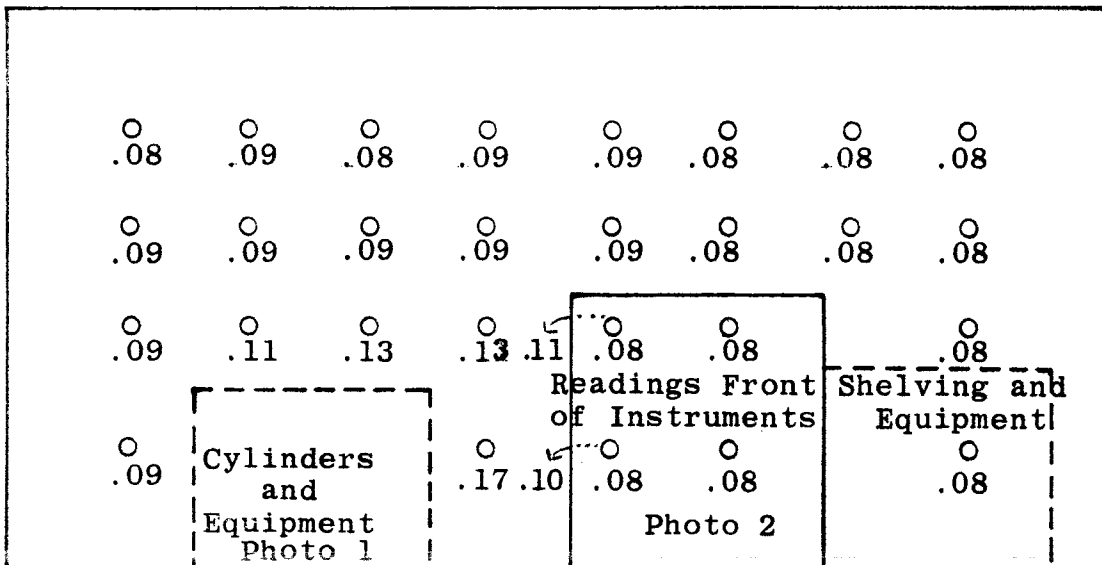


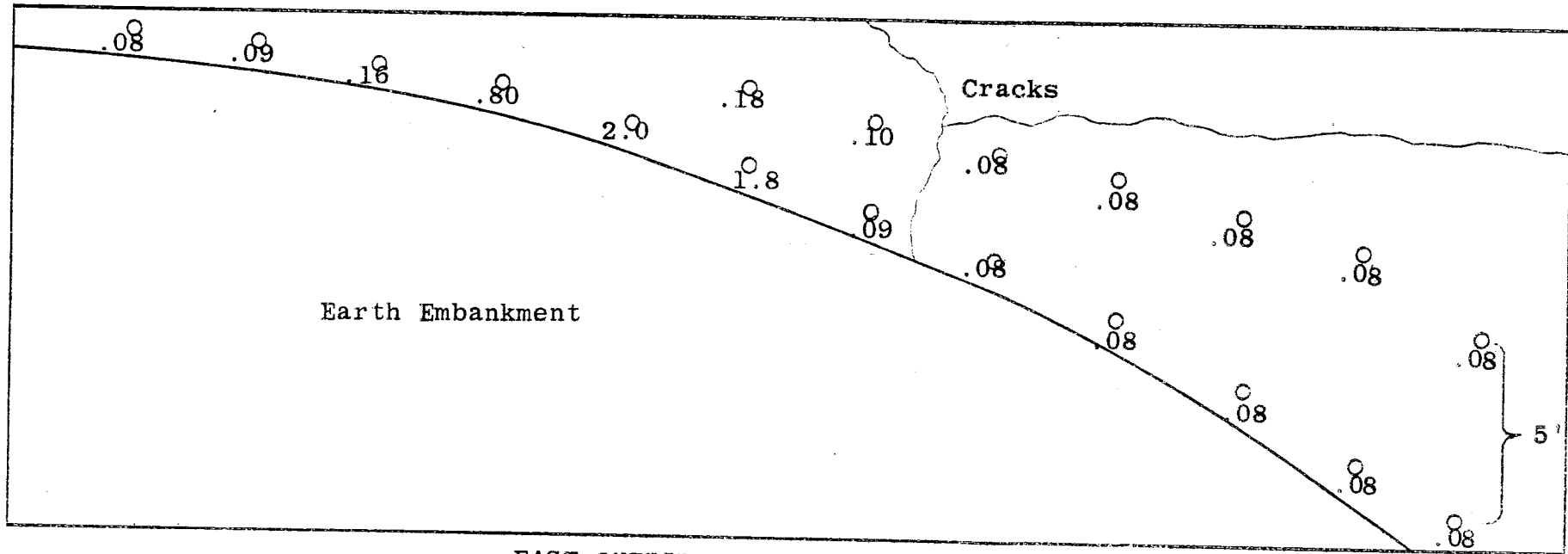
PHOTO 2



NORTH WALL - INSIDE BUILDING 722
Background Count = 0.08 mr/hr

FIGURE II

Date: February 1, 1961
Scale: 1/4" = 1.0'
Data by: J. D. Cavender
N. H. Ketcham



EAST OUTSIDE WALL - BUILDING 722

Background Count = 0.08 mr/hr

FIGURE III

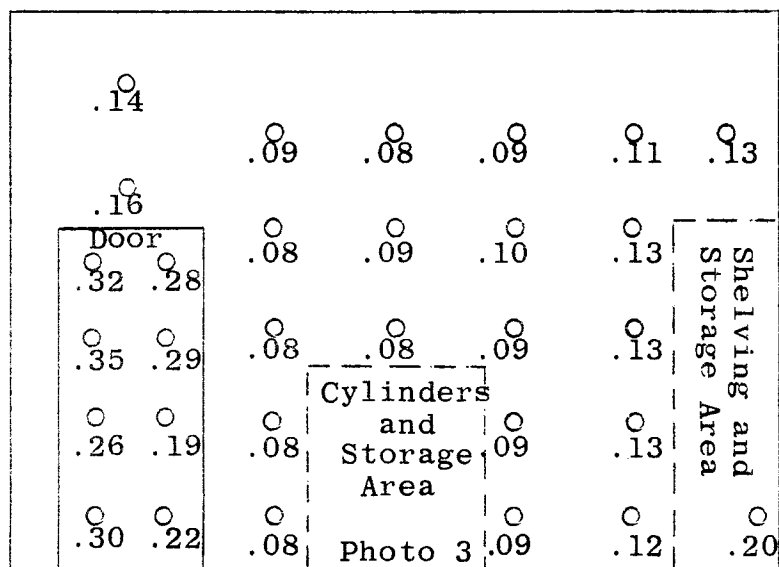
Note: First row of counts made 4 to 6" above earth.

Date: February 1, 1961

Scale: 1/4" = 1.0'

Data by: J. D. Cavender

N. H. Ketcham



WEST WALL - INSIDE BUILDING 722
Background Count = 0.08 mr/hr

FIGURE IV

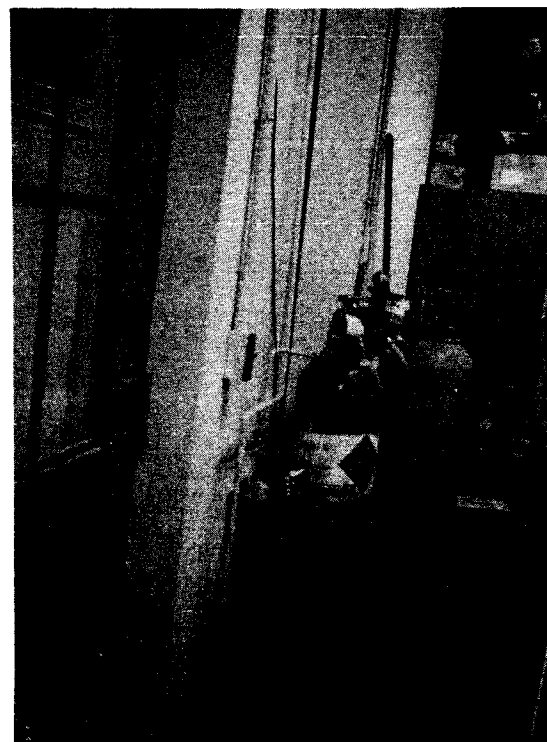


PHOTO 3

Date: February 1, 1961
Scale: 1/4" = 1.0'
Data by: J. D. Cavender
N. H. Ketcham

**Survey Report
Building 722
South Charleston Technology Park**

Survey Date: 11-17-2008

Purpose:

Confirmation of the decommissioning of the work area used for experiments utilizing Cobalt-60, as well as for storage of loose isotopes in Building 722 of the South Charleston Technology Park, Union Carbide Corporation, South Charleston, WV. Note that the building was believed to be decommissioned during the late 1960's, but no decommissioning report can be located that documents this work.

Plant/Area Under Examination:

Building 722 of the South Charleston Technology Park.

Use of Area:

This building was used for experiments utilizing Cobalt-60 during the late 1950's and 1960's. During the 1960's, the building was also used for temporarily storage of radioactive materials in loose form, specifically Carbon-14.

Methods/Sampling Equipment:

Wipe test: Final wipe analysis of equipment stated in analytical report (Attachment B). Wipe of 100 cm² analyzed by liquid scintillation in a Beckman LS6002 Liquid Scintillation Counter located in Midland, MI.

Survey Meter: Survey of approximately 50% of the building area (i.e. walls, floors, and railing) at approximately two inches from the surface areas using a Ludlum Model 3 Survey Meter (Serial Number 10296) with Model 44-9 GM Pancake Probe (Serial Number 010745).

Exposure Guideline:

Per NUREG 1757, Volume 1, Appendix B, all areas of laboratory must have less than 3.7×10^6 dpm/100 cm² of C-14, less than 7.1×10^3 dpm/100 cm² of Co-60, and less than 1.2×10^8 of contamination to be released for unrestricted use. As an ALARA goal, it is preferable to reduce levels of removable contamination to well below these acceptable release levels.

Sampling Locations:

See Attachment A

Results:

Wipe Test: All wipes were below the acceptable release levels. See Attachment B

Survey Meter: All readings were not distinguishable from background levels.

Conclusion and Recommendation:

This laboratory is free of radioactive contamination and may be released for unrestricted use.

**Survey Report
Building 722
South Charleston Technology Park**

Attachment A

Wipe Samples

(11-17-2008)

**Survey Report
Building 722
South Charleston Technology Park**

11/17/2008

Building 722 Wipe Samples

Samples taken on 11/17/2008 by
Brian Proper

Floor	FL
Wall	WL
Handrail	HR
Control Box	CB

Bldg	Area	Sample #	Description (See sample maps for sampling locations)
722	WL	1	Laboratory work area
722	WL	2	Laboratory work area
722	WL	3	Laboratory work area
722	WL	4	Laboratory work area
722	WL	5	Laboratory work area
722	WL	6	Laboratory work area
722	WL	7	Laboratory work area
722	WL	8	Laboratory work area
722	WL	9	Laboratory work area
722	FL	10	Laboratory work area
722	FL	11	Laboratory work area
722	FL	12	Laboratory work area
722	FL	13	Laboratory work area
722	FL	14	Laboratory work area
722	FL	15	Laboratory work area
722	FL	16	Laboratory work area
722	FL	17	Laboratory work area
722	FL	18	Laboratory work area
722	FL	19	Laboratory work area
722	FL	20	Laboratory work area
722	FL	21	Laboratory work area
722	FL	22	Laboratory work area
722	FL	23	Laboratory work area
722	FL	24	Laboratory work area
722	FL	25	Laboratory work area
722	FL	26	Laboratory work area
722	FL	27	Laboratory work area
722	FL	28	Laboratory work area
722	FL	29	Laboratory work area
722	FL	30	Laboratory work area
722	FL	31	Laboratory work area
722	FL	32	Office area
722	FL	33	Office area

**Survey Report
Building 722
South Charleston Technology Park**

Bldg	Area	Sample #	Description (See sample maps for sampling locations)
722	WL	34	Office area
722	WL	35	Office area
722	WL	36	Office area
722	FL	37	Office area
722	FL	38	Office area
722	FL	39	Office area
722	FL	40	Office area
722	FL	41	Office area
722	FL	42	Laboratory work area
722	FL	43	Laboratory work area
722	WL	44	Laboratory storage area
722	FL	45	Laboratory storage area
722	WL	46	Laboratory storage area
722	FL	47	Laboratory storage area
722	WL	48	Laboratory storage area
722	FL	49	Laboratory storage area
722	WL	50	Laboratory storage area
722	FL	51	Laboratory storage area
722	WL	52	Laboratory storage area
722	FL	53	Laboratory storage area
722	WL	54	Laboratory storage area
722	FL	55	Laboratory storage area
722	WL	56	Laboratory storage area
722	FL	57	Laboratory storage area
722	WL	58	Laboratory storage area
722	FL	59	Laboratory storage area
722	FL	60	Laboratory storage area
722	FL	61	Laboratory storage area
722	FL	62	Laboratory storage area
722	WL	63	Laboratory storage area
722	WL	64	Laboratory storage area
722	FL	65	Laboratory storage area
722	FL	66	Laboratory storage area
722	FL	67	Laboratory storage area
722	FL	68	Laboratory storage area
722	WL	69	Laboratory storage area
722	FL	70	Laboratory storage area
722	FL	71	Laboratory storage area
722	WL	72	Laboratory storage area
722	FL	73	Laboratory storage area
722	FL	74	Laboratory storage area
722	FL	75	Laboratory storage area
722	WL	76	Laboratory storage area
722	FL	77	Laboratory storage area
722	FL	78	Labyrinthine Passage to Radiation Chamber
722	FL	79	Labyrinthine Passage to Radiation Chamber
722	FL	80	Labyrinthine Passage to Radiation Chamber
722	FL	81	Labyrinthine Passage to Radiation Chamber

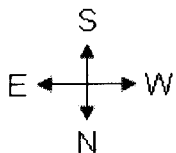
**Survey Report
Building 722
South Charleston Technology Park**

Bldg	Area	Sample #	Description (See sample maps for sampling locations)
722	FL	82	Labyrinthine Passage to Radiation Chamber
722	FL	83	Labyrinthine Passage to Radiation Chamber
722	FL	84	Labyrinthine Passage to Radiation Chamber
722	WL	85	Radiation Chamber
722	WL	86	Radiation Chamber
722	WL	87	Radiation Chamber
722	WL	88	Radiation Chamber
722	WL	89	Radiation Chamber
722	WL	90	Radiation Chamber
722	WL	91	Radiation Chamber
722	WL	92	Radiation Chamber
722	WL	93	Radiation Chamber
722	WL	94	Radiation Chamber
722	WL	95	Radiation Chamber
722	WL	96	Radiation Chamber
722	WL	97	Radiation Chamber
722	WL	98	Radiation Chamber
722	WL	99	Radiation Chamber
722	WL	100	Radiation Chamber
722	WL	101	Radiation Chamber
722	WL	102	Radiation Chamber
722	WL	103	Radiation Chamber
722	WL	104	Radiation Chamber
722	FL	105	Radiation Chamber
722	FL	106	Radiation Chamber
722	FL	107	Radiation Chamber
722	FL	108	Radiation Chamber
722	FL	109	Radiation Chamber
722	FL	110	Radiation Chamber
722	FL	111	Radiation Chamber
722	FL	112	Radiation Chamber
722	FL	113	Radiation Chamber
722	FL	114	Radiation Chamber
722	FL	115	Radiation Chamber
722	FL	116	Radiation Chamber
722	FL	117	Radiation Chamber
722	FL	118	Radiation Chamber
722	FL	119	Radiation Chamber
722	FL	120	Radiation Chamber
722	FL	121	Radiation Chamber
722	FL	122	Radiation Chamber
722	FL	123	Radiation Chamber
722	FL	124	Radiation Chamber
722	FL	125	Radiation Chamber
722	FL	126	Radiation Chamber
722	FL	127	Radiation Chamber
722	FL	128	Radiation Chamber
722	FL	129	Radiation Chamber

**Survey Report
Building 722
South Charleston Technology Park**

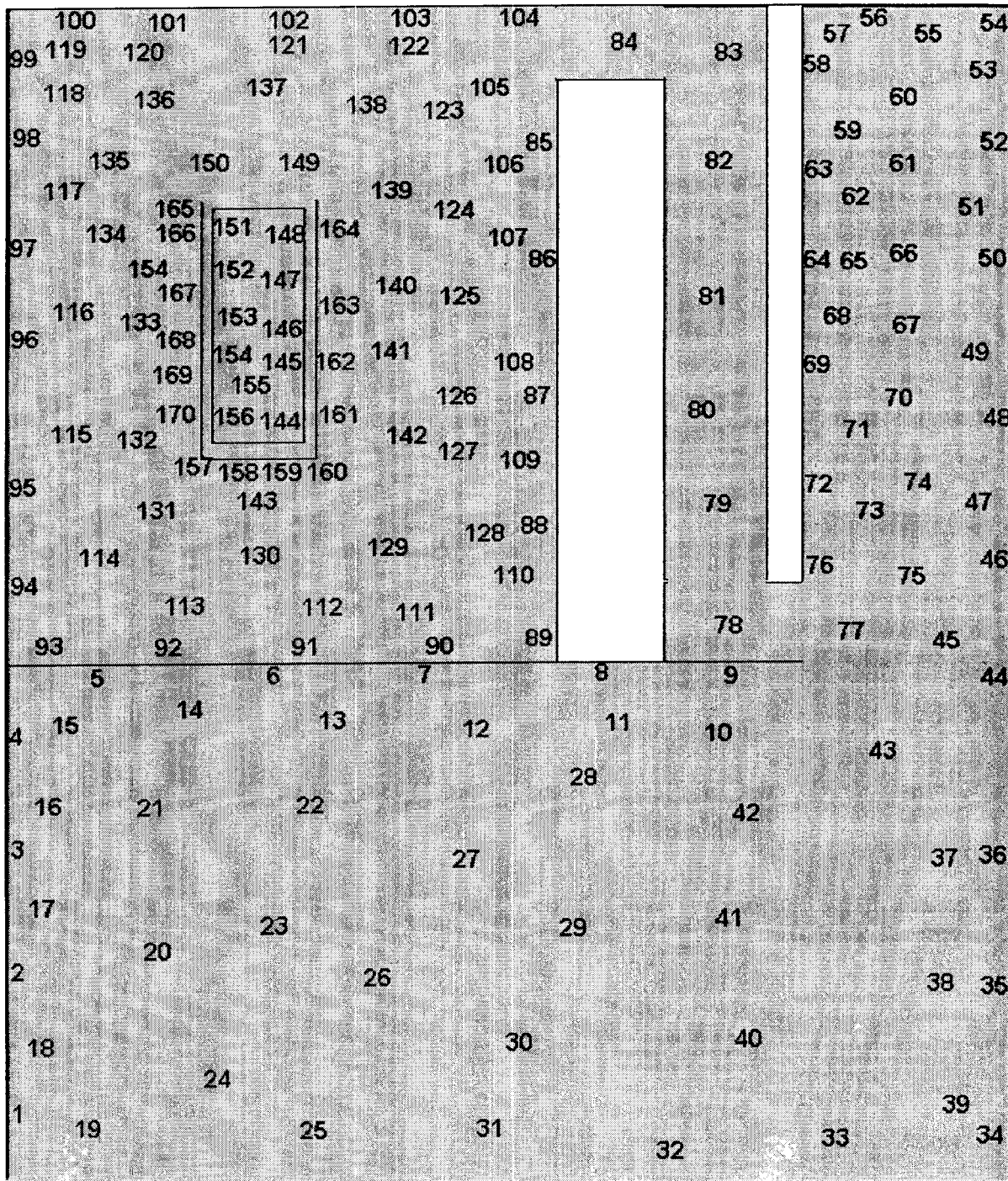
Bldg	Area	Sample #	Description (See sample maps for sampling locations)
722	FL	130	Radiation Chamber
722	FL	131	Radiation Chamber
722	FL	132	Radiation Chamber
722	FL	133	Radiation Chamber
722	FL	134	Radiation Chamber
722	FL	135	Radiation Chamber
722	FL	136	Radiation Chamber
722	FL	137	Radiation Chamber
722	FL	138	Radiation Chamber
722	FL	139	Radiation Chamber
722	FL	140	Radiation Chamber
722	FL	141	Radiation Chamber
722	FL	142	Radiation Chamber
722	FL	143	Radiation Chamber
722	FL	144	Location of storage pool - filled in with concrete
722	FL	145	Location of storage pool - filled in with concrete
722	FL	146	Location of storage pool - filled in with concrete
722	FL	147	Location of storage pool - filled in with concrete
722	FL	148	Location of storage pool - filled in with concrete
722	FL	149	Radiation Chamber
722	FL	150	Radiation Chamber
722	FL	151	Location of storage pool - filled in with concrete
722	FL	152	Location of storage pool - filled in with concrete
722	FL	153	Location of storage pool - filled in with concrete
722	FL	154	Location of storage pool - filled in with concrete
722	FL	155	Location of storage pool - filled in with concrete
722	FL	156	Location of storage pool - filled in with concrete
722	HR	157	Location of storage pool - filled in with concrete
722	HR	158	Location of storage pool - filled in with concrete
722	HR	159	Location of storage pool - filled in with concrete
722	HR	160	Location of storage pool - filled in with concrete
722	HR	161	Upper handrail surrounding location of storage pool
722	HR	162	Lower handrail surrounding location of storage pool
722	HR	163	Upper handrail surrounding location of storage pool
722	HR	164	Upper handrail surrounding location of storage pool
722	HR	165	Lower handrail surrounding location of storage pool
722	CB	166	Control Box hanging on lower handrail
722	HR	167	Upper handrail surrounding location of storage pool
722	HR	168	Upper handrail surrounding location of storage pool
722	HR	169	Lower handrail surrounding location of storage pool
722	HR	170	Upper handrail surrounding location of storage pool
		BLK1	Blank sample
		BLK2	Blank sample
		BLK3	Blank sample
		BLK4	Blank sample
		BLK5	Blank sample

Survey Report
Building 722
South Charleston Technology Park



B-722 Wipe Sample Map

11/17/2008
BP



North Wall Removed

**Survey Report
Building 722
South Charleston Technology Park**

Attachment B

Wipe Sample Analysis (11/21/2008)

Survey Report
Building 722
South Charleston Technology Park

CUSTOMER REQUEST **DOW CHEMICAL U.S.A**
H & ES ANALYTICAL CHEMISTRY LABORATORY

ES-AL NUMBER: 5107
LS: 6082-2816

Date: 11/17/2008	Plant Code:	Cost Center: 6490067	Project/Task:	Date Needed By:	<input type="checkbox"/> Return Sample <input checked="" type="checkbox"/> Discard Sample
SAMPLE OF: B722 Samples					
SAMPLE NUMBER(S): 175					
SAFETY HAZARDS					
<input type="checkbox"/> Toxic <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Low Flash Point <input type="checkbox"/> Explosive <input type="checkbox"/> Spontaneous <input type="checkbox"/> Non-Hazardous <input type="checkbox"/> Lachrymator <input type="checkbox"/> Flammable <input type="checkbox"/> Unusual Chemical Reactive					
NAME	DEPARTMENT	BUILDING	DOOR	PHONE	
B. Proper	EH & S	S. Charleston, WV		304-747-1766	
RELATIVE ERROR SUFFICIENT, ETC.		APPROXIMATE LEVEL, ETC.		LOWER LIMIT, ETC.	
ANALYSIS REQUEST AND REASON FOR REQUEST. (PLANT OR PROJECT RELATED). INDICATE DOLLAR (\$) VALUE TO DOW.					
Check for Radioactivity					
RESULTS:					
ALL WIPES BELOW DETECTION LIMIT OF 50 dpm/WIPE (2.3 x 10⁻³ µCi/wipe) INITIAL <i>KK</i> DATE <i>11.24.08</i>					
SIGNATURE: <i>K Kennett</i>		PHONE: <i>8-3304</i>		BUILDING: <i>1803</i>	
DATE FINISHED: <i>11.24.08</i>	HOURS: <i>1</i>	RESULTS PHONED:	REVIEWED BY: <i>Mary K Scherzer</i> <i>11.24.08</i>		

**Survey Report
Building 722
South Charleston Technology Park**

PAGE: 1

ID:WIPETEST SCREEN

21 NOV 2008 11:53

USER: 5 COMMENT:LS-6002 ES-2717 + ESAL 4230
 PRESET TIME : 10.00
 TA CALC : CPM H# : NO SAMPLE REPEATS: 1 PRINTER :EDIT
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : OFF
 TWO PHASE : NO ADC : NO CYCLE REPEATS : 1
 SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

CHAN: 20.0 - 400.0 XERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 29
 CHAN: 220.0 - 700.0 XERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 60
 CHAN: 420.0 - 1000.0 XERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 64

SAM NO	POS	WIND1 CPM	WIND2 CPM	WIND3 CPM
1	1-1	0.00	0.00	0.00
2	1-2	0.00	0.00	0.00
3	1-3	0.00	0.00	0.00
4	1-4	0.00	0.00	0.00
5	1-5	0.00	0.00	0.00
6	1-6	0.00	0.00	0.00
7	1-7	0.00	0.00	0.00
8	1-8	0.00	0.00	0.00
9	1-9	0.00	0.00	0.00
10	1-10	0.00	0.00	0.00
11	1-11	0.00	0.00	0.00
12	1-12	0.00	0.00	0.00
13	1-13	0.00	0.00	0.00
14	1-14	0.00	0.00	0.00
15	1-15	0.00	0.00	0.00
16	1-16	0.00	0.00	0.00
17	1-17	0.00	0.00	0.00
18	1-18	0.00	0.00	0.00
19	2-1	0.00	0.00	0.00
20	2-2	0.00	0.00	0.00
21	2-3	0.00	0.00	0.00
22	2-4	0.00	0.00	0.00
23	2-5	0.00	0.00	0.00
24	2-6	0.00	0.00	0.00
25	2-7	0.00	0.00	0.00
26	2-8	0.00	0.00	0.00
27	2-9	0.00	0.00	0.00
28	2-10	0.00	0.00	0.00
29	2-11	0.00	0.00	0.00
30	2-12	0.00	0.00	0.00
31	2-13	0.00	0.00	0.00
32	2-14	0.00	0.00	0.00
33	2-15	0.00	0.00	0.00
34	2-16	0.00	0.00	0.00
35	2-17	0.00	0.00	0.00
36	2-18	0.00	0.00	0.00
37	3-1	0.00	0.00	0.00
38	3-2	0.00	0.00	0.00
39	3-3	0.00	0.00	0.00
40	3-4	0.00	0.00	0.00
41	3-5	0.00	0.00	0.00
42	3-6	0.00	0.00	0.00
43	3-7	0.00	0.00	0.00
44	3-8	0.00	0.00	0.00

**Survey Report
Building 722
South Charleston Technology Park**

PAGE: 2

<u>SAM</u>	<u>POS</u>	<u>WIND1</u>	<u>WIND2</u>	<u>WIND3</u>
<u>NO</u>		<u>CPM</u>	<u>CPM</u>	<u>CPM</u>
45	3-9	0.00	0.00	0.00
46	3-10	0.00	0.00	0.00
47	3-11	0.00	0.00	0.00
48	3-12	0.00	0.00	0.00
49	3-13	0.00	0.00	0.00
50	3-14	0.00	0.00	0.00
51	3-15	0.00	0.00	0.00
52	3-16	0.00	0.00	0.00
53	3-17	0.00	0.00	0.00
54	3-18	0.00	0.00	0.00
55	4-1	0.00	0.00	0.00
56	4-2	0.00	0.00	0.00
57	4-3	0.00	0.00	0.00
58	4-4	0.00	0.00	0.00
59	4-5	0.00	0.00	0.00
60	4-6	0.00	0.00	0.00
61	4-7	0.00	0.00	0.00
62	4-8	0.00	0.00	0.00
63	4-9	0.00	0.00	0.00
64	4-10	0.00	0.00	0.00
65	4-11	0.00	0.00	0.00
66	4-12	0.00	0.00	0.00
67	4-13	0.00	0.00	0.00
68	4-14	0.00	0.00	0.00
69	4-15	0.00	0.00	0.00
70	4-16	0.00	0.00	0.00
71	4-17	0.00	0.00	0.00
72	4-18	0.00	0.00	0.00
73	5-1	0.00	0.00	0.00
74	5-2	0.00	0.00	0.00
75	5-3	0.00	0.00	0.00
76	5-4	0.00	0.00	0.00
77	5-5	0.00	0.00	0.00
78	5-6	0.00	0.00	0.00
79	5-7	0.00	0.00	0.00
80	5-8	0.00	0.00	0.00
81	5-9	0.00	0.00	0.00
82	5-10	0.00	0.00	0.00
83	5-11	0.00	0.00	0.00
84	5-12	0.00	0.00	0.00
85	5-13	0.00	0.00	0.00
86	5-14	0.00	0.00	0.00
87	5-15	0.00	0.00	0.00
88	5-16	0.00	0.00	0.00
89	5-17	0.00	0.00	0.00
90	5-18	0.00	0.00	0.00
91	6-1	0.00	0.00	0.00
92	6-2	0.00	0.00	0.00
93	6-3	0.00	0.00	0.00
94	6-4	0.00	0.00	0.00
95	6-5	0.00	0.00	0.00
96	6-6	0.00	0.00	0.00
97	6-7	0.00	0.00	0.00
98	6-8	0.00	0.00	0.00
99	6-9	0.00	0.00	0.00
100	6-10	0.00	0.00	0.00
101	6-11	0.00	0.00	0.00
102	6-12	0.00	0.00	0.00

**Survey Report
Building 722
South Charleston Technology Park**

PAGE: 3

SAM NO	POS	WIND1 CPM	WIND2 CPM	WIND3 CPM
103	6-13	0.00	0.00	0.00
104	6-14	0.00	0.00	0.00
105	6-15	0.00	0.00	0.00
106	6-16	0.00	0.00	0.00
107	6-17	0.00	0.00	0.00
108	6-18	0.00	0.00	0.00
109	7-1	0.00	0.00	0.00
110	7-2	0.00	0.00	0.00
111	7-3	0.00	0.00	0.00
112	7-4	0.00	0.00	0.00
113	7-5	0.00	0.00	0.00
114	7-6	0.00	0.00	0.00
115	7-7	0.00	0.00	0.00
116	7-8	0.00	0.00	0.00
117	7-9	0.00	0.00	0.00
118	7-10	0.00	0.00	0.00
119	7-11	0.00	0.00	0.00
120	7-12	0.00	0.00	0.00
121	7-13	0.00	0.00	0.00
122	7-14	0.00	0.00	0.00
123	7-15	0.00	0.00	0.00
124	7-16	0.00	0.00	0.00
125	7-17	0.00	0.00	0.00
126	7-18	0.00	0.00	0.00
127	8-1	0.00	0.00	0.00
128	8-2	0.00	0.00	0.00
129	8-3	0.00	0.00	0.00
130	8-4	0.00	0.00	0.00
131	8-5	0.00	0.00	0.00
132	8-6	0.00	0.00	0.00
133	8-7	0.00	0.00	0.00
134	8-8	0.00	0.00	0.00
135	8-9	0.00	0.00	0.00
136	8-10	0.00	0.00	0.00
137	8-11	0.00	0.00	0.00
138	8-12	0.00	0.00	0.00
139	8-13	0.00	0.00	0.00
140	8-14	0.00	0.00	0.00
141	8-15	0.00	0.00	0.00
142	8-16	0.00	0.00	0.00
143	8-17	0.00	0.00	0.00
144	8-18	0.00	0.00	0.00
145	9-1	0.00	0.00	0.00
146	9-2	0.00	0.00	0.00
147	9-3	0.00	0.00	0.00
148	9-4	0.00	0.00	0.00
149	9-5	0.00	0.00	0.00
150	9-6	0.00	0.00	0.00
151	9-7	0.00	0.00	0.00
152	9-8	0.00	0.00	0.00
153	9-9	0.00	0.00	0.00
154	9-10	0.00	0.00	0.00
155	9-11	0.00	0.00	0.00
156	9-12	0.00	0.00	0.00
157	9-13	0.00	0.00	0.00
158	9-14	0.00	0.00	0.00
159	9-15	0.00	0.00	0.00
160	9-16	0.00	0.00	0.00

**Survey Report
Building 722
South Charleston Technology Park**

PAGE : 4

SAM	POS	WIND1	WIND2	WIND3
NO		CPM	CPM	CPM
161	9-17	0.00	0.00	0.00
162	9-18	0.00	0.00	0.00
163	10-1	0.00	0.00	0.00
164	10-2	0.00	0.00	0.00
165	10-3	0.00	0.00	0.00
166	10-4	0.00	0.00	0.00
167	10-5	0.00	0.00	0.00
168	10-6	0.00	0.00	0.00
169	10-7	0.00	0.00	0.00
170	10-8	0.00	0.00	0.00
171	10-9	0.00	0.00	0.00
172	10-10	0.00	0.00	0.00
173	10-11	0.00	0.00	0.00
174	10-12	0.00	0.00	0.00
175	10-13	0.00	0.00	0.00
176	10-14	7859.93	41966.06	33636.83

-7C Ung std is okay KK 11-24-08

June 29, 2000

Mr. Jose Diaz
USNRC, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85.
Atlanta, GA 30303-3415

Re: License No. 47-00260-02

Dear Mr. Mr. Diaz:

This is in response to your recent inspection of Union Carbide Corporation ("Union Carbide") at its Technical Center in South Charleston, West Virginia (the "Site"). The inspection concerned Union Carbide's USNRC license to possess and use radioactive material. In the course of the inspection, you verbally advised us of a potential violation concerning a failure to transfer the USNRC license for two radiation sources when Union Carbide sold the business of which the sources are a part. We wish to provide additional background information on this matter, and to make clear that Union Carbide is taking prompt, appropriate actions to address this potential violation.

The two radiation sources are being used in Building 727 at the Site as part of a level gauge system on the toluene diisocyanate tank in that building. These sources were installed on November 1, 1989, and have been in continuous service since that date. The potential violation occurred as a result of Union Carbide's sale of the business of which Building 727 is a part to ARCO Chemical Company ("ARCO"). Union Carbide and ARCO signed the sale agreement in 1989, but it did not take effect until late 1990, after regulatory approvals were obtained. (See 55 Fed. Reg. 37759 (Sept. 13, 1990); 55 Fed. Reg. 51963 (Dec. 18, 1990) (Federal Trade Commission consideration and approval of consent order concerning this transaction).) Thus, the initial transfer occurred nearly ten years ago. Some years later, ARCO sold the business of which Building 727 is a part to Lyondell Petrochemical Company, which recently sold it to Bayer Corporation ("Bayer").

During the entire period since 1989, Union Carbide has provided technical services to whichever company at the time owned the business of which Building

727 is a part, including services related to the radiation sources. During that time the owner has occupied Building 727 and controlled Union Carbide's access to it.

The level gauge system has worked very well. The level gauge has required very little maintenance or other attention over the years except for periodic tests and surveys required by the USNRC. The sources are included on the Site's radioactive materials inventory. Periodic surveys and leak tests are performed by the Site Radiation Safety Staff. The sources are padlocked in the "on" position, and only the Site Radiation Safety Officer has keys for operation of the sources.

Bayer personnel only interact with the sources in a limited manner. The gauge is used to detect high and low levels of material in Bayer's toluene diisocyanate tank. Any actions affecting these sources are coordinated with the Site Radiation Safety Staff. Bayer and its predecessors have contributed a proportionate amount to the Site's annual USNRC fee. An ARCO person from Building 727 has served on the Site's Radiation Safety Committee in the past.

During the inspection you offered the opinion that Bayer should have its own license for the possession and use of these sources. After conferring with your supervisors, you subsequently advised me that NRC does consider this to be a violation.

Union Carbide had assumed that these sources could be possessed and used under Union Carbide's USNRC License No. 47-00260-02. The cause of this potential violation is our understanding of the definition of "the user". Our interpretation was that since this material is in use at this Site and its use is controlled by the Site's Radiation Safety Staff, its possession and use should be under the jurisdiction of the Site's radioactive materials license. This potential violation was not discovered in any of the approximately five inspections of our operations by the USNRC that have occurred since the sources were installed in Building 727 in 1989.

Although the five-year statute of limitations for assessing a civil penalty, 28 U.S.C. § 2462, has passed, Union Carbide is taking the following steps to correct this situation:

1. Union Carbide has fully informed Bayer personnel of the situation. Bayer has indicated that it will promptly apply for a license to use these sources. The Union Carbide Site Radiation Safety Staff will continue to service and maintain them as we have in the past during the transition period.
2. Union Carbide is assisting Bayer personnel in preparing the license application, at their request. We anticipate that Bayer will submit it shortly.

3. Union Carbide will continue to provide radiation safety services for these sources while the license application is pending and thereafter if permitted under the terms and conditions of Bayer's license.

4. Union Carbide has sent a notice to all of its other plants with USNRC or Agreement State licenses for radioactive materials, advising them of this potential violation and requesting that they review their operations to assure that they do not have a similar problem. While we do not anticipate that any similar situations will be found, we will promptly notify the USNRC if any are discovered.

5. Union Carbide is reviewing its processes and procedures related to radiation safety for possible revision to address the potential need to transfer licenses in case of acquisition or divestiture of licensed facilities. Once any appropriate revisions are implemented, this action should prevent similar situations from occurring in the future.

There does not appear to be a need to amend Union Carbide's License No. 47-00260-02 to delete the sources, as they are not specifically referenced therein. Please let me know if you believe that a license amendment is appropriate.

Since these sources are an integral part of the safety of Bayer operations, we request that Bayer be permitted to continue to use them while its license application is pending.

If there are further actions that need to be taken, please let me know. If you have any question on this, please call me at 304/747-5314.

Sincerely,

Michael L. Green
Radiation Safety Officer
South Charleston Technical Center
Union Carbide Corporation



October 3, 2000

U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, S. W., Suite 23T85
Atlanta, GA 30303-8931

Bayer Corporation
South Charleston Technical Center
Building 727
P.O. Box 38007
3200 Kanawha Turnpike
South Charleston, WV 25303
Phone: 304 746-8000
Fax: 304 746-8519

Attn: Materials Licensing/Inspection Branch

Re: Written Notification of Licensed Activities

Dear Sir or Madam:

Bayer Corporation was recently granted a new NRC materials license for two (2) radiation sources located at our South Charleston, West Virginia, Technical Center. Our new license number is 47-25529-01 (Reference Control No. 258999; Docket No. 030-35442).

This is the required written notification informing you that activities authorized by our license will be initiated. Our Radiation Safety Officer, Mr. Gary Trent, is currently participating in a one-week (October 2-6, 2000) RSO training course at Ohmart Vega Corporation in Cincinnati, Ohio. Mr. Mike Green of Union Carbide Corporation (this same site) is serving as our backup RSO.

Please let me know if you require any further information or documentation. My telephone number is 304-746-8583 and my fax number is 304-746-8519.

Very truly yours,

A handwritten signature in cursive script that reads "William A. Gill".

William A. Gill
Manager, Applications Development
and Technical Services

WAG/mbd

Cc: Gary L. Allen - Bayer Site Director, South Charleston
Mike Green - Union Carbide Corporation, South Charleston
Gary W. Trent - Bayer Site Radiation Safety Officer, South Charleston
Ken Yoder - Bayer, Pittsburgh



UNION CARBIDE CORPORATION
P.O. BOX 8361, SOUTH CHARLESTON, WV 25303

October 5, 2000

Mr. Gary W. Trent
Bayer Corporation
South Charleston Technical Center
PO Box 38007
So. Charleston, WV 25303

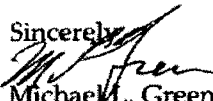
Re: Transfer of Radioactive Material to Bayer USNRC License

Dear Gary:

Attached are forms officially transferring the two sources containing radioactive material to Bayer's USNRC License. This should resolve all the issues raised during the USNRC's inspection of this facility in June.

I will continue to survey and leak test these devices in January and July of each year.

If there are further actions that need to be taken, please let me know. If you have any question on this, please call me at 304/747-5314.

Sincerely,

Michael L. Green
Radiation Safety Officer
South Charleston Technical Center
Union Carbide Corporation

Cc: William Gill, Bayer Corp.
M. N. Duvall, UCC Danbury
R. J. Romagnoli, Bld. 2000
T. E. Hanning, Bld. 740

UNION CARBIDE CORPORATION
Radiation Safety Office, 740-1101
So. Charleston Technical Center
P. O. Box 8361
So. Charleston, WV 25303-8361

To:
Gary W. Trent
Bayer Corporation
Bld 727, So. Charleston Technical Center
So. Charleston, WV 25303

Subject: Transfer of Radioactive Material from USNRC License No. 47-00260-02 to License No. 47-25529-01 issued by USNRC

RADIOACTIVE MATERIAL DESCRIPTION

Mfg. Serial No.:	524
UCC Property No.:	
Isotope:	Cs-137
Activity (mCi)	200 mCi
Assay Date:	October 1974
Material Form:	Sealed Source TN570-57157C
Type of Holder:	5192
Leak Wipe Test Date:	July 2000
Manufacturer:	Texas Nuclear Corp
Original PO No. & Date:	

As of October 9, 2000 the Union Carbide Technical Center, USNRC License No. 47-00260-02, relinquishes all license responsibility for the above stated radioactive material unless informed in writing by the addressee.

Signed



Michael E. Green, Radiation Safety Officer

UNION CARBIDE CORPORATION
Radiation Safety Office, 740-1101
So. Charleston Technical Center
P. O. Box 8361
So. Charleston, WV 25303-8361

To:
Gary W. Trent
Bayer Corporation
Bld 727, So. Charleston Technical Center
So. Charleston, WV 25303

Subject: Transfer of Radioactive Material from USNRC License No. 47-00260-02 to License No. 47-25529-01 issued by USNRC

RADIOACTIVE MATERIAL DESCRIPTION

Mfg. Serial No.:	567
UCC Property No.:	
Isotope:	Cs-137
Activity (mCi)	200 mCi
Assay Date:	January 1975
Material Form:	Sealed Source TN570-57157C
Type of Holder:	5192
Leak Wipe Test Date:	July 2000
Manufacturer:	Texas Nuclear Corp
Original PO No. & Date:	

As of October 9, 2000 the Union Carbide Technical Center, USNRC License No. 47-00260-02, relinquishes all license responsibility for the above stated radioactive material unless informed in writing by the addressee.

Signed


Michael L. Green, Radiation Safety Officer

MEMORANDUM

TO: Mr. D. L. Engle
Dr. C. K. HWU
Mr. N. H. Ketcham
Mr. A. E. Montagna
Mr. J. S. Nicholas
Mr. H. T. Sessions
R. J. Sexton, M. D.
Mr. H. B. Walker
Mr. M. B. Young

DATE: December 30, 1964

FROM: Fred Williams

SUBJECT: Radiation Surveys and Health
Protection in a Study Using
Krypton ⁷⁹ as a Radioactive Tracer

SUMMARY: A study consisting of three experiments using Krypton⁷⁹, an inert radioactive gas, was performed successfully in Building 773. There were no known personnel exposures, neither was there radiation contamination of the quench water and product during the study to determine the residence time distribution of ethylene ~~oxide~~ during polyethylene production. However, there were controlled releases of Krypton⁷⁹ to the atmosphere that approached the established limits.

INTRODUCTION: Upon the approval of a radioisotope for use in the Technical Center, the industrial hygienist as radiation protection officer must conduct surveys and radiation checks to assure compliance with the Atomic Energy Commission Rules and Regulations. The radiation protection officer worked with personnel during planning and operating stages to assure that safe practices existed.

AEC Rules and Regulations Title 10, Section 20.403 state that immediate notification shall be made if "The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limits specified for such materials in Appendix B, Table II"; and that twenty-four hour notification shall be made if "The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits specified for such materials in Appendix B, Table II".

Surveys were conducted to evaluate possible exposures of personnel to radiation, to measure the release of material to the atmosphere and to determine the possible contamination in the quench water and product while the study was conducted with Krypton⁷⁹. This radioactive material was used October 13, 21 and November 11, 1964 to determine the residence time distribution for ethylene ~~oxide~~ in the production of polyethylene. Krypton⁷⁹ has a half-life value of 34.5 hours.

Personnel directly involved in handling and measuring the radioisotope included J. A. Boggess, C. R. Landfried, M. B. Young and Fred Williams.

A report of the study and findings will be issued by the Special Instrumentation and Research and Development Departments.

DISCUSSION: There are no established limits in Appendix B, Table II for Krypton⁷⁹. The average of the limits for Krypton^{85m} and Krypton⁸⁵ was used to determine a value in the absence of established emission concentrations for this material. The limit given in Appendix B, Table II for Krypton^{85m} is 1×10^{-7} microcurie per milliliter while 3×10^{-7} is shown for Krypton⁸⁵. Thus, the concentration 2×10^{-7} $\mu\text{c/ml}$ was used as the limit for Krypton⁷⁹ emissions to the atmosphere in unrestricted areas. This given a limit of 1×10^{-3} $\mu\text{c/ml}$ for immediate notification of AEC while a limit of 1×10^{-4} $\mu\text{c/ml}$ requires notifying AEC within twenty-four hours after a release.

Personnel performing the work with Krypton⁷⁹ wore pocket dosimeters and film badges to measure radiation exposures. The highest significant exposure measured 10 milliroentgens on a pocket dosimeter. A limit of 100 milliroentgens is permissible for each experiment.

Two Jordan survey-meters, A Tracerlab Model SU-14 survey meter, a Geiger-Mueller detector tube in a low background lead pig and scintillation equipment were used to measure the radiation levels during the study.

A total of fifteen 55 gallon drums was used to collect the quench water. Samples of this water were taken to measure the radioactivity. It was not necessary to hold the water until radioactive decay reached a safe limit since there was no evidence of radiation contamination.

The gases were vented to the atmosphere above the roof level of Building 773, approximately thirty feet from the ground. Exhaust rates of 600 and 1200 cubic feet per hour were used during the study.

Krypton⁷⁹ was transferred from the glass ampoule to a stainless steel cylinder with ethylene ~~oxide~~ under pressure to 150 psi. This work was performed in the radiation hood located in Building 745. The shielded cylinder was then taken to Building 773 where controlled amounts were fed to the system.

Accurate measurements were difficult to make on the emissions to the atmosphere due to the rapid material flow through the system. Equipment was installed during the third experiment to show the intensity of the response and to relate the time of the emissions to the data received during the process. The emissions that are reported were calculated on the estimated amount of Krypton⁷⁹ injected into the system.

FINDINGS: Each shipment of Krypton⁷⁹ was labeled as containing 15 millicuries of the radioisotope. The following show measurements received during various phases of the operation.

<u>Location of Measurements</u>	<u>Shipment 1(Oct 13)</u> <u>(Experiment 1)</u>	<u>Shipment 2(Oct 21)</u> <u>(Experiment 2)</u>	<u>Shipment 3(Nov. 11)</u> <u>(Experiment 3)</u>
On shipping box, contact	5. mr/hr	15. mr/hr	12.mr/hr
On vacuum can, contact	-	45.	15.
On lead shield, contact	35	200.	--
Sample ampoule, contact	200	>1000.	500.
On transfer cylinder, contact	<5.	10.	5.
Quench water	0	0	0
Product	0	0	0
Inside reactor	0	0	0
Pocket dosimeters	0	10.	0
Emissions to atmosphere	$9.8 \times 10^{-6} \mu\text{c/ml}$	$2.7 \times 10^{-5} \mu\text{c/ml}$	$1.5 \times 10^{-5} \mu\text{c/ml}$

There is reason to believe that some of shipment 1 was lost through leakage during transit by plane. As shown above, the measurements that were received on shipment 2 gave the expected readings but the third shipment showed less radiation than anticipated. The meter readings for shipment 1 and 3 did not agree with measurements recorded on the radiation shipping form but the survey for shipment 2 showed good agreement.

It is understood that Krypton⁷⁹ is difficult to package in known quantities. It is believed that these three shipments are the first attempts by the Oak Ridge National Laboratory to ship Krypton⁷⁹.

The emissions to the atmosphere are within the limits for releases without notifying AEC. If the releases had occurred at ground level with very little dilution, then AEC would have been notified that an incident had occurred. A total of 15 millicuries of Krypton⁷⁹ is the largest quantity that should be contained in one container due to possible leakage of this material to the atmosphere.

Vent exhaust rates: 600 cf/h.
1200 cf/h.

	unrestricted area	restricted area
Permissible Limit	$X_1^{85m} = 1 \times 10^{-7}$	6×10^{-6}
Continuous release	$X_1^{85} = 3 \times 10^{-7}$	1×10^{-5}
	$X_2^{79} = 2 \times 10^{-7} \mu\text{cf}/\text{ft}^3$	$8 \times 10^{-6} \mu\text{cf}/\text{ft}^3$

Incidents: A&C immediate notification $(2 \times 10^{-7})(5 \times 10^3) = 1 \times 10^{-3} \mu\text{cf}/\text{ft}^3$
A&C 24 hr " $(2 \times 10^{-7})(5 \times 10^2) = 1 \times 10^{-4} \mu\text{cf}/\text{ft}^3$

Controlled releases:

2 runs - 3 mc each at 600 cf/h (15 min. ea)

$$\frac{3000 \text{ mc}}{283,200 \times 15} = 7.1 \times 10^{-4} \mu\text{cf}/\text{ft}^3$$

2 runs - 3 mc each at 1200 cf/h. (15 min. ea)

$$\frac{3000 \text{ mc}}{566,400 \times 15} = 3.5 \times 10^{-4} \mu\text{cf}/\text{ft}^3$$

Operation over a period of 8 hr.

600 cf/hr $\frac{6000 \text{ mc}}{283,200 \times 240} = 8.9 \times 10^{-5} \mu\text{cf}/\text{ft}^3$

1200 cf/hr $\frac{6000 \text{ mc}}{566,400 \times 240} = 4.4 \times 10^{-5} \mu\text{cf}/\text{ft}^3$
AVG. $6.6 \times 10^{-5} \mu\text{cf}/\text{ft}^3$

If averaged for a period of 24 hr.
assuming total quantity released.

$$\frac{15,000 \text{ mc}}{283,200 \times 1440} = 3.6 \times 10^{-5} \mu\text{cf}/\text{ft}^3$$

$$\frac{15,000 \text{ mc}}{566,400 \times 1440} = 1.8 \times 10^{-5} \mu\text{cf}/\text{ft}^3$$

AVG. 2.7×10^{-5}

If averaged for a period of 24 hr.

$$\frac{12,000 \text{ mc}}{283,200 \times 1440} = 2.9 \times 10^{-5} \mu\text{cf}/\text{ft}^3$$

$$\frac{12,000 \text{ mc}}{566,400 \times 1440} = 1.5 \times 10^{-5} \mu\text{cf}/\text{ft}^3$$

$2.2 \times 10^{-5} \mu\text{cf}/\text{ft}^3$

Cary Electrometer, Model 31 used to measure vent exhaust during experiment #2.

Exp. #2 Vent exhaust - 600cf/hr - 1 ft² ml. run 10 cf/min.
 1200cf/hr - 3 ft² ml. run 20 cf/min.

600x
 $28.32 \text{ cf} \times 10 = 283.2 \text{ ltr/min} = 283,200 \text{ ml/min}$

$$\begin{array}{r} 283,200 \\ \underline{1440} \\ 11328000 \\ 1132800 \\ \underline{283200} \\ 407808,000 \end{array}$$

$$\begin{array}{r} .0000294 \\ 407,808,000 \overline{) 1200000} \\ \underline{815616} \\ 3843840 \\ \underline{3663272} \\ 1805680 \end{array} \quad \begin{array}{l} 2.9 \times 10^{-5} \\ 294 \times 10^{-7} \end{array}$$

12 mc total
 $2.9 \times 10^{-5} \text{ mc/ml}$ during 24 hours at 600cf/hr.

~~1.47~~ $1.47 \times 10^{-5} = 197 \times 10^{-7}$ - at 1200cf/hr

~~5 x 10⁻² ml~~ ARE

$$\begin{array}{r} .0000365 \\ 407,808 \overline{) 15,00000} \\ \underline{1223424} \\ 2765760 \\ \underline{2446848} \\ 2189120 \end{array}$$

$3 \times 10^{-7} \text{ mc/ml}$ out-plant } $\times 85$
 $1 \times 10^{-5} \text{ mc/ml}$ in-plant }

15 mc { $3.65 \times 10^{-5} \text{ mc/ml}$ during 24 hrs. at 600cf/hr
 $1.82 \times 10^{-5} \text{ mc/ml}$ " " " 1200cf/hr

20 min. 2 ft / 3 mi.
 $\frac{4}{80}$

$$\begin{array}{r} 283,200 \\ \underline{80} \\ 22,656,000 \end{array} \quad \begin{array}{r} 424,800 \\ \underline{80} \\ 33,984,000 \end{array}$$

283,200 ml/m at 10cf/min.
 $\frac{566,400 \text{ ml/m at } 20 \text{ cf/min.}}{849,600} = \text{Avg. } 424,800$

$$\frac{22,656}{12.0000} = 5.3 \times 10^{-4} \text{ mc } 10 \text{ cf/min flow}$$

$$\begin{array}{r} .00035 \\ 33,984 \overline{) 12.0000} \\ \underline{101952} \\ 180480 \end{array}$$

$3.5 \times 10^{-4} \text{ mc/80 min.}$ at opening of exhaust vent

1st. experiment

~ 4 mc total Xyptin⁷⁹

$$\frac{4000}{283,200 \times 1440} = 9.8 \times 10^{-6} \text{ mc/ml}$$

2nd. experiment

~ 15 mc total Xyptin⁷⁹

$$\frac{15000}{283,200 \times 1440} = 3.6 \times 10^{-5} \text{ mc/ml}$$

$$\frac{566,400}{1440} = 1.8 \times 10^{-5} \text{ mc/ml}$$

$$\text{Avg. } 2.7 \times 10^{-5} \text{ mc/ml}$$

3rd. experiment

~ 8 mc total Xyptin⁷⁹

$$\frac{8,000}{283,200 \times 1440} = 2.0 \times 10^{-5} \text{ mc/ml}$$

$$\frac{566,400}{1440} = 1.0 \times 10^{-5} \text{ mc/ml}$$

$$\text{Avg. } 1.5 \times 10^{-5} \text{ mc/ml}$$



SAFETY AND HEALTH DEPARTMENT
South Charleston Plant

P. O. Box 8004
South Charleston, WV 25303

August 18, 1989

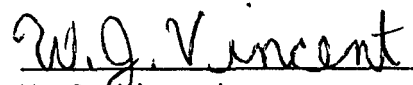
Mr. Paul R. Guinn
U. S. Nuclear Regulatory Commission
Nuclear Materials Safety Section
101 Marietta Street, Suite 2900
Atlanta, Georgia 30323

Dear Mr. Guinn,

Attached is completed Certificate of Disposition of Materials Forms. Since the South Charleston Plant no longer possesses any ionizing radiation sources, License No. 47-00260-07 need not be renewed. The attachment contains the radiation transfer information that is required.

If you have any questions, please call me at 304-747-2434.

Very truly yours,


W. J. Vincent

~~3256A~~
3256A

Attachment

CERTIFICATE OF DISPOSITION OF MATERIALS

(All items MUST be completed, please print)

FILE CERTIFICATES AS FOLLOWS

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIALS SAFETY SECTION B
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
NUCLEAR MATERIALS SAFETY SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

IF YOU ARE LOCATED IN:

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
NUCLEAR MATERIALS SAFETY SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

LICENSEE NAME AND ADDRESS

Union Carbide Corporation
P.O. Box 8004
South Charleston, WV 25303

LICENSE NUMBER

47-00260-07

LICENSE EXPIRATION DATE

Sept. 30, 1989

THE LICENSEE OR ANY INDIVIDUAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE LICENSEE CERTIFIES THAT: (Check and/or complete the appropriate item(s) below.)

A. MATERIALS DATA (Check one and complete, as necessary)

1. NO MATERIALS HAVE EVER BEEN POSSESSED OR PROCURED BY THE LICENSEE UNDER THIS LICENSE.

OR

2. ALL MATERIALS PROCURED AND/OR POSSESSED BY THE LICENSEE UNDER THE LICENSE NUMBER CITED ABOVE HAVE BEEN TRANSFERRED ON

DATE

TO

M. L. Green

Union Carbide Corporation
P.O. Box 8361, So. Chas. WV

WHICH HAS NRC LICENSE NUMBER

47-00260-02

OR

3. ALL MATERIALS PROCURED AND/OR POSSESSED BY THE LICENSEE UNDER THE LICENSE NUMBER CITED ABOVE HAVE BEEN TRANSFERRED ON

DATE

TO

WHICH HAS LICENSE NUMBER

ISSUED BY THE STATE OF

AN AGREEMENT STATE PURSUANT TO SECTION 274 OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED, AND THE ENERGY REORGANIZATION ACT OF 1974.

OR

4. MATERIALS HAVE BEEN DISPOSED OF IN THE FOLLOWING MANNER. (Describe specific disposal procedures—use the reverse of this form, or provide attachments)

B. OTHER DATA

1. OUR LICENSE HAS NOT YET EXPIRED; PLEASE TERMINATE IT.

2. WAS A RADIATION SURVEY CONDUCTED TO CONFIRM THE ABSENCE OF LICENSED RADIOACTIVE MATERIALS AND TO DETERMINE WHETHER ANY CONTAMINATION REMAINS ON THE PREMISES COVERED BY THE LICENSE? (Check one)

NO

YES, THE RESULTS (Check one)

ARE ATTACHED, OR

WERE FORWARDED TO NRC ON (Date)

3. THE PERSON TO BE CONTACTED REGARDING THE INFORMATION PROVIDED ON THIS FORM

NAME

W. J. Vincent

TELEPHONE NUMBER

304-747-2434

4. MAIL ALL FUTURE CORRESPONDENCE REGARDING THIS LICENSE TO

W. J. Vincent
Union Carbide Corporation
P.O. Box 8004
So. Charleston, WV 25303

CERTIFYING OFFICIAL

PRINTED NAME AND TITLE

SIGNATURE

DATE

UNION CARBIDE CORPORATION
OX & TS DIVISION P&S
P.O. BOX 8001
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 75204
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 100
Type of Label: YELLOW 11
Transport Index: 0.2
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 12
Container Description
& Shielding Material: SHD HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)
At Surface

	At Surface	At 3 Feet
Gamma	<u>18</u> mr/hr	Gamma <u>0.2</u> mr/hr
Beta	<u>—</u> mr/hr	Beta <u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha <u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron <u>—</u> mr/hr
Total	<u>18</u> mr/hr	Total <u>0.2</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

Alpha
Beta
Gamma
Neutron

INSTRUMENT USED

EBERLINE E-520

RPO'S CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed ucc 647934

Shipped

J. A. Boggs

Responsible Officer

UNION CARBIDE CORPORATION
EM & IS DIVISION PMS
P.O. BOX 8361
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 74051
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 50
Type of Label: YELLOW II
Transport Index: 0.3
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 1
Container Description
& Shielding Material: SHD HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

At Surface		At 3 Feet	
Gamma	<u>11.0</u> mr/hr	Gamma	<u>0.3</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>11.0</u> mr/hr	Total	<u>0.3</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

INSTRUMENT USED

Alpha

Beta

Gamma

Neutron

EBERLINE E-520

RPO'S CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed

Container Properly Labeled

Source Holder Locked

Security Seal Installed

Signed

J. A. Boggers

Union Carbide Corporation, Charleston, WV 25303

UNION CARBIDE CORPORATION
S&TS DIVISION PMS
P.O. BOX 8361
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 75203
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 100
Type of Label: YELLOW II
Transport Index: 0.2
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 13
Container Description
& Shielding Material: SHD HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

<u>At Surface</u>		<u>At 3 Feet</u>	
Gamma	<u>19</u> mr/hr	Gamma	<u>0.2</u> mr/hr
Beta	<u>-</u> mr/hr	Beta	<u>-</u> mr/hr
Alpha	<u>-</u> mr/hr	Alpha	<u>-</u> mr/hr
Neutron	<u>-</u> mr/hr	Neutron	<u>-</u> mr/hr
Total	<u>19</u> mr/hr	Total	<u>0.2</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

Alpha
Beta
Gamma
Neutron

INSTRUMENT USED

EBERLINE E-520

RPO'S CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed UCC 647932

Witnessed

J. A. Boggers

Leadical Center Radiation Production Officer

U.S. DEPARTMENT OF ENERGY
ENR & TS DIVISION PMS
P.O. BOX 8361
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 74050
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 50
Type of Label: YELLOW II
Transport Index: 0.3
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 2
Container Description
& Shielding Material: SHD HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

<u>At Surface</u>		<u>At 3 Feet</u>	
Gamma	<u>11.0</u> mr/hr	Gamma	<u>0.3</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>0.3</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>11.0</u> mr/hr	Total	<u>0.3</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

Alpha
Beta
Gamma
Neutron

INSTRUMENT USED

EBERLINE E-520

REG'S CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed UCC 647944

J. A. Boggers
Special Agent in Charge

U.S. DEPARTMENT OF ENERGY
ENR & TS DIVISION PMS

UNION CARBIDE CORPORATION
EM & TS DIVISION PMS
P.O. BOX 8341
SOUTH CHARLESTON, WV 26303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 74043
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 50
Type of Label: YELLOW II
Transport Index: 0.2
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 3
Container Description
& Shielding Material: SHD HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

At Surface		At 3 Feet	
Gamma	<u>10.0</u> mr/hr	Gamma	<u>0.2</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>10.0</u> mr/hr	Total	<u>0.2</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

INSTRUMENT USED

Alpha

Beta

Gamma

Neutron

EBERLINE 5-520

RPO'S CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed

Container Properly Labeled

Source Holder Locked

Security Seal Installed UCC 647945

Signed

J. A. Bogger

Res. Insp. / Radiation Protection Officer

UNION CARBIDE CORPORATION
EH & TS DIVISION PMS
P.O. BOX 9361
SOUTH CHARLESTON, WV 25307

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 73483
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 150
Type of Label: YELLOW II
Transport Index: 0.3
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 10
Container Description
& Shielding Material: SHD HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC
Container Survey: (convert Neutron flux to field intensity)

<u>At Surface</u>		<u>At 3 Feet</u>	
Gamma	<u>25</u> mr/hr	Gamma	<u>0.3</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>25</u> mr/hr	Total	<u>0.3</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

Alpha
Beta
Gamma
Neutron

INSTRUMENT USED

EMERLINE E-520

PROVE CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed UCC 647940

Signed

J. A. Berger

For a call to the National Council on Radiation Protection & Control

NORTH CAROLINA CORPORATION
AS & IS DIVISION PMS
P.O. BOX 8361
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. Z3124
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 150
Type of Label: YELLOW II
Transport Index: 0.2
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 9
Container Description
& Shielding Material: SHD HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC
Container Survey: (convert Neutron flux to field intensity)

At Surface		At 3 Feet	
Gamma	<u>2.5</u> mr/hr	Gamma	<u>0.2</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>2.5</u> mr/hr	Total	<u>0.2</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

Alpha
Beta
Gamma
Neutron

INSTRUMENT USED

EDERLINE E-520

DECLARATION CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed UCC 647937

Signed

J. A. Bogger

Health Physics Protection Officer

NUON CARBON CORPORATION
P.O. & TS DIVISION PMS
P.O. BOX 8341
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 73163
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 150
Type of Label: YELLOW II
Transport Index: 0.3
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 11
Container Description
& Shielding Material: SHD HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

<u>At Surface</u>		<u>At 3 Feet</u>	
Gamma	<u>0.25</u> mr/hr	Gamma	<u>0.3</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>0.25</u> mr/hr	Total	<u>0.3</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

Alpha
Beta
Gamma
Neutron

INSTRUMENT USED

EBERLINE E-520

REG. 5 CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Nuclear Physics Instructions Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal installed UCC 647985

Signed

J. A. Boggers

for Radioactive Material Production Division

UNION CARBIDE CORPORATION
ER & TS DIVISION PMS
P.O. BOX 8361
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. Z116E
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 100
Type of Label: YELLOW II
Transport Index: 0.4
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 6
Container Description
& Shielding Material: SH-100 HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: Alpha Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

	<u>At Surface</u>	<u>At 3 Feet</u>
Gamma	<u>4.0</u> mr/hr	Gamma <u>0.4</u> mr/hr
Beta	<u>-</u> mr/hr	Beta <u>-</u> mr/hr
Alpha	<u>-</u> mr/hr	Alpha <u>-</u> mr/hr
Neutron	<u>-</u> mr/hr	Neutron <u>-</u> mr/hr
Total	<u>4.0</u> mr/hr	Total <u>0.4</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

INSTRUMENT USED

Alpha
Beta
Gamma
Neutron

EBERLINE E-520

RPO'S CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed

Signer: J. A. Buggers
Technical Director, Radiation Protection Officer

CLARK SANDS CORPORATION
SOUTH DIVISION PM
P.O. BOX 2700
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 61063
DOT Property No. 4901-25093
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 100
Type of Label: YELLOW II
Transport Index: 0.5
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 4
Container Description
& Shielding Material: SHRM-PA HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA BETA GAMMA NEUTRON

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

	At Surface	At 3 Feet
Gamma	<u>50.0</u> mr/hr	<u>0.5</u> mr/hr
Beta	<u>—</u> mr/hr	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	<u>—</u> mr/hr
Total	<u>50.0</u> mr/hr	<u>0.5</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

INSTRUMENT USED

ALPHA
BETA
GAMMA
NEUTRON
EBERLINE 5020

BEING CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed

Container Properly Labeled

Source Holder Locked

Security Seal Installed

Signature

J. A. Boggers

Date: _____ Title: _____

UNION CARBIDE CORPORATION
ELECTRICALS DIVISION PMS
P.O. BOX 6361
SOUTH CHARLESTON, WV 25305

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 64127
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 100
Type of Label: YELLOW II
Transport Index: 0.4
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 7
Container Description
& Shielding Material: SHRM-PA HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA BETA GAMMA NEUTRON

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

<u>At Surface</u>		<u>At 3 Feet</u>	
Gamma	<u>50</u> mr/hr	Gamma	<u>0.4</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>50</u> mr/hr	Total	<u>0.4</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED INSTRUMENT USED

ALPHA
BETA
GAMMA
NEUTRON
EBERLINE E-520

RPMS CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed

Signed

J.A. Boygen

Res. Cal. Dept.

Radiation Protection Officer

UNION CARBIDE CORPORATION
QA & IS DIVISION PMS
P.O. BOX 5701
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 64128
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 100
Type of Label: YELLOW II
Transport Index: 0.5
Leak Wipe Tests (Results): <0.0005
Leak Wipe tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 8
Container Description
& Shielding Material: SHRM-PA HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

<u>At Surface</u>		<u>At 3 Feet</u>	
Gamma	<u>50</u> mr/hr	Gamma	<u>0.5</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>50</u> mr/hr	Total	<u>0.5</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

Alpha
Beta
Gamma
Neutron

INSTRUMENT USED

EBERLINE E-520

REGULATORY CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed

Issued

J. A. Boogers

Technical Director, Radiation Protection Unit

AMERICAN CARBIDE CORPORATION
HEALTH & ENVIRONMENTAL PROTECTION DIVISION
P.O. BOX 8361
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 66075
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 1500
Type of Label: YELLOW II
Transport Index: 0.2
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 1A
Container Description
& Shielding Material: SHL6-1 HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

At Surface		At 3 Feet	
Gamma	<u>30</u> mr/hr	Gamma	<u>0.2</u> mr/hr
Beta	<u>-</u> mr/hr	Beta	<u>-</u> mr/hr
Alpha	<u>-</u> mr/hr	Alpha	<u>-</u> mr/hr
Neutron	<u>-</u> mr/hr	Neutron	<u>-</u> mr/hr
Total	<u>30</u> mr/hr	Total	<u>0.2</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

INSTRUMENT USED

Alpha
Beta
Gamma
Neutron

EBERLINE E-520

RPO'S CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed

Signed

J. A. Boggers

Health Physics Division, Environmental Protection Office

UNION CARBIDE CORPORATION
EN & TS DIVISION FMS
P.O. BOX 9361
SOUTH CHARLESTON, WV 25303

RADIOACTIVE MATERIAL SHIPMENT RECORD DATA

Copies to: File
W. J. VINCENT
FILE

RADIATION MATERIAL SHIPPING INFORMATION

Mfg. Serial No. 71167
UCC Property No. N/A
Isotope: CESIUM 137
Group I thru VII: CLASS VII
Activities (mCi): 100
Type of Label: YELLOW II
Transport Index: 0.5
Leak Wipe Tests (Results): <0.0005
Leak Wipe Tests (Date): 06/11/87
Material Form: SPECIAL FORM
Container No.: 5
Container Description
& Shielding Material: SH-100 HOLDER LEAD & STEEL

SPECIFIC DATA

Type of Emission: ALPHA Beta Gamma Neutron

IF NEUTRON, STATE EMISSION IN NEUTRONS/SEC

Container Survey: (convert Neutron flux to field intensity)

<u>At Surface</u>		<u>At 3 Feet</u>	
Gamma	<u>3.5</u> mr/hr	Gamma	<u>0.5</u> mr/hr
Beta	<u>—</u> mr/hr	Beta	<u>—</u> mr/hr
Alpha	<u>—</u> mr/hr	Alpha	<u>—</u> mr/hr
Neutron	<u>—</u> mr/hr	Neutron	<u>—</u> mr/hr
Total	<u>3.5</u> mr/hr	Total	<u>0.5</u> mr/hr

TYPE OF SURVEY INSTRUMENTS USED

Alpha
Beta
Gamma
Neutron

INSTRUMENT USED

EBERLINE E-500

RPO'S CERTIFICATION THAT MATERIAL IS READY FOR SHIPMENT

Health Physics Instruction Enclosed
Container Properly Labeled
Source Holder Locked
Security Seal Installed

Signature

J. D. Buggers

Technical Center Radiation Protection Officer

