UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

JAN 25 1991

Report No.: 47-06067-03/91-01

Licensee: Union Carbide Chemicals and Plastics Company, Inc.
Silicones Plant, Esters Unit
P. O. Box 180
Sistersville, West Virginia 26175

Docket No.: 030-14716 License No. 47-06067-03

Inspection at: West Virginia Route 2 South
Sistersville, West Virginia

Inspection Conducted: January 3 and 4, 1991

Inspector: David J. Collins, January 25, 1991
David J. Collins, Radiation Specialist Date Signed
Radiation Safety Projects Section

Approved by: Edward J. McAlpine, 1/25/91
Edward J. McAlpine, Chief Date Signed
Radiation Safety Projects Section
Nuclear Materials Safety and
Safeguards Branch
Division of Radiation Safety
and Safeguards

INSPECTION SUMMARY

Scope:

This announced special safety inspection conducted on January 3 and 4, 1991 included a review of the misalignment incident of December 6, 1990: receipt, inventory and leak tests of sealed sources; operational controls, emergency procedures; training of personnel; and, installation, servicing, relocation of source holders.

Results:

Six apparent violations were identified. Five apparent violations were identified within the scope of the unauthorized movement of the source holder gauge unit. These included: 1. creating a radiation area and exceeding the limits for an unrestricted area for one hour and seven consecutive days; 2. failure to post a radiation area; 3. failure to ensure the legibility of labels on sealed source containers; 4. unauthorized movement or relocation of sealed source holders, and 5. failure to train individuals working in a restricted area (Paragraph 2.c). One apparent violation was identified with the licensee's routine program: failure to post the license, 10 CFR Parts 19 and 20, and operating and emergency procedures, or the alternative notice of availability (Paragraph 5).

REPORT DETAILS

1. Persons Contacted

Union Carbide Chemicals and Plastics Company, Inc.

*W. V. Summers, Assistant Plant Manager
*D. L. Ramsey, Manager of Industrial Health and Safety
*B. K. Kincaid, Radiation Protection Officer

* Attended the exit interview on January 4, 1991

2. Fixed Gauge Misalignment of December 6, 1990

a. Event

On December 6, 1990, after 4:00 p.m., and continuing until identification at 2:45 a.m. December 9, 1990, a 37 millicurie cesium-137 sealed source holder with an open shutter was rotated about 90 degrees horizontally away from the condenser tank it was intended to monitor. The gauge was not pointed into the nearby general walkway, but was pointed toward a space between the tanks and other piping. The nearest general walkway position was about eight feet from the source head.

During the period, 56 individuals were known to have spent some portion of their workday in the vicinity of the source's radiation beam. Two individuals have been identified who spent some significant portion of their work time in the area and within the radiation field. The investigation and analysis of these individuals concluded that they received between 577 and 585 millirem during the incident. The investigation determined that of the remaining 54 individuals, 53 of them could have received less than 2 millirem, and one individual could have received about 32 millirem. The plant investigation determined that the radiation field from the unit was 162 millirem per hour (mRem/hr) at 12 inches from the source holder's face; 72 mRem/hr at 18 inches; 18 mRem/hr at 3 feet; and, 2 mRem/hr at 8 feet distant.

b. Background

The Esters unit was shutdown for modification on December 3, 1990, temporary scaffolding was erected, walkdowns of work areas were performed, and piping installation and re-insulation was begun. Plant management stated that since there were no intentions to remove or relocate any of the level detectors, and standard practice was to provide for the work force not to move any instruments, it was unnecessary to lock the shutters in the closed position, and was not deemed necessary to provide specific instructions to the work crew about the hazards of inserting their hands in front of the units and between the tanks. Standard policy for the work crew was stated to be available to them in the policy manuals and the safety manuals which were available to them and to which their annual training directed them. The units have padlock eyes labeled OPEN and CLOSED on the manually operated shutters. Each of the units the inspector observed had a padlocked OPEN shutter, and there were no electrical connections. A walkdown prior to startup was conducted by plant staff in the evening hours of December 6, 1990. These individuals recalled specifically that the source unit was aligned properly on its pipe standoff. The insulation work was completed on December 8, 1990.

NRC Region II was informed of the incident on December 15, 1990, and a Confirmation of Action Letter was sent to the licensee on December 18, 1990. The confirmed actions were:

(1) Prior to December 28, 1990, verify all licensed gauges are properly positioned and aligned, and that the gauges are properly labelled.

This action was completed on December 19, 1990, and the inspector verified them on January 4, 1991. Two gauges in the plant were found to have had their marking signs removed temporarily for repositioning; however, these gauges did not cause a radiation area, and the caution labels for the gauge identification were clearly adequate in their warning of the presence of radioactive materials. This item is closed.

(2) Conduct an investigation to determine cause, lessons learned, and corrective actions to prevent recurrence. A separate section should contain an evaluation of the exposures to individuals. This investigation report shall be sent to NRC Region II by December 28, 1990.

A preliminary report dated December 27, 1990 was received from the licensee on December 28, 1990. The report stated that individual exposures were still being formulated for the 56 individuals. The inspector reviewed the draft reports to the individuals and noted that the reports will be inserted into the medical records of the individuals. This item remains open pending receipt of the final report.

(3) Communicate the investigation results to all plant personnel, and results of exposure studies to the individuals concerned.

As noted in the licensee's letter of December 27, 1990, the plant population was notified of the incident and the overall results by way of a special emphasis bulletin board notice. This was also observed by the inspector on January 3-4, 1991. As stated above, individual notices have not yet been given to the individuals involved. This item remains open pending NRC review of information provided to involved individuals.

c. Findings

The inspector determined through a review of the incident that the following apparent violations were linked to the movement of the source head from its intended position:

(1) A radiation area of 12 millirems/hr at one meter and 125 millirems/hr at one foot was created and existed for about 59 hours. This area was in an unrestricted area of the facility.

This is an apparent violation of 10 CFR 20.105(b) which prohibits creation of a radiation area exceeding 2 millirem in any one hour or 100 millirem in seven days.

(2) A radiation area is defined in 10 CFR 20.202(b)(2) as any area, accessible to personnel in which there exists radiation at such levels that a major portion of the whole body could receive in any one hour a dose in excess of 5 millirem or in any five consecutive days a dose in excess of 100 millirems.

Failing to post the radiation area created is an apparent violation of 10 CFR 20.203(b).

(3) The label on the source container was sufficiently deteriorated by time and grime that it was not legible to individuals observing it.

Failure to ensure that the label on the source holder was legible is an apparent violation of 10 CFR 20.203(f)(2). This source holder contained about 37 millicuries of cesium-137, exceeding the labelling exemption granted by subparagraph 20.203(f)(3) of 100 microcuries.

(4) Condition 14 of License No. 47-06067-03 permits relocation by Union Carbide under License No. 47-06067-02 of the Technical Center, South Charleston, West Virginia.

Relocation of the sealed source by an unidentified, unapproved individual is an apparent violation of Condition 14.

(5) Failure to specifically train individuals in the hazards associated with the insertion of their hands into or near the radiation beam created by the cesium level detector units while the shutters were padlocked in the OPEN position; and the specific work involved in the removal and reapplication of insulation, and the application of piping in the immediate vicinity is an apparent violation of 10 CFR 19.12.

3. Program Scope and Licensee Organization (87100)

The Sistersville Plant is a chemical manufacturing facility and is authorized to possess and use licensed radioactive materials as sealed sources within fixed gauges. The plant is not authorized to mount, remove, realign, or store radioactive

gauges. These functions are limited by license condition to the Union Carbide Technical Center, South Charleston, West Virginia, or others specifically licensed.

The Radiation Protection Officer reports to the Safety and Health Department Head, and is assisted by two technicians. Additionally instrument technicians perform work on the electronics packages. The radiation protection function is audited by the Technical Support Center every two years. The inspector reviewed the most recent audit, conducted December 19, 1990, which identified no major program flaws and recommended that fixed gauge units be relabeled with new labels. The staff stated these labels have been ordered and should be in place prior to January 31, 1991.

4. Receipt, Inventory and Leak Tests of Sealed Sources (87100)

The licensee collects leak test samples for analysis by the Union Carbide Technical Center, South Charleston, West Virginia. The inspector reviewed data for the period 1986 through 1990. Inventory is conducted twice per year at six month intervals by the Radiation Protection Officer. The inspector reviewed inventories for 1987 through 1990. The licensee maintains records of receipt and shipment for each source unit within its facility.

The licensee's facility design group uses guidance within the Mandatory Standard Chemicals & Plastics Technology Manuals which contain guidance on use, specification, purchase of radioactive gauge units.

No violations were identified.

5. Instructions to Operators and Maintenance Personnel (83822)

The inspector reviewed the licensee's guidance issued to operations and maintenance staff. The guidance contained information on normal and emergency operations for the gauges within the plant. The staff has a pre-job briefing and annual safety briefing which outlines the program and presents information to staff and contractor personnel.

The inspector reviewed the posting of license documents with the licensee staff. NRC Form 3 is posted at the main plant entrance, there is no posting of the license, NRC regulations, or guidance documents at this location.

Failure to post copies of the NRC license, 10 CFR Parts 19 and 20, and operating instructions, nor the permitted alternative notification of who to contact is an apparent violation of 10 CFR 19.11(a) and (b).

6. Exit Interview

The inspector conducted an exit interview at the conclusion of the inspection with the individuals noted in Section 1. The inspector summarized the scope and the findings of the inspection. The licensee's representatives expressed concern with the apparent violation concerning training supplied to the experienced contract construction crew. The representatives stated that they felt that the annual safety briefing coupled with their knowledge of the use of similar gauge units in this and other Union Carbide plants should have been sufficient to preclude the unauthorized movement of the source holder from its established position. No other dissenting comments were received from the licensee.

JAN 25 1991

ENCLOSURE 2

PROPOSED ENFORCEMENT CONFERENCE AGENDA

Enforcement Conference with

Union Carbide Chemical and Plastics Company, Inc.
Silicones Plant, Esters Unit
Sistersville, West Virginia

LOCATION OF MEETING

Region II Executive Conference Room
Atlanta, Georgia

DATE AND TIME OF MEETING

February 4, 1991, 3:30 p.m.

I.	Opening Remarks	**S. D. Ebneter, Regional Administrator**
II.	NRC Enforcement Policy and Procedure	**G. R. Jenkins, NRC**
III.	Discussion of NRC Concerns	**J. Philip Stohr, NRC**
IV.	Causes of Apparent Violations an Corrective Actions	**L. W. Phair, UCC**
V.	Closing Comments	**NRC and Licensee**