



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

March 1, 2006

Docket No. 03031956
EA No. 06-026

License No. 37-28586-01

Gus Hutras
Plant Manager
Epsilon Products Company
P. O. Box 432
Marcus Hook, PA 19061

SUBJECT: INSPECTION 03031956/2005002, EPSILON PRODUCTS COMPANY,
MARCUS HOOK, PENNSYLVANIA SITE

Dear Mr. Hutras:

This refers to the inspection conducted from August 30, 2005, through January 17, 2006, at your facility located in Marcus Hook, Pennsylvania. The purpose of the inspection was to review the malfunction of an Ohmart gauge Model SHLM-CR-3, that you identified and reported to NRC Operations Center on August 27, 2005 (Event No. 41952). The inspection included visits to your facility, telephone discussions with members of your staff and review of documents, including those describing your corrective actions, that you provided to the inspectors. The enclosed report presents the results of this inspection.

Based on the results of this inspection, six apparent violations were identified and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at www.nrc.gov; select **What We Do, Enforcement**, then **Enforcement Policy**." The apparent violations include: 1) conduct of licensed activities such that eight employees and contractors (members of the public) received radiation doses in excess of 100 millirem in a year; 2) dose rates in unrestricted areas not maintained below 2 millirem in any one hour; 3) failure to make appropriate radiological surveys; 4) failure to provide appropriate training to an authorized user; 5) not using a device containing licensed material in accordance with the provisions of its Registration Certificate; and 6) failure to develop appropriate operating and emergency procedures. Since the NRC has not made a final determination in this matter, a Notice of Violation is not being issued for these inspection findings at this time. In addition, the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review.

A predecisional enforcement conference, open to public observation, to discuss these apparent violations has been scheduled for 10:00 a.m. on March 15, 2006, at the Region I Office in King of Prussia, PA. The NRC announces enforcement conferences to the public by issuing a press release. The decision to hold a predecisional enforcement conference does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference is being held to obtain information to enable the NRC to make an enforcement decision, such as a common understanding of the facts, root causes, missed opportunities to identify the apparent violations sooner, corrective actions, significance of the issues, and the

need for lasting and effective corrective action. In addition, this is an opportunity for you to point out any errors in our inspection report and for you to provide any information concerning your perspectives on 1) the severity of the violations, 2) the application of the factors that the NRC considers when it determines the amount of a civil penalty that may be assessed in accordance with Section VI.B.2 of the Enforcement Policy, and 3) any other application of the Enforcement Policy to this case, including the exercise of discretion in accordance with Section VII. In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your action will be considered in assessing any civil penalty for the apparent violation. The guidance in the enclosed NRC Information Notice 96-28, "SUGGESTED GUIDANCE RELATING TO DEVELOPMENT AND IMPLEMENTATION OF CORRECTIVE ACTION," may be helpful.

You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding these apparent violations is required at this time.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and the enclosed inspection report will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm.html> (the Public Electronic Reading Room).

Current NRC regulations are included on the NRC's website at www.nrc.gov; select **Nuclear Materials; Medical, Industrial, and Academic Uses of Nuclear Material**; then **Toolkit Index Page**. The current Enforcement Policy is included on the NRC's website at www.nrc.gov; select **What We Do, Enforcement**, then **Enforcement Policy**. Or you may obtain these documents by contacting the Government Printing Office (GPO) toll-free at 1-888-293-6498. The GPO is open from 7:00 a.m. to 9:00 p.m. EST, Monday through Friday (except Federal holidays).

Sincerely,

Original signed by George Pangburn

George Pangburn, Director
Division of Nuclear Materials Safety

Enclosures:

1. Inspection Report No. 03031956/2005002
2. NRC Information Notice 96-28
3. Directions to Region I Office

cc w/enclosures:

Wayne Applegate, Radiation Safety Officer
Christopher Bland, Health, Environmental & Safety Manager
Commonwealth of Pennsylvania

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Inspection No. 03031956/2005002
Docket No. 03031956
License No. 37-28586-01
Licensee: Epsilon Products Company
Location: P. O. Box 432
Marcus Hook, Pennsylvania 19061
Inspection Dates: August 30, November 7 and 11, December 16, 2005, and
January 17, 2006
Date Information Received: August 29, November 9, 11, 22, and 30, 2005

Inspectors:	/RA/	February 13, 2006
	_____ Richard Ladun Health Physicist	_____ date

/RA/	February 13, 2006
_____ Sattar Lodhi, Ph.D. Senior Health Physicist	_____ Date

Approved By:	Original signed by John D. Kinneman	February 13, 2006
	_____ John D. Kinneman, Chief Materials Security and Industrial Branch Division of Nuclear Materials Safety	_____ date

EXECUTIVE SUMMARY

Epsilon Products Company
NRC Inspection Report No. 03031956/2005002

On August 27, 2005, the licensee notified the NRC Operations Center that an Ohmart gauge (Model SHLM-CR-3) containing a sealed source of 1200 millicuries (mCi) of cesium 137 (Cs-137) had malfunctioned and the source had failed to retract to its shielded position. The gauge was installed outside of chemical reactor #2 (reactor) to monitor build up of chunks due to polymerization within the reactor. Upon the discovery that the source was exposed, the licensee performed radiological surveys around the gauge to determine the boundary where the dose rates exceeded 2 milliRöntgen/hr (mR/hr) and cordoned off the area where dose rates were in excess of 2 mR/hr.

The reactor had been in shut down mode since August 21, 2005, when it had tripped. The licensee stated that, in accordance with the shut down procedures, following the trip a worker had retracted the source and locked it in its shielded position. Another technician had performed surveys around the reactor vessel to confirm that the source was in its shielded position and it was safe to enter the reactor vessel. The individual did not report any unusual radiation levels around the reactor vessel. Between August 24 and August 25, 2005, thirty-two individuals who were not radiation workers cleaned the interior of the reactor and performed other maintenance which required that the personnel enter the reactor vessel.

After cordoning off the area, the licensee contacted Ohmart Corporation (Ohmart) for assistance and hired a certified health physicist (CHP) to evaluate the event. The CHP performed detailed radiological surveys inside and around the reactor vessel. The highest dose rates of approximately 5 rem/hr were observed around a section of the guide tube between the reactor's outside wall and the gauge. Based on the results of these surveys, the licensee concluded that the source was lodged in this region. Later, an engineer from Ohmart arrived at the facility and performed independent surveys which confirmed the results and conclusion of the earlier surveys. The engineer was able to push the source back into the gauge in the shielded position. He determined that the gauge could not be repaired and removed it from the reactor and packaged it for shipment to Ohmart for evaluation/repair. Based on the surveys and interviews with the individuals who worked near the reactor, the licensee estimated that eight of the thirty-two individuals received a radiation dose in excess of 100 millirem (mrem).

Region I conducted an special inspection to review the event. The inspection included a review of the licensee's training program, maintenance of equipment, survey procedures, operating and emergency procedures, and interview of personnel. Representatives of Ohmart were also contacted. The inspection identified the following violations of NRC requirements: 1) conduct of licensed activities such that eight employees and contractors (members of the public) received radiation doses in excess of 100 millirem in a year; 2) dose rates in unrestricted areas not maintained below 2 millirem in any one hour; 3) failure to make appropriate radiological surveys; 4) failure to provide appropriate training to an authorized user; 5) not using a device containing licensed material in accordance with the provisions of its Registration Certificate; and 6) failure to develop appropriate operating and emergency procedures.

REPORT DETAILS

I. Organization and Scope of the Program

a. Inspection Scope

The inspection consisted of a review of organization, designation of Radiation Safety Officer (RSO) and authorized users, and the use of licensed material.

b. Observations and Findings

The licensee possesses and uses 21 gauges of various models containing cesium 137 (Cs-137) in sealed form which are used to control industrial processes. The amount of Cs-137 in these gauges varies from 30 mCi to 1200 mCi. All gauges were acquired from Ohmart, and one of these gauges was an Ohmart Model SHLM-CR-3 that was in use at chemical reactor 2 until August 21, 2005.

The licensee has appointed an RSO to implement the radiation safety procedures. He reports to the Manager of Health & Environmental Safety. The licensee's procedures allow Instrument & Electrical (I/E) Technicians to act as authorized user/Assistant RSOs (ARSO). There are four authorized users/ARSOs. The licensee operates in 12 hour shifts and there is at least one authorized user/ARSO present during each shift. The inspectors reviewed the training records of authorized users and noted that the licensee had no record of training of one of the authorized users (Individual A), and there was no record of when Individual A was designated as an authorized user by the RSO. Individual A is an I/E Technician. He stated that the RSO had instructed him in the use of survey instruments approximately seven years ago and that he has been performing the duties of an authorized user/ARSO since then and had performed these duties on August 22, 2005. He also stated that he had not received any refresher training since the RSO initially instructed him in the use of survey instruments. The inspectors also noted that Individual A had not received the manufacturer's or equivalent training.

c. Conclusions

An individual performed the duties of an authorized user/ARSO and had not been provided the specified training nor had he been authorized in writing by the RSO.

Condition 11 of the license requires that licensed material be used by or under the supervision of individuals who have received the training described in the application dated February 13, 2001 (ML010650386), and have been designated in writing by the RSO. Item 7.2 of the application requires, in part, that authorized users successfully complete the training described in the Criteria in Section 8.7.2, entitled, "Authorized Users," in NUREG 1556, Volume 4, dated October 1998. The Criteria require that the authorized users successfully complete fixed gauge manufacturer's or distributor's course for users, or equivalent course that meets Appendix G criteria, which require that an authorized user be provided training in operating and emergency, and lock out procedures.

Failure to provide the required training to an ARSO and failure of the RSO to authorize the individual in writing is an apparent violation of Condition 11 of the license.

II. Notification of the Event

On August 27, 2005, the licensee notified the NRC Operations Center (Event No. 41952) that an Ohmart fixed gauge Model SHLM-CR-3 containing 1200 mCi of Cs-137 had malfunctioned and the source failed to fully retract to its shielded position. The licensee believed that the shutter may have sheared the cable causing the source to separate from the cable. Initial radiological surveys by the licensee indicated that the source was stuck outside the gauge in an unshielded region. The notification stated that a protective barrier around the gauge in an area where the dose rates exceeded 2 mR/hr had been established and work in this area had been discontinued. The licensee had contacted Ohmart for assistance and a representative of Ohmart was scheduled to visit the facility to assess the event and retract the source to its shielded position. On August 28, 2005, the licensee provided the NRC Operations Center with an update of the event and stated that the Ohmart representative had retracted the source back into the holder in its shielded position, the protective barriers had been removed and the area had returned to normal background radiation levels.

On September 6, the licensee submitted the 30-day report of the event. The report (ML052690139) provides a brief description of the reactor, including a diagram showing the location of the gauge, and the radiation levels inside and around the reactor vessel prior to retraction of the source into its shielded position.

Conclusion

The Licensee identified the event at approximately 12:30 a.m. on August 27, 2005, and made the notification on August 27, 2005, at approximately 3:00 a.m. The inspectors determined that the licensee had made the notification in a timely manner as required by 10 CFR 30.50(b)(2).

III. Follow up of the Event by NRC

a. Inspection Scope

The inspection included on-site visits by inspectors, a review of licensee's procedures, implementation of corrective actions, and interview of personnel.

b. Observations and Findings

On August 29, 2005, the inspectors contacted the licensee via telephone and obtained a brief description of the event and licensee's actions to minimize exposure of personnel to radiation. The licensee informed the inspectors that a Certified Health Physicist (CHP) had performed detailed radiological surveys, and a representative of Ohmart had pushed the source back into the gauge and had removed the gauge from the reactor vessel. The

inspectors requested and received, via facsimile, a copy of results of CHP's surveys on August 29, 2005 (ML053550137). These surveys indicated that dose rates as high as 5 R/hr existed in the vicinity of the gauge prior to its removal. The licensee stated that evaluation of exposure of personnel to radiation was continuing.

On August 30, November 7, and 11, 2005, the inspectors visited the licensee's facility to review the event, licensee's response to the event, and to interview licensee personnel. From the discussions with the licensee personnel the inspectors developed the following information about the event and actions of the licensee's personnel:

Reactor 2 is approximately 80 feet tall and 9½ feet in diameter. The structure around the reactor has six horizontal levels and the reactor extends from below the third level to several feet above the 6th level. There are three manways, one on the 3rd level, one on the 4th level and one on the 6th level. These manways allow personnel to enter the vessel. The gauge is installed on the exterior of the wall of the reactor vessel below the 4th level and approximately 10 feet above the 3rd level. A ladder is required to reach the gauge from the 3rd level. During normal operating conditions, the source is pushed through a guide tube to the center of the reactor vessel. The guide tube is in the form of a quarter circle in a vertical plane passing through the center of the reactor vessel. One end of the guide tube is connected to the gauge and the other end reaches the center of the reactor vessel. The gauge does not have indicators to show if the source is in the shielded position and monitoring of the radiation levels is necessary to ensure that the source is actually in the shielded position. Twelve detectors are located around the circumference of the reactor vessel in approximately the same horizontal plane as the source. The response to these detectors may be monitored on a screen in the control room. Under normal conditions the reactants in the reactor are in vapor form and the detectors receive radiation from the source. When the reactants polymerize to form "chunks," the radiation is blocked from the detectors and the detectors go into an "alarm mode" indicating that they are not receiving radiation from the source. When the source is retracted into its shielded position, all of these detectors got into alarm mode because they do not receive any radiation from the source.

On August 21, 2005, at approximately 5 p.m., the reactor tripped (unplanned shut down), and it was decided not to restart it and clean the interior of the reactor vessel. In accordance with the licensee's shut down procedures, one of the reactor operators retracted the source and locked the shutter in its closed position some time during early morning hours of August 22, 2005. Individual A then surveyed around the reactor on the 4th level and did not notice any radiation levels that were significantly above background. He did not record the measured dose rates nor he was required to do so by any procedure. His survey procedure was to walk slowly around the reactor vessel with his survey meter turned on. He did notice that the shutter was locked in the closed position and because the survey meter did not indicate presence of any radiation, he documented that the source was retracted. He did not survey around the gauge because the licensee's procedures did not require that the surveys be performed in the immediate vicinity of the gauge to ensure that the source was indeed in its shielded position. The lockout procedure was completed on August 23, 2005, and personnel were then allowed to enter the reactor vessel to perform clean up and other maintenance.

Personnel first entered the reactor vessel on August 24, at approximately 7:30 a.m. to perform the clean up operation and the clean up was completed on August 25, at approximately 3:30 p.m. The vessel was closed on August 26 and preparations begun for the start up of the reactor.

On August 26, at 6 p.m., during a shift change check, the incoming shift operator noted that three of the twelve detectors were not in the alarm mode possibly indicating the presence of a radiation field. This was unusual because the source was supposed to have been in the shielded position and all of the detectors should have been in the alarm mode. The operator initially assumed that this may have been caused by an electrical problem and an I/E Technician checked the electrical wiring. Two of these detectors still indicated the presence of a radiation field and the troubleshooting continued until midnight. On August 27, at approximately 12:30 a.m., an I/E Technician, concluding that the source may not have been retracted completely, pulled the source cable to try to pull the source further back into the gauge. The cable pulled out of the source holder without any difficulty indicating that the source had separated from the cable. After performing radiological surveys around the gauge, a barrier was established around the source where the dose rates were in excess of 2 mR/hr.

The licensee then contacted Ohmart for assistance and hired a CHP to perform detailed radiological surveys. Details of these surveys are provided in the CHP's written report dated October 24, 2005 (ML053550142). The Ohmart representative also performed radiological surveys. These surveys indicated that dose rates as high as 5 R/hr existed in the vicinity of the gauge, and the dose rates in unrestricted areas on the 3rd and 4th levels were in excess of 2 mR/hr. The results of these surveys indicated that the source was lodged in the guide tube outside the gauge. This portion of the guide tube connected the gauge to the reactor vessel and the source appeared to be lodged in the tube at a distance of approximately 1 foot from the gauge. On August 28, at approximately 11 a.m., the Ohmart representative was able to push the source back into the gauge.

During the visit on August 30, 2005, the inspectors noted that the gauge Model SHLM-CR-3, had been removed from the reactor and was stored in a secure area at the licensee's facility with its shutter in the locked position. However, the inspectors observed that the spring-loaded set pin located at the exterior of the gauge was missing. The licensee did not have any documentation showing how long the pin had been missing, and licensee could not recall when the pin was lost. The gauge is registered in the Sealed Source and Device (SSD) Registry (Certificate No. KY-512-D-104-S). The Certificate states that the spring-loaded set pin holds the shutter in the open position to prevent the shutter from damaging the source extension cable.

The inspectors reviewed the licensee's operating procedures and discussed the procedure with Individual A who had performed the surveys on August 22, 2005. He stated that his method to verify if the source was retracted to its shielded position, was to check if the shutter was in locked position and to walk around the reactor vessel on the 4th level with his survey meter turned on. He also stated that he did not perform surveys around the gauge housing because the gauge was installed approximately 10 feet above the floor of 3rd level and he would have to get a ladder to be able to make a survey around the gauge. The

inspectors noted that the licensee's procedure did not include instructions for making appropriate surveys to ensure that the source was indeed in its shielded position.

At the time of the inspection, the licensee possessed 21 Ohmart gauges. However, only one of these gauges (Ohmart Model SHLM-CR-3) had a source which extends from and retracts into the shield. The SSD certificate of this device requires a physical inspection of the device at least every six months for maintenance purposes. The licensee had a general procedure that required that periodic shutter checks be made when performing the semi-annual physical inventories of all devices. However, the licensee did not have a procedure specific to this gauge which required physical inspections at least once every six months for maintenance purposes. Licensee personnel stated that they were aware that the set pin was missing for some time, but they failed to institute appropriate repairs. Licensee personnel also stated that they had occasionally experienced some difficulty while retracting the source into its shielded position. Since the set pin holds the shutter in the open position to prevent the shutter from damaging the source extension cable, this probably provided the mechanism for separating the source from the cable.

The radiological surveys performed by the CHP and Ohmart's representative on August 27, 2005, indicated that between August 22, and August 26, 2005, dose rates as high as 5 R/hr may have existed in unrestricted areas around the gauge. However, this area was difficult to access and was not accessed during the cleaning and maintenance. The highest dose rate inside the reactor vessel was about 60 millirem per hour.

The licensee stated that during the interval between August 24, and August 26, the licensee's personnel and contractors participated in the clean up of the interior of the reactor and other maintenance of related equipment. The licensee conducted interviews with the personnel who had participated in the maintenance and clean up of the reactor vessel to determine the time each may have spent in the radiation area. The licensee's investigation was unable to establish when the source became lodged at the location it was found on August 27, 2005, and there was uncertainty about the location of the source when personnel worked in the reactor vessel. Therefore, the estimates of the radiation doses received by the personnel span a broad range. Based on the information developed during these interviews, and the dose rates measured by the CHP, the licensee estimated a range of radiation dose that each of these individuals may have received during the operation. The licensee estimated that 32 persons worked in the radiation area around the gauge and may have received radiation doses. Of these 32 workers, 27 were licensee employees and 5 were contract employees. The licensee estimated that 8 of these individuals may have received a radiation dose in excess of 100 mrem. The licensee's 30-day report provides

estimates of maximum and minimum doses to individuals. The range of dose received by the eight individuals are as follows:

	Minimum dose (mrem)	Maximum dose (mrem)
Employee #3	169	526
Employee #2	72	332
Employee #6	192	289
Employee #7	197	197
Employee #8	197	197
Employee #11	0	155
Employee #17	13	110
Employee #1	103	103

During the visit on August 30, the licensee informed the inspectors that an internal team has been appointed to investigate the event. The licensee also stated that there was only one gauge of this type at their facility and it has been decided not to replace the gauge and use alternate methods to control the industrial process. During the visit on November 7, the licensee provided the inspectors with a copy of the team's report (ML053550147). The report identifies that inadequacy of procedures and lack of appropriate training of personnel as the factors that contributed to the event, and recommended revisions of operating procedures.

c. Conclusions

The inspectors concluded that from the available information, it could not be established whether the source was initially stuck above the distribution plate and then slid down the guide tube during the clean up operation or that the source had already slid down before the personnel entered. Therefore, it was reasonable to estimate a range of radiation doses to personnel because the location of the source (and hence the dose rates) was unknown when the personnel entered the reactor vessel.

The inspection identified four apparent violations, namely, (1) failure to perform adequate surveys; (2) failure to limit dose rates below 2 mrem in any one hour; (3) failure to conduct operations to ensure that members of the public do not receive radiation dose in excess of 0.1 rem in a year; and (4) failure to comply with the requirements specified in SSD certificate and failure to develop appropriate radiation safety procedures.

Condition 23 of the license requires, in part, that the licensee conduct its licensed activities in accordance with the application dated February 13, 2001. The licensee's application dated February 13, 2001, requires that the gauge be used as listed on its SSD certificate. The SSD Certificate states, in part, that physical inspections of the device be conducted at least once every six months for maintenance. The licensee did not perform physical inspection of the gauge nor had documentation of these inspections, and was unable to provide the date when the retaining pin was lost.

Failure to physically inspect the gauge at the specified frequency is an apparent violation of Condition 23 of the license.

Condition 23 of the license requires, in part, that the licensee conduct licensed activities in accordance with the procedures contained in the application dated February 13, 2001. Item 10 of the application requires, in part, that the licensee develop, implement, and maintain operating and emergency procedures that meet the criteria in the section entitled "Radiation Safety Program - Operating and Emergency Procedures," in NUREG 1556, Volume 4, dated October 1998.

Section 8.10.6 of the NUREG 1556 describes the criteria that the operating and emergencies must meet. These criteria require, in part, that the operating procedures include instructions for testing each gauge for proper operation of the on-off mechanism (shutter) at intervals not to exceed 6 months. The criteria also require that the procedures be adequate to assure that no individual or portion of individual's body can enter the radiation beam.

Failure of the licensee to develop, implement and maintain adequate procedures is another example of an apparent violation of Condition 23 of the license.

10 CFR 20.1501(a) requires, in part, that each licensee make or cause to be made, surveys that may be necessary for the licensee to comply with the regulations in 10 CFR Part 20.

Failure to perform appropriate surveys is an apparent violation of 10 CFR 20.1501(a)

10 CFR 20.1301(a)(1) requires, in part that each licensee conduct operations so that the total effective dose equivalent to individual members of the public from the licensed operations does not exceed 0.1 rem in a year.

Failure to conduct operations as specified in 10 CFR 20.1301(a)(1) is an apparent violation of 10 CFR 20.1301.

10 CFR 20.1301(a)(2) requires, in part, that each licensee conduct operations so that the dose in any unrestricted area from external sources does not exceed 0.002 rem in any one hour.

Failure to conduct operations as specified in 10 CFR 20.1301(a)(2) is an apparent violation of 10 CFR 20.1301.

IV. Inspector's Discussion with Ohmart Corporation

a. Inspection Scope

The inspection included discussion with Ohmart's personnel on their evaluation of causes of the separation of the source from the cable and to determine if there have been other reports of such failures in the past.

b. Observations and Findings

The inspectors contacted Ohmart to discuss the failure of the device and to determine if there were other such incidents involving the device at other locations. On November 9, 2005, Ohmart's RSO provided the inspectors with a report (ML053480315) of its representative who had responded to the licensee's request for assistance. His findings and conclusions with respect to the failure of the source to retract are described in the report.

The RSO of Ohmart on November 22, 2005, in an e-mail (ML053480329) to the inspectors stated that they have researched their records and they have never had any report of such a failure of any of these devices at other locations. The e-mail also included photographs of the gauge, that showed the missing pin, the source tube that appears to be intact, and a diagram showing the internal construction of the source tube.

The Ohmart report stated that the spring pin in the shutter mechanism was missing - the shutter handle was bent and had been filed upon. The shutter handle does not have a positive physical component to prevent the rotor from drifting to the closed position during operation or when attempting to retract the source carrier. The report stated that if the shutter was not held in the full open position, then it is possible to retract the cable, but nearly impossible to retract the carrier into the source holder. The report included photos of the interior of the gauge that indicate evidence of the source carrier hitting the face of the mounting flange, internal housing and rotor. Ohmart concluded that the damage was caused when the rotor drifted closed forcing the cable to the side wall and thereby causing the carrier to hit each of these components. With the rotor partially closed, there was not adequate clearance for the source carrier to be retracted through the rotor and into the holder. Ohmart believed that Epsilon personnel used excessive force on the cable in order to retract the capsule back into its container. This is when the cable became disconnected from the swaged carrier fitting. The report finally concluded that the event was caused by unfamiliarity and lack of training of Epsilon personnel and not due to any assembly error of the source holder.

c. Conclusions

The information provided by Ohmart indicated that this was the first recorded event of its kind. Based on the information provided by Ohmart, the failure does not appear to be a generic problem with the device. As indicated in the device's SSD Certificate the fact that the retaining pin was missing may have allowed the shutter to move from the fully open position and rest on the drive cable during operations. Efforts to retract the source with the shutter in this position could have resulted in damage to the connection between the cable and the source tube.

V. Exit Meeting

The inspectors discussed the inspection findings with the licensee's Health, Environmental & Safety Manager on December 16, 2005. The discussions included the apparent violations identified during the inspection. The inspectors also informed the licensee of receipt of its new survey procedures that the licensee had sent via e-mail (ML053480347)

on November 30, 2005. On January 17, 2005, the licensee confirmed via telephone that all of the required operating procedures have been developed and implemented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Christopher Bland, Health, Environmental & Safety Manager
Gus Hutras, Plant Manager
Wayne Applegate, Radiation Safety Officer
Anthony Borelli, I/E Technician
John Anderson, Shift Operator
Keven Grace, I/E Technician
Len Macario, Attendant

Ohmart/Vega

David Brink, Service Representative (via telephone & e-mail)
Mark Cornellison, Radiation Safety Officer (via telephone & e-mail)