August 29, 2005

NMED No. 41914

Nancy Ernest, Plant Manager
DaimlerChrysler
1100 South Tibbs Avenue
Indianapolis, IN 46241

SUBJECT: NRC SPECIAL INSPECTION REPORT NO. 99990003/05-001(DNMS) AND NOTICE OF VIOLATION

Dear Ms. Ernest:

This refers to the inspection conducted on August 11 and 12, 2005, at the DaimlerChrysler facility in Indianapolis, Indiana, with continued NRC in-office through August 22, 2005. The NRC in-office review included receipt of information from an Industrial Hygienist that was unavailable during the site inspection. The purpose of the inspection was to follow up on a reported event involving damage to a nuclear gauge that occurred on July 28, 2005. The enclosed report presents the results of this inspection.

This inspection was an examination of activities conducted under the general license provisions in Title 10 Code of Federal Regulations, Section 31.5, "Certain Detecting, Measuring, Gauging, or Controlling Devices and Certain Devices for Producing Light or an Ionizing Atmosphere," (10 CFR 31.5) as they relate to safety and compliance with the Commission's rules and regulations. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation involved your staff's failure to immediately suspend operation of the nuclear gauge upon indication of a possible failure of, or damage to, the gauge shielding. The violation was evaluated 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 violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because your staff failed to identify the violation and the safety significance of the violation was more than minor.

Your staff conducted radiation surveys, conducted a leak test, and requested service from the gauge manufacturer in response to suspected high radiation survey results which indicated a good safety focus and resulted in quicker identification of gauge shielding damage. However, you missed an opportunity to prevent additional inadvertent radiation exposures by not immediately restricting access to the gauge source housing on August 1, 2005, when you had indication of a possible failure of, or damage to, the gauge shielding.

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence is already adequately addressed on the docket in the enclosed report. Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). The NRC's document system is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Sincerely,

/RA by R. Gattone Acting for/

John R. Madera, Chief
Materials Inspection Branch

Docket No. 99990003
General License 10 CFR 31.5

Enclosures:
1. Inspection Report 99990003/05-001(DNMS)
2. Notice of Violation

Distribution w/encls:
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DATE	08/29/05		08/29/05		08/29/05		08/29/05	

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NOTICE OF VIOLATION

DaimlerChrysler
Indianapolis, Indiana

Docket No. 99990003
General License

During an NRC inspection conducted on August 11 and 12, 2005, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," the violation is listed below:

> 10 CFR 31.5(c)(5) requires, in part, that the licensee immediately suspend operation of the gauge if there is a failure of, or damage to, or any indication of a possible failure of, or damage to, the shielding of the radioactive material or the on-off mechanism or indicator, and may not operate the gauge until it has been repaired by an authorized person.
>
> Contrary to the above, on August 1, 2005, the licensee had indication of a possible failure of, or damage to, the gauge shielding and the licensee continued to operate the gauge from August 1 to 10, 2005. Specifically, on August 1, 2005, a member of the licensee's staff suspected that some ambient radiation survey results of the gauge were abnormally high and recommended that the licensee keep people away from the gauge source housing; however, the licensee continued to operate the gauge from August 1 to 10, 2005.
>
> This is a Severity Level IV violation (Supplement VI).

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence and the date when full compliance was achieved is already adequately addressed on the docket in Inspection Report No. 99990003/05-001(DNMS). However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555 with a copy to the Regional Administrator, Region III, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 29th day of August 2005

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket:	99990003
License:	General License
Report:	99990003/05-001(DNMS)
Licensee:	DaimlerChrysler
Location Inspected:	1100 South Tibbs Avenue Indianapolis, Indiana
Inspection Dates:	August 11 and 12, 2005, with continued NRC in-office review through August 22, 2005
Preliminary Exit Meeting:	August 12, 2005
Final Exit Teleconference:	August 22, 2005
Inspectors:	Robert G. Gattone, Jr., Senior Health Physicist Geoffrey Warren, Health Physicist Meghan Thorpe-Kavanaugh, Nuclear Safety Professional
Approved By:	John R. Madera, Chief Materials Inspection Branch, Region III

EXECUTIVE SUMMARY

DaimlerChrysler
NRC Inspection Report 99990003/05-001(DNMS)

The inspectors conducted a reactive inspection to review the circumstances surrounding an event involving damage to a nuclear gauge (gauge) that occurred on July 28, 2005. The inspectors identified a violation of Title 10 Code of Federal Regulations, Section 31.5, “Certain Detecting, Measuring, Gauging, or Controlling Devices and Certain Devices for Producing Light or an Ionizing Atmosphere,” involving the licensee's failure to immediately suspend operation of the gauge upon indication of a possible failure of, or damage to, the gauge shielding. The inspectors determined that failure of one of the two downcomers to release small metal pellets used to clean an air heat exchanger was the root cause of the damaged gauge event. In addition, the inspectors determined that the licensee’s failure to promptly identify the downcomer malfunction, which resulted in continued cupola (a furnace used to melt metal) operation, was a contributing factor of the damaged gauge event.

The licensee conducted radiation surveys, conducted a leak test, and requested service from the gauge manufacturer in response to suspected high radiation survey results which indicated a good safety focus and resulted in quicker identification of gauge shielding damage. However, the licensee missed an opportunity to prevent additional inadvertent radiation exposures by not immediately restricting access to the gauge source housing on August 1, 2005, when it had indication of a possible failure of, or damage to, the gauge shielding.

The inspectors determined that the maximum radiation doses received by individuals who worked in close proximity to the source housing after the gauge shielding melted was approximately 43 millirem to the whole body and approximately 134 millirem to an extremity.

The licensee's corrective actions to prevent a similar event and a similar violation included: (1) installing high heat insulation over the new source housing to avoid melting the shielding; (2) conducting more frequent preventive maintenance on the recuperator, including pellet flow checks; (3) monitoring the temperature in the recuperator as a means of detecting abnormally high temperature increases; (4) implementing provisions to promptly conduct ambient exposure rate surveys of the gauge source housing after each burn-down and whenever abnormally high temperatures are detected near the source housing; and (5) implementing provisions to immediately cease gauge operation and restrict personnel access to the source housing if the radiation survey results are suspiciously higher than normal.

Report Details

1 Program Overview

Licensed Activities and Inspection History

Pursuant to the general license provisions in Title 10 Code of Federal Regulations Section 31.5, "Certain Detecting, Measuring, Gauging, or Controlling Devices and Certain Devices for Producing Light or an Ionizing Atmosphere" (10 CFR 31.5), the Nuclear Regulatory Commission (NRC) authorized DaimlerChrysler (licensee) to use a TN Technologies, Inc. (currently named "Thermo Electron Corporation" (TEC)) Model 5201 (Serial No. B3021) nuclear gauge (gauge) for measuring the level of contents within vessels. The gauge source housing contained a source capsule of byproduct material. The source housing had lead shielding around the source capsule to reduce the ambient radiation levels near the gauge. In addition, the source housing had a manually-operated shutter to open or close the radiation beam that was aimed at the cupola (a furnace used to melt metal) being measured. A radiation detector positioned on the opposite side of the cupola detected the low levels of radiation that passed from the source housing through the cupola. The amount of low-level radiation measured by the detectors was used to determine the level of the cupola contents for process control. The gauge contained the only radioactive material possessed by the licensee at the location inspected.

The licensee used the gauge to measure the level of steel within the cupola. The molten metal was used to mold engine blocks. The hot air in the cupola was vented to the "recuperator." The recuperator was a heat exchanger that cooled the air before it was vented to a "baghouse," which filtered particles from the air prior to release to the atmosphere.

The NRC had not previously inspected the licensee's general-licensed activities.

2 Damaged Gauge Event Summary

2.1 Inspection Scope

The inspectors evaluated the circumstances surrounding the damaged gauge event by interviewing selected licensee staff, observing re-enactments of the event, observing the damaged gauge, and reviewing selected records.

2.2 Observations and Findings

The licensee conducted weekly "burn-downs" of the cupola. Burn-downs involved raising the cupola temperature above normal operating temperature to eliminate residual contents. The burn-downs caused sediment build up on the coolant tube bundles within the recuperator.

The licensee cleaned the sediment from the coolant tube bundles by releasing small metal pellets from two "downcomers" at the top of the recuperator. The pellets moved down the recuperator by gravity and they mechanically removed the sediment from the coolant tubes. However, on July 28, 2005, one of the two downcomers at the top of the recuperator failed to release small metal pellets; therefore, about half of the sediment

was not removed from the coolant tubes. The residual sediment on the cooling tubes reduced the air flow through the recuperator by half.

The restricted air flow caused back pressure in the cupola, forcing some of the hot air into the area near the gauge. The temperature near the gauge rose to more than 621 degrees Fahrenheit (the melting point of lead) causing the lead shield to melt. An expansion plug opened and allowed some of the lead to leak from the source housing. The loss of lead from the source housing reduced the shielding around the source capsule such that the upper half of the source housing was unshielded by lead. In addition, the loss of lead resulted in partial shielding of the shutter beam port, causing less radiation to pass from the source housing, through the cupola, and to the detectors. Therefore, the detectors measured less radiation than normal.

Licensee staff identified that the detectors measured less radiation than normal. Licensee staff suspected that the reduced radiation was caused by electrical malfunction of the detectors rather than by a problem with the source housing because similar problems in the past were caused by the detectors.

July 28, 2005, was the first time that the air flow through the recuperator was reduced by half. The licensee identified the recuperator problem as the cause of the increased temperature near the gauge and stopped operating the gauge on July 28. The licensee repaired the recuperator on July 31, 2005. However, the licensee was unaware that the gauge shielding was damaged.

Between July 28 and August 2, 2005, five electricians worked on the gauge shutter position indicator switch and associated hardware, and conducted switch operability tests in close proximity to the gauge source housing. The switch was used to indicate gauge shutter position at the processing equipment console. The electricians worked on the switch because of damage incident to heat. None of the electricians worked near the source housing after 3:00 p.m. on August 2, 2005, when the licensee restricted access to the source housing.

On August 1, 2005, licensee staff began to question if the detectors were measuring less radiation than normal as a result of a problem with the source housing. Licensee staff conducted ambient radiation exposure rate measurements at selected areas near the gauge and suspected that the results were higher than normal.

The licensee resumed operation of the gauge (i.e., used the gauge to measure the level of steel within the cupola) on August 1, 2005. Although the detectors measured less radiation than normal, the licensee was able to compensate for the low radiation by increasing the electrical gain on the detectors to obtain a satisfactory signal for gauge operation.

On August 2, 2005, an Industrial Hygienist (hygienist) came to the facility and conducted ambient radiation exposure rate measurements at selected areas near the gauge. The hygienist suspected that some of his survey results were abnormally high. As a result, the licensee requested that a TEC service representative arrive at the site to diagnose the problem with the gauge. In addition, the licensee established an “exclusion area” at approximately 3:00 p.m. on August 2, 2005, to keep people away from the gauge source housing.

The TEC service representative arrived at the site on August 9, 2005. The service representative determined that the lead shielding had melted on July 28, 2005, resulting in an elevated radiation exposure rate from the top of source housing. The service representative also determined that the damage caused less radiation to pass from the source housing, through the cupola, and to the detectors. In addition, the service representative determined that the source capsule was not leaking.

The service representative conducted a dose assessment for four of the five electricians that worked near the source housing. The service technician estimated that the highest whole body dose received was 179 millirem, and the highest extremity dose received was 50 millirem.

On August 10, 2005, the RSO telephoned the NRC Region III office requesting guidance on whether or not the licensee was required to report the damaged gauge event to the NRC. Based on a discussion with a member of the NRC staff, the RSO learned that the licensee was required to report the damaged gauge event to the NRC, and the licensee was required to immediately suspend operation of the gauge because of the shielding damage.

The licensee suspended gauge operation at 6:00 p.m. (Central Time) on August 10, 2005. The licensee notified the NRC Operations Center about the damaged gauge event on August 10, 2005, at 6:18 p.m. (Eastern Time).

2.3 Conclusions

The inspectors developed a time line and set of facts surrounding the damaged gauge event. The time line and set of facts developed by the licensee for the damaged gauge event agreed substantially with the inspectors'.

3 Damaged Gauge Event Response Detail

3.1 Inspection Scope

The inspectors developed a time line and set of facts surrounding the licensee's identification and response to the damaged gauge event. The inspectors interviewed selected individuals including the Corporate Radiation Safety Officer (RSO), a safety specialist, the hygienist, and electricians who worked near the source housing after the event. In addition, the inspectors toured the facilities and examined the gauge. The inspectors also reviewed selected records, including selected leak test records and radiation survey records.

3.2 Observations and Findings

On August 1, 2005, licensee staff began to question if the detectors were measuring less radiation than normal as a result of a problem with the source housing. Therefore, a manager with experience in conducting radiation surveys performed ambient radiation exposure rate measurements at selected areas near the gauge. The manager noted that there was no visible damage to the source housing. The manager measured a maximum of 100 milliroentgens per hour at the surface of the source housing. The manager did not know the normal exposure rates for the gauge. Therefore, he reported his survey results telephonically to the hygienist who was off site.

The hygienist suspected that some of the manager's survey results were abnormally high; however, the hygienist was not sure if the survey results were abnormally high. As a safety precaution, the hygienist recommended that the licensee keep people away from the gauge source housing.

On August 2, 2005, the hygienist came to the facility and conducted ambient radiation exposure rate measurements at selected areas near the gauge. The hygienist measured a maximum of 1.3 milliroentgens per hour at 6 feet from the source housing. The hygienist did not know the normal exposure rates for the gauge, and he suspected that some of his survey results were abnormally high.

In addition to conducting the ambient radiation exposure rate measurements on August 2, the hygienist conducted a leak test on the gauge. To reduce his radiation dose, the hygienist used a broom handle to increase his distance from the swipe material during leak test sample collection. The hygienist submitted the leak test sample to TEC for expedited analysis. The leak test results were reported to the licensee on August 3, 2005, and the results were negative (less than 2.5 E -5 microcurie).

On August 2, 2005, the licensee requested that a TEC service representative arrive at the site to diagnose the problem with the gauge (i.e., determine why the detectors were measuring less radiation than normal and if the radiation survey results conducted on August 1 and 2 were within normal limits). However, the TEC service representative could not be scheduled prior to August 9, 2005. In addition, based on the hygienist's suspicion that some of the survey results were abnormally high, the licensee established an "exclusion area" at approximately 3:00 p.m. on August 2, 2005, to keep people away from the gauge source housing. The licensee also informed its staff about the exclusion area and why it was established.

The boundary of the exclusion zone was established where the ambient exposure rates were less than 1 milliroentgen per hour. The boundary was taped off at all entry points and posted with, "Danger High Radiation" signs and other signs that read, "Caution: Preliminary Exclusion Area - Keep out of the taped off area around the cupola level detector. As a safety precaution, this area is designated an 'Exclusion Area' for all employees until more information is received from the level detector manufacturer. If you have questions, contact (named individuals). Dated August 2, 2005."

The TEC service representative arrived at the site on August 9, 2005, to evaluate the gauge. The service representative conducted ambient exposure rate surveys of selected areas near the source housing and other areas, including the floor above the source housing. The service representative determined that the lead shielding had melted and an expansion plug opened allowing some of the lead to leak from the source housing on July 28, 2005. The service representative determined that the loss of lead from the source housing reduced the shielding around the source capsule such that the upper half of the source housing was unshielded by lead, resulting in an exposure rate of about 160 milliroentgens per hour at about 3 feet from the top of source housing. In addition, the loss of lead resulted in partial shielding of the shutter beam port, causing less radiation to pass from the source housing, through the cupola, and to the detectors. The service representative's survey results for the floor above the source housing were indistinguishable from background in a low background area. The floor above the

source housing was constructed of one-half to three-quarters inches thick steel plating and was covered with metallic dust, which provided radiation shielding for the area above the floor.

The service representative also conducted a field leak test of the gauge. The leak test sample was collected at the front access port, an area that would likely show radioactive contamination if the source capsule leaked. The service representative analyzed the leak test sample with a Bicron Model 200X survey instrument that was last calibrated on July 1, 2005. The leak test result was negative (less than 0.005 microcuries).

The service representative interviewed four of the five electricians that worked near the source housing in order to conduct a dose assessment. One of the five electricians refused to be interviewed by the service technician. During the interviews, the service representative collected information about what the electricians did, the distances that their bodies were from the source housing, and the time that the electricians stayed positioned near the source housing. Based on the information collected during the interviews and the service technician's survey results and exposure rate calculations, the service technician estimated that the highest whole body dose received by an individual was 179 millirem, and the highest extremity dose received was 50 millirem.

During the early afternoon on August 10, 2005, the licensee's RSO telephoned the NRC Region III office requesting guidance on whether or not the licensee was required to report the damaged gauge event to the NRC. A Region III employee informed the RSO that another Region III employee with technical expertise in the subject in question would call back with the answer. A Senior Health Physicist (physicist) was able to reach the RSO at approximately 4:00 p.m. on August 10, 2005. Based on the RSO's description of the event and the extent of the damage to the gauge shielding, the physicist informed the RSO that the event is required to be reported to the NRC Operations Center pursuant to 10 CFR 30.50(b)(2),"Reporting Requirements." In addition, the physicist informed the RSO of the written reporting requirements in 10 CFR 30.50(c)(2), and 10 CFR 31.5(c)(5). The physicist also informed the RSO that 10 CFR 31.5(c)(5) requires that the licensee immediately suspend operation of the gauge because there was damage to the gauge shielding and the gauge may not be operated until it is repaired by an authorized person.

The licensee suspended gauge operation at 6:00 p.m. (Central Time) on August 10, 2005, and did not resume operation until the gauge was replaced by TEC on August 17, 2005. The licensee notified the NRC Operations Center about the damaged gauge event on August 10, 2005, at 6:18 p.m. (Eastern Time).

As stated in Section 2.2 above, the licensee resumed operation of the gauge on August 1, 2005. The licensee operated the gauge from August 1 until 6:00 p.m. on August 10, 2005. Title 10 CFR 31.5(c)(5) requires, in part, that the licensee immediately suspend operation of the gauge if there is a failure of, or damage to, or any indication of a possible failure of, or damage to, the shielding of the radioactive material or the on-off mechanism or indicator, and may not operate the gauge until it has been repaired by an authorized person. Based on the results of the manager's radiation survey conducted on August 1, 2005, the hygienist suspected that some of the manager's survey results were abnormally high and recommended that the licensee keep people away from the gauge source housing. Therefore, on August 1, 2005, the licensee had indication of a possible failure of, or damage to, the gauge shielding. However, the licensee continued

to operate the gauge until 6:00 p.m. on August 10, 2005. The licensee's failure to immediately suspend operation of the gauge on August 1, 2005, when it had indication of a possible failure of, or damage to, the gauge shielding, is a violation of 10 CFR 31.5(c)(5). Licensee staff were unaware of the requirements in 10 CFR 31.5(c)(5) until the physicist informed the RSO about them on August 10, 2005.

3.3 Conclusions

The inspectors identified a violation of 10 CFR 31.5(c)(5) involving the licensee's failure to immediately suspend operation of the gauge upon indication of a possible failure of, or damage to, the gauge shielding. The licensee's initiative to conduct radiation surveys, conduct a leak test, and request service from the gauge manufacturer in response to suspected high radiation survey results indicated a good safety focus. However, the licensee missed an opportunity to prevent additional inadvertent radiation exposures by not immediately establishing the exclusion area on August 1, 2005, when it had indication of a possible failure of, or damage to, the gauge shielding.

4 NRC Dose Assessment

4.1 Inspection Scope

The inspectors conducted independent dose estimates for each of the five electricians who worked near the source housing between July 28 and August 2, 2005. The inspectors also performed independent ambient exposure rate and removable contamination surveys of areas near the source housing. In addition, the inspectors observed re-enactments of the work conducted by the electricians and interviewed the electricians and other selected staff to obtain information for the dose assessment.

4.2 Observations and Findings

The inspectors conducted ambient exposure rate surveys with a calibrated Eberline Model E600 Smart Pole, Serial No. 01968, survey instrument. The inspectors measured elevated radiation exposure rates at the top surface of the source housing, and significantly lower exposure rates at the bottom surface of the source housing, consistent with the TEC service representative's survey results. The inspectors measured a maximum of 6.7 Roentgens per hour at the top surface of the source housing, and a minimum of 7 milliroentgens per hour at the bottom surface. The inspectors noted that the radiation exposure rates dropped significantly with distance from the source housing. For example, the inspectors measured 750 milliroentgens per hour and 206 milliroentgens per hour at 6 inches and 12 inches from the top of the source housing, respectively.

The inspectors measured a maximum of 1 milliroentgen per hour at the surface of the floor above the source housing. The inspectors noted that the area was a fenced-in, low occupancy area.

The inspectors collected a removable contamination survey sample from selected surfaces at the boundary of the exclusion area. The inspectors used a Ludlum Model 3 survey instrument interfaced with a pancake probe to determine that the sample was indistinguishable from background in a low background area.

To conduct independent dose assessments for each of the five electricians that worked in close proximity to the source housing after the gauge shielding melted, the inspectors used their measured exposure rates at locations where the electricians' bodies and extremities were near the source housing, and multiplied the measured exposure rates by the measured times that the electricians dwelled in those positions to calculate radiation dose. The inspectors calculated that the maximum doses received were approximately 43 millirem to the whole body and approximately 134 millirem to an extremity.

4.3 Conclusions

The maximum radiation doses received by individuals who worked in close proximity to the source housing after the gauge shielding melted was approximately 43 millirem to the whole body and approximately 134 millirem to an extremity. The source capsule did not leak radioactive material.

5 Root Cause and Contributing Factors

5.1 Inspection Scope

The inspectors assessed the root cause and contributing factors for the damaged gauge event by interviewing selected licensee staff and observing the condition of selected equipment.

5.2 Observations and Findings

On July 28, 2005, one of the two downcomers at the top of the recuperator failed to release small metal pellets; therefore, about half of the sediment was not removed from the coolant tubes. The residual sediment on the cooling tubes reduced the air flow through the recuperator by half. The restricted air flow caused back pressure in the cupola and some of the hot air escaped into the area near the gauge. The temperature near the gauge rose above the melting point of lead, causing the lead shield to melt. Therefore, failure of one of the two downcomers to release the small metal pellets was the root cause of the damaged gauge event.

Subsequent to the failure of one of the two downcomers to release the small metal pellets into the recuperator, the licensee continued to operate the cupola because its staff did not promptly identify the downcomer failure. The licensee's failure to promptly identify the downcomer malfunction, which resulted in continued cupola operation, was a contributing factor of the damaged gauge event.

5.3 Conclusions

The root cause of the damaged gauge event was failure of one of the two recuperator downcomers to release the small metal pellets. The licensee's failure to promptly identify the downcomer malfunction, which resulted in continued cupola operation, was a contributing factor of the damaged gauge event.

6 Corrective Actions

6.1 Inspection Scope

The inspectors interviewed selected licensee staff to identify the corrective actions taken by the licensee to prevent a similar damaged gauge event and a similar violation.

6.2 Observations and Findings

The licensee implemented actions to prevent a similar damaged gauge event. The licensee obtained approval from TEC to install high heat insulation over the new source housing to avoid melting the shielding, and subsequently installed the insulation. In addition, the licensee implemented more frequent preventive maintenance on the recuperator, including pellet flow checks. The licensee also implemented action to monitor the temperature in the recuperator as a means of detecting abnormally high temperature increases.

The licensee implemented corrective action to prevent a similar violation of 10 CFR 31.5(c)(5). The licensee implemented provisions to promptly conduct ambient exposure rate surveys of the gauge source housing after each burn-down and whenever abnormally high temperatures are detected near the source housing. The licensee also implemented provisions to immediately cease gauge operation and restrict personnel access to the source housing if the radiation survey results are suspiciously higher than normal.

6.3 Conclusions

The licensee initiated adequate corrective actions to prevent a similar event and a similar violation of 10 CFR 31.5(c)(5).

7 Notifications and Reports

7.1 Inspection Scope

The inspectors evaluated the licensee's notification to the NRC of its identification of the damaged gauge event. The inspectors interviewed the RSO, the hygienist, and other selected licensee staff. In addition, the inspectors reviewed the NRC events database.

7.2 Observations and Findings

The TEC service representative arrived at the site on August 9, 2005, and determined that the lead shielding had melted on July 28, 2005, resulting in an elevated radiation exposure rate from the top of the source housing. Based on the information obtained from the service representative, the RSO telephoned the NRC Region III office on August 10, 2005, requesting if the licensee was required to report the damaged gauge event to the NRC. After a discussion with a member of the NRC staff, the RSO learned that the licensee was required to report the damaged gauge event to the NRC pursuant to 10 CFR 30.50(b)(2) and 10 CFR 31.5(c)(5). Therefore, the licensee notified the NRC Operations Center about the damaged gauge event on August 10, 2005, at 6:18 p.m. (Eastern Time).

The licensee plans on providing the written reports required by 10 CFR 30.50(c)(2) and 10 CFR 31.5(c)(5) prior to September 10, 2005.

7.3 Conclusions

The licensee notified the NRC about the damaged gauge event as required by 10 CFR 30.50(b)(2), and it planned to provide the written reports as required by 10 CFR 30.50(c)(2) and 10 CFR 31.5(c)(5) .

8 Exit Meeting

The inspectors discussed the preliminary conclusions described in this report with licensee management during an exit meeting conducted at the licensee's facility on August 12, 2005. The inspectors discussed the final conclusions described in this report with the RSO during a final exit teleconference conducted on August 22, 2005. The licensee did not identify any information reviewed during this inspection and selected for inclusion in this inspection report as proprietary in nature.

PARTIAL LIST OF PERSONS CONTACTED

Steven Adams, Safety Specialist
Ray Anderson, Manufacturing Manager
Kevin Bemis, Manufacturing Engineer Manager
M. Childs-Watson, Human Resources Manager
Jack Hartwig, Industrial Hygiene Supervisor, Corporate Radiation Safety Officer
* John Rider, Industrial Hygienist

participated in exit meeting
* contacted by telephone