

small cavity was identified adjacent to Nozzle 2. This cavity was approximately 1.75 inches wide, 4 inches long, and 0.25 inches deep. Region III sent an Augmented Inspection Team (AIT) to the site to determine the facts and circumstances of the head degradation, beginning on March 12, 2002, and held a public exit meeting on April 5, 2002. A follow-up inspection identified several apparent violations of Agency regulations. The apparent violations will be processed in accordance with Agency procedure.

On April 8, 2002, prior to discovery of the crack in the cladding, the licensee submitted a safety significance assessment for the degraded RPV head to the NRC. This assessment determined that the as-found stainless steel cladding layer would have remained intact during anticipated operational occurrences and postulated accidents. Further, this assessment determined that had the RPV head failed due to the corrosion: (a) Adequate core cooling could have been established and maintained for the long term, (b) the reactor could have been placed and maintained in a safe shutdown condition, and (c) the integrity of containment would not have been compromised. The NRC staff is performing an independent assessment and reviewing the adequacy of the licensee's assessment. The NRC has not reached a final conclusion on the significance of this condition.

Cause or Causes—On April 18, 2002, the licensee submitted its Root Cause Analysis Report to the NRC. In this report, the licensee concluded that the most probable technical cause of the RPV head degradation was boric acid corrosion resulting from leakage through a crack in the CRDM penetration nozzle attributable to primary water stress corrosion cracking. Further, this corrosion had occurred over a period of several years. Absent more definitive information, the licensee's technical root cause analysis represents a plausible scenario for the degradation.

The licensee has completed a number of activities designed to identify management and human performance issues which contributed to this event. Several management and human performance issues were subsequently identified by both the licensee and NRC. NRC continues to monitor these activities and independently assess the effectiveness of the licensee's efforts in this area.

Actions Taken To Prevent Recurrence

Licensee—The licensee elected to replace the damaged head with one procured from the owners of the

canceled Midland nuclear power plant located in Michigan. The licensee has also completed a number of activities designed to identify the management and human performance deficiencies which contributed to the degradation of the reactor vessel head and implemented a series of inspections and evaluations to identify and correct any other potentially problematic plant issues.

NRC—Region III issued Confirmatory Action Letter (CAL) 3-02-001 on March 13, 2002, and Revised CAL 3-02-001A on May 15, 2002, which detailed specific licensee actions to be taken before NRC would consider restart of Davis-Besse. The NRC issued two Information Notices (IN) and two Bulletins to promptly inform the industry of the event: IN 2002-11, "Recent Experience with Degradation of Reactor Pressure Vessel Head"; IN 2002-13, "Possible Indicators of Ongoing Reactor Pressure Vessel Head Degradation"; Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity"; and Bulletin 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs."

The NRC placed Davis-Besse under the Inspection Manual Chapter 0350 "Oversight of Operating Reactor Facilities in a Shutdown Condition With Performance Problems" on April 29, 2002. Further inspections and assessment of Davis-Besse performance will be performed before plant restart is considered. The NRC also chartered a Lessons Learned Task Force (LLTF). The objective of this task force was to independently evaluate the NRC's regulatory processes related to assuring RPV head integrity in order to identify and recommend areas for improvement that may be applicable to either the NRC or the nuclear industry. The LLTF completed its evaluation and its conclusions were reviewed by a Senior Management Review Team to determine appropriate Agency actions. The recommendations of the Senior Management Review Team were issued November 26, 2002. A Commission meeting was held on January 14, 2003, to brief the Commission on the Senior Management Review Team recommendations and the Commission approved proceeding with the recommendations.

This event is considered open for the purpose of this report.

Fuel Cycle Facilities (Other Than Nuclear Power Plants)

None of the events that occurred at fuel cycle facilities during this period was significant enough to be reported as an AO.

Other NRC Licensees (Industrial Radiographers, Medical Institutions, etc.)

The NRC determined that the following events which occurred at facilities, licensed or otherwise regulated by the NRC, during this reporting period were significant enough to be reported as AOs:

02-2 Gamma Stereotactic Radiosurgery (Gamma Knife) Misadministration at St. Luke's Medical Center in Milwaukee, Wisconsin

Date and Place—July 10, 2001; St. Luke's Medical Center; Milwaukee, Wisconsin.

Nature and Probable Consequences—A patient undergoing Gamma Stereotactic Radiosurgery (Gamma Knife) was prescribed treatment of 20 Gy (2,000 rad) to a portion of the brain. During the treatment, the licensee completed three of eight treatment fractions and approximately one-half of the fourth fraction when the medical physicist and radiation therapist realized that the administered treatment utilized the treatment parameters for another patient, resulting in a dose of 12.8 Gy (1,280 rad) to an unintended portion of the brain (*i.e.*, wrong treatment site).

For treatment, the licensee's medical physics staff prepared treatment plans for two patients, to be treated on the same day. The treatment plan for Patient A consisted of a prescribed dose of 18 Gy (1,800 rad). Prior to initiating treatment of Patient A, someone on the licensee's staff handed the plan of treatment for Patient B to the licensee's radiation therapist; later, the therapist could not recall who had handed her the plan. Using Patient B's treatment plan, the treatment team set up and delivered the first three fractions to Patient A and began delivery of the fourth fraction. The error was discovered by the medical physicist during delivery of the fourth fraction. Once notified of the error, the radiation oncologist terminated the treatment.

The medical physicist determined that the treatment delivered a dose of 12.8 Gy (1,280 rad) to an unintended region of the patient's brain. The radiation oncologist determined that the location of the unintended site was far enough away from the intended site to proceed with the intended treatment.