

during this reporting period, were significant enough for reporting as AOs:

*AS 02-1 Loss of Package Integrity and Elevated Radiation Levels Measured at Federal Express Facility in Kenner, Louisiana*

*Date and Place*—January 2, 2002, Federal Express facility at New Orleans International Airport, in Kenner, Louisiana.

*Nature and Probable Consequences*—A package containing iridium-192 (Ir-192) with elevated surface radiation levels was discovered at the Federal Express facility located at the New Orleans airport. The package was identified as a routine shipment for Source Production and Equipment Company (SPEC), located in St. Rose, Louisiana. After being notified by Federal Express authorities, a representative of SPEC picked up the package from the Federal Express facility. While loading the package, known as the SAFKEG, onto his truck, the individual noticed that his survey meter was offscale and his pocket dosimeter showed a reading of 1.6 mSv (160 mrem). The SAFKEG was transported back to SPEC facilities and entombed in high-density concrete bricks in its secured warehouse. The individual's total exposure during these activities was later determined to be 3.45 mSv (345 mrem).

The SAFKEG was shipped from a Swedish Company, Studsvik AB, and contained three vials loaded with a total of 1078 Ir-192 discs. The total activity was 366 terabecquerels (TBq) (9893 curies (Ci)). Shipping papers accompanying the package indicated that the Ir-192 was solid metal, in a Type B(U) package with a yellow radioactive III label, and a transportation index of 2 (radiation levels of 0.02 mSv/hr (2 mrem/hr) at one meter from the surface). Photographs taken by SPEC personnel, in St. Rose, Louisiana, prior to the SAFKEG entombment confirmed that the appropriate U. S. Department of Transportation (DOT) labeling was affixed to the package. Surveys conducted at about the same time at 15 feet from the cask revealed measured radiation levels of 10 mSv/hr (1 rem/hr). The package remained entombed until a hot cell capable of remote inspection was constructed. After the SAFKEG's contents were removed, in the hot cell, and before its shipment from the St. Rose facility, surveys for radiation levels and leak tests conducted for removable contamination showed no removable contamination.

The SAFKEG was originally shipped by Federal Express. A Health Physicist/

Consultant to Federal Express performed dose estimate calculations for personnel exposed to the package during its transit. Personnel monitoring devices were worn by the flight crews for both the flights; specifically, from Sweden to Paris and from Paris to Memphis. The First Officer for the Paris to Memphis flight received 0.05 mSv (5 mrem) for the January–February 2002 monitoring period and 0.39 mSv (39 mrem) for the November–December 2001 period. The consultant concluded that there were no excessive radiation levels from the SAFKEG on either flight. The consultant's calculations estimated the highest dose to any Federal Express employee at 20 mSv (2 rem). The French and Swedish regulatory agencies evaluated the portions of the event that occurred within their jurisdictions.

*Cause or Causes*—On February 7, 2002, after construction of the hot cell, appropriate SPEC personnel opened the SAFKEG utilizing robotics. The tamper seal was intact; after it was broken, it was sealed in plastic and put aside. The interior shielded pot was removed and placed into a small lead shield. The shielding pot lid is normally secured with six allen head screws; however, one of the six screws was found loose. The plug assembly accessing the cavity containing the three vials of Ir-192 disks was removed, revealing that two of the three vials were open. The screw tops for the vials and a large number of Ir-192 disks were visible along the lip of the inner cavity. It is presumed the screw tops became unscrewed during transportation, resulting in the elevated external radiation levels.

*Actions Taken To Prevent Recurrence*

*Licensee*—The licensees involved in this occurrence are the package shipper, Studsvik AB, the package manufacturer, Croft, and the U.S. recipient, SPEC. The shipper and package manufacturer are pursuing corrective actions, but these have not been formalized as of the date of this report.

The inner-shielded pot of the package remained in the hot cell of the SPEC facility at the time of this report. SPEC had no plans to attempt further decontamination of the pot.

*DOT*—DOT issued a revision to the certificate of compliance (COC) requiring the type of radioactive material transported in the SAFKEG be contained in special form source capsules. This revision prohibits the use of the screw-top type vials that were used during this incident. The revised COC should prevent this type of occurrence in the future. DOT has discussed possible enforcement action as a result of this event.

*State Agency*—The State of Louisiana had the lead role in the investigation of this event and has concluded its investigation.

This event is closed for the purpose of this report.

*AS 02-2 Industrial Radiography Occupational Overexposure at Longview Inspection in Channahon, Illinois*

*Date and Place*—The Illinois Department of Nuclear Safety (the Department) was notified on January 15, 2002, by the licensee's RSO, that in June 2000, a radiographer experienced an overexposure and subsequent injury at a temporary job site near Channahon, Illinois.

*Nature and Probable Consequences*—On January 15, 2002, the licensee reported a potential overexposure to a radiographer and a subsequent injury that could have resulted from the overexposure. The overexposure occurred in June 2000, and involved a 3.0 TBq (81.2 Ci), Ir-192 source at a temporary job site near Channahon, Illinois. The radiographer, believing that the source was secured following the radiographic exposure, approached the guide tube area and knelt down without looking at his survey meter. The radiographer's alarming rate meter was inoperable because of a low battery. After changing the radiography film for the next shot and unhooking the guide tube, he noticed the source drive cable was still in the guide tube and his survey meter showed an off-scale reading. He immediately cranked the source back into the shielded position. His self-reading pocket dosimeter was off-scale. The radiographer did not inform the licensee of the incident. Approximately 2 weeks after the incident, the radiographer noticed skin redness in a 2-centimeter sized area of his left calf. Over the next year, the wound became ulcerated and would not heal. A physician examined the individual and concluded that it could have resulted from radiation. In January 2002, the licensee's RSO became aware of the condition and reported it to the Department. Prior to commencing an extensive investigation, the Department recommended that the licensee seek immediate assistance from Oak Ridge Radiation Emergency Assistance Center/ Training Site (REAC/TS). The REAC/TS concluded that the injury could have resulted from the overexposure in June 2000. The Department performed interviews and extensive time-motion studies and concluded that the incident could have occurred as described by the radiographer. The estimated dose to the individual was 15,000 mSv (1,500 rem) to the extremity. The licensee's