



Physics Division

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RADIOLOGICAL WORK PERMIT DOSE RATES EXCEEDED AT ROCKY FLATS

On January 14, 1998, at the Rocky Flats Environmental Technology Site, a Building 371 source custodian was exposed to radiation levels outside radiological work permit suspension limits while conducting a radioactive source inventory and inspection. The custodian removed six selenium sources from a lead storage container, held them in her hands near her eyes, and inspected each one to verify the manufacturer's identification number. The supporting radiological control technician did not realize the permit dose rates had been exceeded until after the job was completed. The radiological work permit specified a radiation level suspension guide area dose rate of 100 mrem/hr. The radiological control technician performed surveys during the job and measured radiation levels of up to 390 mrem/hr at 30 centimeters. The site radiological manager issued a site-wide stop work order for all radioactive inventories, inspections, and leak tests. Internal dosimetry personnel will perform dose reconstruction for the source custodian and will determine if other radioactive source workers require dose reconstruction. Lack of awareness about a radiological limiting condition, poor radiological work practices, and inadequate procedures resulted in an unnecessary radiation exposure. (ORPS Report RFO-KHLL-371OPS-1998-0004)

Investigators determined that the radiological control technician and source custodian were performing a biannual radioactive source inventory and inspection of americium and selenium sources. They also determined that no pre-

evolutionary briefing was conducted. The radiological control technician became uneasy when he measured the last source at 390 mrem/hr, so he discussed it with radiological operations personnel and realized that the radiological work permit suspension limit had been exceeded. Dosimetry personnel collected the dosimeters of all personnel involved to determine the doses received.

The facility manager held a fact-finding meeting. The source custodian stated in the meeting that she had always handled the radioactive sources when performing source inventories. Meeting attendees learned that the radiological control technician surveyed the sources after the source custodian had inspected them and did not notify other personnel in the area of the higher measurements. The facility manager determined that personnel involved failed to demonstrate an understanding of safe radiological work practices. He also determined that the source inventory procedure was inadequate because it did not ensure that appropriate prerequisites were performed. Meeting attendees also learned that the administrative procedure requirements for radioactive source inspections are conflicting and confusing. The procedure required surveys of the source, source housing, and source storage cabinets in one section. However, in another section, the procedure stated that surveys of sources in a shield or device should be completed by wiping the area of the shield or device where contamination is most likely to occur. The facility manager determined that this procedure should be upgraded to an operating procedure to ensure that personnel (1) perform the appropriate prerequisites, (2) identify hazards, and (3) conduct pre-evolutionary briefs. Upgrading the procedure will also ensure that safety concerns are incorporated into procedure steps. Facility managers will continue to evaluate this event to determine if the concern should be expanded to include additional radioactive source handling activities and to develop corrective actions. A corrective action plan is required before site-wide radioactive source inventory and inspection activities are resumed.

NFS has reported numerous events in the Weekly Summary where limits established in radiological work permits were exceeded. Following are some examples:

- Weekly Summary 97-35 reported that workers at the Hanford Site did not stop work when a dose rate exceeded a radiation work permit void level of 7,000 mrad/hr for a non-penetrating dose during decontamination of a hot-cell door in the analytical laboratory. A health physics technician discovered a hot spot reading 18,000 mrad/hr while two laborers were wet-wiping the upper and lower hot-cell doors. They did not know that a limit had been

exceeded and continued to work for another half-hour before securing the hot cell and exiting the area. (ORPS Report RL-PHMC-ANALLAB-1997-0022)

- Weekly Summary 96-13 reported that a chemical technologist and a health physics technician at the Hanford Site handled a sample vial containing radioactive liquid in excess of the radiation work permit limit of 10 rad/hr. The measured dose from the vial was 198 rad/hr at a half-inch. (ORPS Report RL-WHC-ANALLAB-1996-0014)

These events underscore the importance of ensuring radiological work permits and work packages adequately address the job task and work area hazards. Job supervisors should instruct workers that all work is to be performed inside the bounds of the work permit. If the existing job scope changes and new hazards are introduced, supervisors should stop the work until these hazards can be analyzed and appropriate protective measures can be incorporated. Managers should ensure that work control processes are followed and radiological protection practices are enforced. They should also ensure that all work-related hazards are evaluated to reduce worker exposure to hazards and to prevent injury. Before signing a radiological work permit, personnel should be aware of (1) radiological conditions, (2) dosimetry requirements, (3) training requirements, (4) protective clothing and respiratory protection requirements, (5) stay times, and (6) conditions that may void the radiological work permit. When a limit is reached that voids the permit, personnel should immediately stop work, exit the area, and report the problem to a supervisor.

Personnel working at DOE facilities should have a continually questioning attitude toward safety issues. Each individual is ultimately responsible for complying with rules to ensure personal safety. Facility managers should communicate a sound policy stressing that safety is of prime importance and that all personnel must exhibit an individual commitment to excellence and professionalism.

- DOE/EH-0256T, *Radiological Control Manual*, states: "Each person involved in radiological work is expected to demonstrate responsibility and accountability through an informed, disciplined, and cautious attitude toward radiation and radioactivity." The manual sets forth DOE guidance on the proper course of action in the area of radiological control, including work preparation; work controls; monitoring and surveys; and training and qualifications. Section 123, "Worker Responsibilities," states that trained personnel should recognize that their actions directly affect contamination control, personnel radiation exposure, and the overall radiological

environment associated with their work.

The first rule of worker responsibility is to obey posted, written, and oral radiological control instructions and procedures, including instructions on radiological work permits. Section 321, "Radiological Work Permits," states that the permit should include limiting radiological conditions that may void the permit.

KEYWORDS: radiological work permit, radiological control technician, procedures, source custodian, inspection, violation

FUNCTIONAL AREAS: Radiation Protection, Procedures

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