

Attachment 4

Working Group Insights

The WG explored topics associated with 10 CFR 34.41(a) (the two-person rule), including its regulatory history, interpretation/ implementation, operational experience, risk information, Agreement State event data and implementation, and adequacy and compatibility information, in order to develop insights into the NRC's implementation of the rule.

Implementation

NRC's two-person rule was effective on June 27, 1998¹ and requires that, "[T]he additional qualified individual shall observe the operations and be capable of providing immediate assistance to prevent unauthorized entry." Texas' response to the draft IMPEP Report regarding this rule clarifies that while Texas supports the requirement that at least two qualified individuals to be present during radiographic operations at a temporary job site, Texas disagrees with NRC's interpretation of the regulation that requires the second qualified individual to maintain continuous direct visual surveillance of radiographic operations, prohibiting the second qualified individual from turning his/her attention away during radiographic operations, i.e., when the source is out of the exposure device.

When the two-person rule was developed, there was strong and sustained support from the States, licensees, and industry for the concept of having at least two qualified individuals present whenever radiography is performed at temporary job sites. The expectation of the two-person rule, as expressed in the SOC, is that, at a temporary job site, the second qualified individual should be able to take charge and secure the area and the source and provide aid, as needed. In the SOC, the Commission stressed that having a second qualified individual is particularly important when radiography is performed where the radiographer alone is not able to control access. Additionally, the second person should be expected to be more than an observer in order to provide for a safe working environment for radiography personnel, workers, and other members of the public at a temporary job site.

Since the effective date, the NRC has consistently implemented the two-person rule as evidenced by generic communications, such as information notices, responses to Technical Assistance Requests from the NRC regional offices, and enforcement actions, to require both qualified individuals to maintain continuous direct visual surveillance of radiographic operations.²

The WG evaluated how nine other Agreement States implemented the rule, i.e., the States that have most of the industrial radiography business that is related to the natural gas, oil, and

¹ The Agreement States are required to adopt NRC regulations within 3 years.

² However, even these communications point out that the configuration of radiographic areas as temporary job sites are occasionally large areas that may encompass both vertical and horizontal directions. For example, when radiography is conducted in an area composed of multiple floors, it may be physically impossible for the additional qualified individual to directly observe operations. In such cases, the staff's view has been that as long as the second qualified individual can provide immediate assistance in an emergency and can control access to the restricted area, these scenarios would not violate §34.41(a).

petrochemical industries. All of these states have nationally-recognized industrial radiographer certification programs. The WG compared each of these States' current two-person rule language with the language in §34.41(a) and interviewed State personnel about their State's implementation of the rule. While the language in the Agreement States' two-person rules are identical or very similar to the language in §34.41(a), six of the States implemented the two-person rule to allow licensees the flexibility to determine when radiographic operations could be conducted safely where the first radiographer could observe operations and prevent intrusion into the restricted area while the second radiographer was nearby engaged in other job-related activities. These States believe effective and efficient radiographic operations can be accomplished allowing for this approach, without sacrificing safety. The three remaining states that were polled indicated that they required both radiographers to be present to observe the operations.

Operational Data and Experience

The WG was not able to attribute events involving industrial radiography to the failure of the two-person rule, much less to isolate the surveillance component of the regulation, because the effectiveness of the two-person rule has not been isolated from the other components in the regulatory framework. The Nuclear Materials Event Database (NMED) did not break the data down to specify what effects the components of the two-person rule had as a cause or a contributing factor (or as a prevention factor) for radiation exposure events involving industrial radiography personnel or members of the public. The event descriptions do not correlate the incidents to the two-person rule. NMED contains numerous incidents that involve industrial radiography during the 7-year period beginning in 1995 through 2002 (i.e., 431 incidents of which 38% were reported by NRC and 62% were reported by Agreement States). Five incidents involved an overexposure of radiography personnel who were working alone. Twenty-three incidents involved a member of the public who had entered the restricted area, whether or not a two-person crew was involved. The Enforcement Action Tracking System (EATS) contained 67 cases that involved industrial radiography during the 7-year period beginning in 1995 through 2002. Nine cases cited violation of the two-person rule. Enforcement actions involved both licensees and individuals. However, none of the cases involved radiation over-exposures to radiography personnel or workers at the site and other members of the public.

The Texas Incident Summaries for the 16-year period beginning in 1986 through 2002 indicated about 350 industrial radiography incidents at temporary job sites. About 80 (23%) resulted in radiation over exposures of radiography personnel. None of the over exposures in Texas was attributable to a lapse in safety due to one certified radiographer being unavailable, e.g., in the dark room while the other certified radiographer was using the radiographic equipment. Causes of the incidents were largely categorized as human performance errors, e.g., failure to survey/improper survey, improper work techniques.

Risk Information

The WG found that risk information obtained from NUREG/CR 6642 does not support the manner in which NRC requires the two-person rule to be implemented as a requirement to enhance safety. In fact, the WG found that during routine operations, the requirement to have an additional qualified individual present may actually increase overall worker occupational

radiation exposure, thereby increasing the overall societal latent cancer risk from routine operations. The effectiveness of the current two-person rule in preventing accidental exposures to radiography workers or members of the public cannot be quantified because the frequency of potential failure or success of the two-person rule is not available. Based on available data in the NMED database, the WG finds that it is unlikely that such failure will result in a substantial increase in societal latent cancer risks to workers or the public relative to exposure from routine radiographic operations.

ALARA Consideration

The WG found that the use of only two persons to provide surveillance of radiography operations may not always be adequate to prevent unauthorized access to radiation and high radiation areas by members of the public. Dependent upon the circumstances, one or several individuals may be required to restrict access to the radiation area boundaries. In addition, in those circumstances in which one radiographer may be able to adequately maintain visual surveillance of areas surrounding the controlled radiation areas and restrict access, requiring a second individual would provide no additional level of protection. To be present and to be exposed to the radiation field in these instances merely to meet the requirements of the two-person rule would not be considered ALARA, i.e., “As Low as is Reasonably Achievable.”

Compatibility Designation

When the two-person rule was enacted under the previous compatibility designations, the SOC indicated Agreement State compatibility for operational safety standards, i.e., Subpart D-Radiation Safety Requirements, which includes §34.41, as Division 2 matters of Compatibility. In 1997, the Joint Working Group on Adequacy and Compatibility (Joint Working Group) transposed those compatibility determinations to the current designations. Section 34.41(a), which contains several requirements³, was designated Category B. The regulatory framework for the two-person rule (Attachment 5) includes requirements that were designated as Category B or Category C.

Industrial radiography is a highly mobile activity that can travel from one jurisdiction to multiple jurisdictions, and the Joint Working Group found that this created significant, direct transboundary implications. For that reason, the Joint Working Group assigned a Category B compatibility to §34.41. This category requires jurisdictions to uniformly adopt requirements to prevent the regulatory confusion and economic inequity that could be created if several jurisdictions had various requirements. Category B designation requires Agreement States to align the program elements of their two-person rule to be essentially identical to the NRC’s requirements in §34.41 in order to benefit licensees and regulatory agencies alike while providing for health and safety. There is little question, for example, that if one jurisdiction allowed a single person to engage in radiographic operations at a temporary job site while

³ Section 34.41(a) requires that: (1) when radiographic operations are performed at a temporary location, the radiographer must be accompanied by at least one other qualified radiographer or a person with a certain level of radiography training, (2) the additional qualified individual shall observe the operations, (3) the additional qualified individual shall be capable of providing immediate assistance to prevent unauthorized entry, and (4) radiography may not be performed if only one qualified individual is present.

another jurisdiction required two people for the same activity, an unfair transboundary advantage would be afforded the licensee requiring a single person. Additionally, this scheme would be difficult to inspect and the health and safety aspects addressed by a two-person approach, more difficult to enforce.

Compatibility Category C is assigned to requirements that should be adopted by an Agreement State to avoid conflicts, duplications, or gaps in the national radiation protection program, the essential objectives of which, should be adopted by each Agreement State. Adopting the essential objective means a State is required to provide a level of protection equivalent to NRC, although the State has the latitude to adopt essential objectives that are similar or more stringent than NRC based on a State's radiation protection experience, professional judgement, and community values. Therefore, while Category C does not allow a less effective level of protection, a State has more flexibility to determine how to provide that level of protection.

While reviewing the compatibility designations, the WG noted a difference in the assignments between §34.41(a) and §34.51 for the same essential objective, surveillance. In §34.41(a) the surveillance component is designated compatibility Category B and in §34.51 it is designated Category C. The WG questions if the Category B designation for the surveillance requirement in §34.41(a) might be inappropriately applied as is more like a protective requirement rather than an activity having a direct and significant trans-boundary impact. The WG discussed the apparent inconsistency in the surveillance component of §34.41(a) and the surveillance section of Part 34, i.e., §34.51. This led the WG to further scrutinize the actual language in the NRC's regulations and question whether the surveillance portion of §34.41(a) was inadvertently included with the other requirements in §34.41(a) as a Category B, when it should have, like §34.51 been designated as a Category C.

Further, the WG discussed whether the flexibility that is provided in §34.51⁴ allowing either the radiographer OR the second qualified individual to maintain continuous direct visual surveillance during radiographic operations, had been negated by the NRC's implementation of the two-person rule and guidance addressing this rule, i.e., NUREG-1556, Volume 2, which indicates that §34.41(a) requires BOTH the radiographer and the second qualified individual to maintain continuous direct visual surveillance during radiographic operations. The WG noted that the SOC, which discusses the requirements for a second qualified individual, also states that this individual should be able to provide the required assistance when required, rather than whenever radiographic operations are being conducted.

⁴ Section 34.51 states that during radiographic operations performed at a temporary location, the radiographer, or the other individual present (as required by §34.41) shall maintain continuous visual surveillance of the operation to protect against unauthorized entry into a high radiation area.