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OFFICE OF RADIATION CONTROL
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SPECIAL INSTRUCTIONS: COMMENTS FROM FLORIDA ON
PROPOSED NEW PART 34

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COMMENTS ON PROPOSED CHANGES TO PART 34 OF 10 CFR

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Section 34.3 Definitions

1. Define "ANSI," which is the American National Standards Institute. Defining ANSI is needed so the abbreviation can be used instead of spelling it out when referenced in specifying requirements for pocket dosimeters (ANSI 13.5 - 1972 and ANSI N322-1977), radiographic exposure devices, source changers, transport/storage containers and associated equipment (ANSI N432-1980).
2. Redefine "associated equipment" as "equipment used in conjunction with a radiographic exposure device or source changer that drives, guides or comes in contact with the sealed source [e.g., guide tube, control tube, control (drive) cable, removable source stop, "J" tube]." Another alternative would be to drop the proposed definition's use of the phrase "to make radiographic exposures" because that phrase excludes source changers, which are not used to make radiographs, but do use "associated equipment."
3. Define "personal supervision," following the state of Texas' definition: "guidance and instruction provided to an assistant radiographer by the radiographer present on the site, in visual contact with the assistant while the assistant is using sources of radiation, and in such proximity that immediate assistance can be given if provided."
4. Change "field examination" to "practical examination" for clarity. Use of the word "field" implies that such examinations may be conducted in the field during production radiography. Quoting from page 12 of the NRC Sept. 1984 Standard Review Plan: "Under no circumstances is it acceptable for a prospective radiographer's assistant to receive training and instruction during actual radiographic operations. Instruction in the use of equipment must be in a training session and not during the actual performance of radiography." Such a restriction should apply to any individual whose competency with radiographic equipment has not been determined, so all practical examinations taken by prospective assistants, radiographers, or radiographers with previous experience should be conducted as special training sessions where production is not a concern. Use of the term "field examination" clouds this issue.

5. In Florida, a "field station" as defined in the proposed regulations would likely be required to have a separate license, because our regulations (section 10D-91.314, F.A.C.) require a separate license for any site, base or facility created or maintained to support more than one job or created or maintained for more than two years. Due to the term's conflict with our licensing requirements, we recommend that it be deleted.
6. Define "lay-barge radiography" as "industrial radiography performed on any water vessel used for laying pipe." The term is needed for a recommended section on underwater, offshore platform, and lay-barge radiography (see below).
7. Define "lock-out survey" as "a radiation survey performed to determine that a sealed source is in its shielded position before moving the radiographic exposure device or source changer to a different temporary job site or before securing the radiographic exposure device or source changer against unauthorized removal." The term is needed for our recommendation regarding performance and documentation of lock-out surveys (see below).
8. Define "offshore" as "within the territorial waters of the United States of America." The term is needed for a recommended section on underwater, offshore platform, and lay-barge radiography (see below).
9.
 - A. Change "radiographer's assistant" to "assistant radiographer." The latter is more concise, and is in use throughout the industry.
 - B. Use "assistant" as a synonym when referring to an "assistant radiographer" (or "radiographer's assistant" if 4.A. is not adopted). Use of "assistant" in the regulations and regulatory guides (after it has been defined) and makes it a much easier reference when using the term. For an example of how using "assistant" is better than the longer version, refer to Recommendation No. 3.
 - C. Redefine "assistant radiographer" (or "radiographer's assistant" if 4.A. is not adopted) as "any individual who has successfully completed the training requirements of 14.43 and who under the personal supervision of a radiographer, uses radiographic exposure devices, source changers, sealed sources of radiation, related handling tools or radiation survey instruments in industrial radiography."

10. Define "radiographer instructor" as "an individual who meets the requirements of 34.43 and who has been authorized by the Commission to provide radiation safety training." Radiographer instructors should be required to have the same minimum qualifications as a RSO. The need for the term is described further in Recommendation No. 2 under 34.13, below.
11. A. Change "radiography" to "industrial radiography" but permit use of "radiography" as a synonym. The term "radiography" has medical uses, so defining the term with the addition of "industrial" distinguishes the industrial nondestructive testing nature of the regulated activity being referenced.
B. Redefine "industrial radiography" (or "radiography" if 6.A. is not adopted) as "the examination of the structure of materials by nondestructive methods, using sealed sources of by-product materials to make radiographic images."
12. Define "residential location" as "any area where structures in which people lodge or live are located, and the grounds on which these structures are located, including, but not limited to, houses, apartments, condominiums, and garages." The term is needed for proposed new section which prohibits storage of radiographic equipment at residential locations (discussed below).
13. Change "temporary jobsite" to "temporary job site." "Jobsite" is not a proper word; it should be two words, not one, as used in your proposed definition.
14. Under the definition of "sievert," the term "rem" is used: "(1 Sv = 100 rems)." The correct plural form of "rem" is still "rem," not "rems." The unit is an abbreviation for "radiation equivalent man." Therefore, change the definition to "(1 Sv = 100 rem)." Examples of users of the plural "rem" are: the National Council on Radiation Protection and Measurements, Herman Cember's "Introduction to Health Physics" textbook, and Oak Ridge Associated Universities (ORAU). All such references in Part 34 should be revised to use plural "rem."

34.13(b)

The regulations should specify the minimum acceptable means of determining radiographers' and assistants' knowledge and understanding of regulations and procedures. The guidelines stated in the NRC's applicant guide should be established as the minimum accepted.

Licensees should be required to provide prior notification of any training class to be conducted. Adequate initial radiation safety training is critical for ensuring safe work practices. However, due to the financial burden of providing such training, radiography licensees have falsified training documents and failed to provide adequate radiation safety training to their workers. Requiring prior notification of scheduled training classes would increase the likelihood that the training will be conducted, and with such notification, the Commission would be able to randomly audit courses to determine compliance. Other than increased performance of field inspections, auditing of radiation safety training courses is the best way to improve the safety record of the industry.

34.13(c)

Certification of radiographers by third parties should not relieve the Commission (or any regulatory agency) from evaluating each licensee's training program. The Commission should not permit substitution of radiographer certification in place of the description of the means to determine the radiographer's knowledge and understanding of the subjects outlined in 34.43(f). The Commission should continue to require submittal of such descriptions in order to evaluate each licensee's radiation safety training program to verify that it meets minimum program requirements specified in the regulations. Licensees' training programs should be designated as one of two types: "limited" or "full" training programs. The training requirements should remain essentially the same as described in the NRC's standard review plan, except they should be specified in the regulations.

A licensee with a "limited" training program would be restricted to certifying assistant radiographers and recertifying previously qualified radiographers. Licensees with "limited" training programs would be required to certify new radiographers by having an approved third party provide 40 hours of radiation safety training covering 34.43(f) subjects. Workers completing the 40 hour course would then be required to pass a third party-administered exam for certification as new radiographers. A practical exam provided by the licensee should remain a requirement.

Licensees with a "full" training program should be required to submit a detailed description of their 40 hour radiation safety course, and the names and qualifications of their radiographer instructors. As stated above, radiographer instructors should be required to have the same minimum qualifications as a RSO. Following completion of the training course, they should be required to successfully complete a third party-administered exam to be certified as radiographers.

34.43

1. Replace "field examination" with "practical examination" and specify that practical exams on equipment use shall not be conducted during actual radiography operations where production is a concern.
2. Require practical exams to be conducted by a radiographer instructor meeting the requirements set for an RSO.
3. Specify the minimum number of hours of initial training for assistant radiographers, radiographers, and previously certified radiographers, and minimum qualifications for instructors.
4. Specify the amount of on-the-job training (OJT) required for an assistant radiographer to become eligible to be a radiographer. An assistant radiographer should be required to complete a minimum of 520 hours of supervised radiography to become eligible for certification as a radiographer. An appendix listing the subjects to be covered during the OJT should be provided. Florida provides such an appendix of subjects (taken from NCRP Report No. 61) to our licensees, and requires each licensee to confirm that the subjects will be covered during OJT.

34.43(c)

Specify the minimum number of hours of annual periodic training required (we recommend 8 hours minimum), and require that periodic training be conducted by instructors meeting the same requirements as set for an RSO.

34.43(d)

Require individuals conducting annual internal inspections per 34.13(4)(e) to have the same minimum qualifications as required for an RSO. An experienced radiographer is best able to evaluate the performance of other radiographic personnel.

34.47(a)

Drop the requirement for use of alarm ratemeters by radiographic personnel. (A) The presence of an alarm ratemeter may serve to increase the chance of an overexposure, because radiographers may stop using their survey meter and depend on their ratemeter to alert them of presence of a very high radiation field. While not intended, ratemeters provide radiographic personnel with an alternative to performing required surveys. (B) Proper use of ratemeters is very distracting and annoying; they alarm each time the source is cranked out of its shielded position, and workers may turn the meter off rather than listen to it constantly alarm. (C) There are too many

uncertainties regarding the performance and suitability of ratemeters. Battery failure may affect their calibration, the recommended decibel levels are often inadequate for the work environment, many models can easily be reset in the field, etc. Proposals to require headphones and/or vibrating mechanisms merely reemphasize the fact that alarm ratemeters are an attempt to engineer a solution to the failure of radiographic personnel to properly use their survey meters as required. (D) When personnel are properly instructed on the importance of performing surveys and use their survey meters as required, alarm ratemeters are unnecessary. (E) Increased enforcement and auditing of training classes would go much farther to improve safety than the requirement for alarm ratemeters.

34.47(c)

1. Change the annual calibration frequency for pocket dosimeters to periods not to exceed 6 months. The harsh environmental conditions radiographers work under in the field leads to a higher incidence of damage than in other work environments (such as hospitals) where annual dosimeter calibration is acceptable. As the only direct means of determining exposure in the field, it is important that pocket dosimeters' accuracy be maintained to the extent possible.
2. Change the permissible acceptance criteria when testing pocket dosimeters for response to radiation from +/- 30 percent accuracy to +/- 20 percent. While 30% is the permissible acceptance criteria listed in NRC Reg. Guide 8.4, no one in the NRC has been able to explain why the acceptance criteria was lowered from the +/- 10 percent listed in ANSI N322-1977 for manufacturers of dosimeters. The regulations should state that pocket dosimeters must meet the criteria in ANSI N322-1977, and should not drop the standard's +/- 10 percent acceptance criteria to +/- 30 percent, like Reg. Guide 8.4 does. Representatives of both Dosimeter Corp. and Victoreen agree that 30 percent is too lax, and recommended the change to 20 percent.
3. Testing pocket dosimeters for electrical leakage (drift check) should be required. Justification is based on:
 - (1) Compatibility with national standards. In ANSI N13.5-1972, the standard defines essential performance characteristics which apply to direct reading pocket dosimeters. Under Part 9. "Accuracy," Subpart 9.3 states that "the discharge of a full charged dosimeter with a range of 100 milliroentgens or more shall not exceed 2 percent of full scale in 24 hours..." In ANSI N322-1977, the standard defines the procedures to be used by manufacturers in testing direct reading dosimeters. Under 7.2 "Test for Electrical Leakage," Subpart 7.2.1 states that "A fully

discharged dosimeter shall discharge no more than 5 percent per 48 hours." The standard states that "since operational decisions may be based on information provided by pocket dosimeters, it is essential that reliability be the key factor in their...testing." The standard goes on to state that for the user, "as a minimum, the electrical leakage (drift test) and calibration tests... should be performed."

- (2) Recommendations from manufacturers. Representatives of Dosimeter Corp. and Victoreen, Inc. both recommended performance of drift checks for pocket dosimeters. In addition, the following is quoted from section IV of Amersham Corp.'s "Gamma Radiography Radiation Safety Handbook": "Charge leakage, also referred to as drift, affects the performance of the dosimeter. The leakage rate should be no greater than 2 percent of the full scale reading in a 24 hour period."
- (3) Current practices by users. Florida checked with four nuclear plants using direct reading pocket dosimeters; all had calibration procedures requiring performance of drift tests (they also used a +/- 10% acceptance criteria for response to radiation).
4. An additional quality control check for pocket dosimeters is the test for geotropism - the effect of gravity on the dosimeter's indicator. Radiography training classes should be required to include instructions for performing pocket dosimeter field checks for physical damage, geotropism and kick (change in reading after charging).
5. Require pocket dosimeters to bear labels identifying the device's date of calibration and the vendor that performed the calibration, and require that records of dosimeter calibrations be retained on file for inspection purposes.

24.53

1. Add the statement, "Posting of Very High Radiation Areas is not required." The failure to reference 20.1903(c) in the section implies that the Very High Radiation Area need not be posted during radiography, but its exclusion in the proposed definition is inadequate to ensure that confusion over posting the Very High Radiation Area does not result. It does not make sense to require posting of a third area during performance of radiography, because the requirements to post and control the High Radiation Area should be sufficient to restrict access to the Very High Radiation Area. It is important to clarify that Very High Radiation Areas do not need to be posted during

industrial radiography, because radiographic operations may create areas which meet the posting requirements of 20.1903(c). The requirement to control entries into Very High Radiation Areas specified in 20.1602 should not present the same problem, because access control is in place at the High Radiation Area boundary.

2. Add the statement "Each sign used to post areas in which radiography is being performed shall bear the words "KEEP OUT." The words "CAUTION" and "DANGER" serve as inadequate warnings for industrial radiography conducted at temporary job sites. Non-radiation workers often fail to heed the "CAUTION" warning. They are often not knowledgeable in the meaning of the radiation symbol, and associate the word "CAUTION" with blinking caution lights used as traffic warnings, which translate into instructions to proceed with caution. This is not the intent of posted restricted areas established for radiography, but it is often the result. The warning "DANGER" is also ignored, though less frequently. Adding the warning "KEEP OUT" to signs used to post Radiation Areas and High Radiation Areas leaves no room for doubt to anyone faced with the posted notice. This recommendation is one of the simplest and most cost-effective methods of reducing the likelihood of exposing members of the public to radiation. The recommendation is also in keeping with the ALARA philosophy of instituting any reasonable method of avoiding unnecessary exposure. Many licensees' warning signs already comply with these recommendations, because their experience has been that the additional warning is needed to improve their ability to restrict access to their operations.

3. Require that the rope or tape used to post restricted areas established for radiography be colored magenta and yellow. This is a reasonable, inexpensive requirement, it cuts down on confusion with other barriers established at construction sites, and most licensees are already in compliance. Requiring use of magenta and yellow barricade rope or tape helps to ensure that if a sign is not visible, the standardized colors for radiation remain to serve as a warning to unauthorized personnel to keep out. Another reason to require radiation colors is because construction sites are often littered with yellow/black caution tape to identify hazardous site conditions. Workers become immune to such warnings and often tend to ignore them; the chances of this happening is reduced when magenta and yellow colored tape is used.

Subpart E Recordkeeping Requirements

A survey of the radiographic exposure device or source changer should be required immediately upon removal from storage, and the highest reading resulting from the survey should be required to be recorded. Justifications for this

KEEP-OUT
SURVEY →

requirement: (1) It ensures that the radiation levels on exterior surfaces of the device do not exceed allowable levels before departure for a field site; (2) The survey results can be compared to the last survey taken when the device was last returned to storage to verify that the source remains in its shielded position; (3) The survey results provide a base reading for the rest of the shift; if any survey following an exposure varies from the initial reading, the radiographer knows that something is awry (for example, if the reading is too low, a source disconnect would be indicated; if the reading was too high, it would indicate that the source had not been returned completely to the shielded position); and (4) recording the initial survey results would allow inspectors to verify compliance with applicable regulations and the licensee's procedures for performing surveys, and to have documentation which would be useful in an investigation of an overexposure.

Permanent Storage Precautions

Add a new section modeled after the state Texas' 31.52(b), which prohibits storage of exposure devices, source changers and transport containers at residential locations.

Underwater, Offshore Platform, and Lay-Barge Radiography

Consideration should be given for inclusion of regulations similar to Texas' 31.57. However, the 31.57(b)(2) requirement for use of collimators should be eliminated.

ALARA

Using 34.1101 as justification, we recommend adopting a requirement for all radiography licensees to establish internal Investigational Exposure Levels (IELs) which if exceeded, require an investigation by the Radiation Safety Officer to determine the cause of the unnecessary exposure and to determine the corrective actions to be taken to prevent recurrence. In Florida, we recommend that our licensees adopt a monthly IEL of 300 millirem and a quarterly IEL of 600 millirem. These administrative levels cause the licensee's management to monitor their workers' occupational exposure records to ensure that unnecessary exposures are avoided. We provide guidance to our licensees for establishing the ALARA component of their radiation protection program. We recommend that the Commission consider adopting a similar requirement.