

**STAFF RESPONSES TO PUBLIC COMMENTS
ON DRAFT REGULATORY GUIDE DG-8028,
“CONTROL OF ACCESS TO HIGH AND VERY HIGH RADIATION AREAS
IN NUCLEAR POWER PLANTS”**

In issuing Draft Regulatory Guide DG-8028 as proposed Revision 1 of Regulatory Guide 8.38, the staff’s purpose was to eliminate ambiguous terminology used in the original version of the guide and more clearly describe explicit or implied staff positions. Consequently, no backfit was intended with this revision. The comments received can be grouped as follows:

- (1) **Backfit:** Several comments requested new or revised staff positions. While some of these suggested revisions would have marginally enhanced the guide, they were clearly backfits and outside the scope of the revision because no backfit was intended.
- (2) **Technical Specifications (TS):** Several comments requested that the revised guide provide guidance on how licensees should demonstrate compliance with their technical specifications, which allow alternative access controls for high radiation areas. These suggestions are clearly outside the scope of this revision, which is intended to provide guidance on how licensees may comply with NRC regulations (e.g., 10 CFR Part 20). It is not appropriate for regulatory guides to provide guidance on technical specifications.
- (3) **Other:** Several comments indicated that the revision did not fully achieve the intended clarity in Regulatory Positions 1.6 and 4.2. Consequently, the staff has reworded and reorganized Regulatory Position 1.6 to more clearly distinguish between temporary vs. permanent shielding (which is part of the plant design), and shielding that can be removed by hand if not secured in place vs. shielding that cannot be removed without the aid of lifting devices. Also, an internal stakeholder noted that the criterion of 1,000 mrem/hr for areas that should have alarming radiation monitors would constitute a backfit from the established staff position that the original version of the guide intended to incorporate. Therefore, the staff also revised item (3) under Regulatory Position 1.6 to reflect the current staff position, as documented on page 12.3-7 of NUREG 0800, “Standard Review Plan,” Rev. 2, dated July 1981.

In addition, comments noted that the addition of item (4) to Regulatory Position 4.2 incorrectly implied that the areas above and around the spent fuel and refueling pools are required to be controlled as high or very high radiation areas when divers are in the pools. Therefore, the staff deleted the proposed item (4) and revised the preceding text to note that the accessibility of the high and very high areas *within the pool* changes when divers are in the pools.

Responses to these and other comments received on Draft Regulatory Guide DG-8028 are provided below.

A. Introduction

Comment #1: *Paragraphs 2 and 3 should be deleted. Necessary information should be incorporated into the text sections of the guide.*

Response: The NRC staff believes that the suggested deletions are not warranted. Paragraph 2 delineates the content of Appendices A and B, while Paragraph 3 specifies the role of the NRC's regulatory guides and their relationship to the agency's regulations (based on questions previously asked by licensees).

B. Discussion

Comment #2: *Page 2, last sentence: Although the language has not changed from the previous revision of this guide, the draft is defining an accessible area as one that can be reasonably occupied by a major portion of an individual's whole body. Per the 10 CFR 20 definition of whole body, the whole body is the head, trunk (including male gonads), arms above the elbow, or legs above the knee. Because "or" is used instead of "and", a portion of any of these body parts is interpreted by some inspectors as a major portion of the whole body. That renders the definition of accessible useless for the license. Licensees are left with a practical definition of accessible that is "if any portion of the person, other than the extremities, can occupy a space, that space is considered accessible".*

Response: As indicated in this comment, 10 CFR Part 20 defines "whole body" as the head, trunk (including male gonads), arms above the elbow, or legs above the knee. An accessible area is one that can be occupied by one or more of these major portions of the whole body. If the maximum dose rate that can be experienced by any of these major portions of the whole body, while occupying such an area, is greater than 100 mrem (1 mSv) in 1 hour, that area is a high radiation area as defined by 10 CFR Part 20.

Regulatory Position 1.2.1. Access Control Procedures

Comment #3: *Page 3, §1.2.1(7): Recommend changing "placement of continuously indicating dose rate measuring instrumentation and alarming dosimeters" to "placement of alarming dosimeters." Although it is true that most electronic dosimeters have a dose rate function built in, the electronic dosimeter display is typically set to show dose accrued. The phrase "continuously indicating dose rate measuring instrumentation" is more typically applicable to survey meters. For these, placement is not the issue. Taken, literally as written, the regulatory guide seems to be requiring electronic dosimeter displays to be set to display dose rate rather than dose accrued.*

Response: The staff has revised Item 7 to refer to "placement of measuring and alarming dosimeters."

Regulatory Position 1.5. Physical Controls

Comment #4: *With regard to the second sentence in this paragraph, will the use of signs and ribbon/rope only be sufficient enough to meet the intent of such a barrier? Or will licensees be required put up physical barriers (i.e., fencing) around all high radiation areas?*

Response: As stated in Regulatory Position 1.5, barriers used to control access to high radiation areas, in accordance with 10 CFR 20.1601, should provide reasonable assurance that they secure the area against unauthorized access and cannot be easily circumvented. Physical barriers (such as chain link fencing or fabricated walls) may be used to prevent unauthorized access to high radiation areas.

Comment #5: *The “6 foot” specification has been omitted. Will this create enforcement issues over 6-foot tall versus 2-meter tall fencing?*

Response: To eliminate confusion, the staff has revised the discussion to refer to “A fence that is 2 meters (approximately 6 ft) high.”

Comment #6: *Page 4, §1.5, second and third sentences: Instead of “prevent inadvertent entry” as in the current version, the draft uses what appears to be a more stringent phrase “secure the area against unauthorized access and cannot be easily circumvented.” The next parenthetical sentence attempts to explain the meaning but is making the adequacy of the barrier dependent upon the psyche of the individual.*

Response: The use of the term “inadvertent entry” in this section of the regulatory guide has caused confusion in interpretation of the guidance in this section. Thus, the purpose of this revision is to clarify the discussion of this and other identified ambiguous language. There is no change to the regulatory positions provided in this regulatory guide.

Comment #7: *Additionally, for nuclear plants governed by Technical Specifications for high radiation areas, the physical controls of §1.5 for high radiation areas appear to be not applicable because the recommendations of §1.5 are much more stringent than typical Technical Specification controls, §2.4. Please address the applicability of §1.5 for plants using Technical Specification controls for high radiation areas, making it clear whether §1.5 applies in these cases. For very high radiation areas, because there are no Technical Specification controls, one could assume that §1.5 would apply.*

Response: As stated in the introduction, the purpose of the NRC regulatory guides is to provide guidance on how to comply with the agency’s regulations (e.g., 10 CFR Part 20). This comment suggests that the revision provide guidance on how licensees should demonstrate compliance with their technical specifications that allow alternative access controls for high radiation areas; however, as previously noted, this is not the intent of this guide. Therefore, this comment is outside the scope of this revision.

Comment #8: *Section 1.5 - (a) the terms “prevent unauthorized personnel access” and “inadvertent entry” should be defined; (b) the parenthetical statement beginning with the wording about fence height should be considered for deletion; and (c) the term “exceptional measures” should be defined.*

Response: (a) The second and third sentences in Regulatory Position 1.5 define “prevent unauthorized personnel access.” The term “inadvertent entry” has been removed from the guide, except when quoting the requirements in 10 CFR 20.1602.

(b) The parenthetical sentence (which does not begin with wording about fence height) should not be deleted because it provides guidance on unauthorized access — a frequently asked question.

(c) Webster’s Dictionary defines “exceptional” as synonymous with “unusual” or “extraordinary,” and “measures” as “an action as a means to an end.” As used in this regulatory guide, an “exceptional measure” is an unusual or extraordinary action taken as a means to an end (i.e., to access the area). The staff has revised the guide to clarify this term.

Comment #9: *The example for unauthorized personnel access “an individual who incorrectly assumes, for whatever reason, that he or she is authorized to enter the area, would be unlikely to disregard and/or circumvent the barrier” is also relatively vague.*

Response: The staff believes that the parenthetical sentence in Regulatory Position 1.5 provides sufficient guidance regarding unauthorized personnel access.

Comment #10: *If a person can deliberately circumvent a two meter barrier by climbing on system cable trays, piping or conduit supports, does that qualify as “unlikely to disregard and/or circumvent the barrier”?*

Response: Regardless of whether the entry is deliberate, a barrier that can easily be circumvented without the use of exceptional measures, does not provide reasonable assurance that unauthorized access is prevented.

Comment #11: *Some evaluators have implied that a LHRA barrier must be impenetrable, such that a deliberate attempt to circumvent the barrier is impossible.*

Response: As stated in Regulatory Position 1.5, barriers used to control access to high radiation areas should provide reasonable assurance that they secure the area against unauthorized access and cannot easily be circumvented. However, deliberate circumvention of a physical barrier cannot absolutely be prevented. Such instances should be addressed with appropriate disciplinary action.

Comment #12: *If a person can reach their arm into a Locked High Radiation Area (LHRA) does that constitute an entry?*

Response: See the staff’s response to Comment #2.

Comment #13: *Is there a maximum dimension for a gap at the perimeter of a barrier or within the barrier itself for a LHRA?*

Response: The maximum dimension should be such that an individual would not be able to go through the gap.

Regulatory Position 1.6. Shielding

Comment #14: *In Section 1.6, the proposed revision includes guidelines applicable to the use of shielding to ensure inaccessibility of a high or very high radiation area. We suggest the following changes to help improve the clarity and consistency in applications of the guidelines:*

- a. *In item (1) clarify that shielding that is secured by wire, bolts or other, means that would require the use of wire cutters or other tools to remove is not considered to be “readily removable.” This is analogous to other guidance provided in this regulatory guide that determined circumvention of controls cannot be prevented absolutely, and that such instances should be addressed through other means.*
- b. *In item (2) clarify that the guidance on periodic verification is applicable to shielding that is “readily removable” as defined in item (1). Also, add clarification that recognizes that the guidance on verification is not intended to lead to additional exposure of survey personnel or unnecessary burden - i.e., it should be accomplished within the routine surveillance program, and not as a special surveillance.*
- c. *Item (3) includes guidance on the use of local alarming radiation monitors for situations involving removable shielding where the unshielded dose rates could exceed 1,000 mrem/hr. Add clarification that, in the case of the use of a local alarming radiation monitor, “periodic verification” as described in item (2), should consist of periodically verifying the operability of the monitor. The monitor itself, if operable, is the means for verifying the effectiveness of the shielding.*

Response: Section 1.6 has been reworded and reorganized to apply to shielding used for the purpose of controlling access, as follows:

- (1) Blankets, bricks, or other portable shielding that could be moved by hand should be secured in place by lock-wire, ties, bolts, or other fasteners that would require a tool to remove. Block walls that are designed into the plant and also provide shielding, or shielded hatches, plugs, or covers that require a hoist or crane to move, are not considered removable by hand.
- (2) The shielding or shielded access should be posted with an appropriate warning sign, such as “Warning, do not remove. High radiation levels may result,” or “Danger, do not remove. Very high radiation levels may result.”
- (3) Local audible and visible alarming radiation monitors should be installed to alert personnel if temporary shielding, used to control access to the spent fuel transfer tube or other plant areas of greater than 100 rads/hour (1 Gy) is removed.
- (4) The facility’s routine radiological surveillance program should verify the effectiveness of the temporary shielding and/or (if appropriate) operability of the alarming radiation monitors.

Regulatory Position 2.2. Positive Access Control

Comment #15: *Do the access control requirements apply to high radiation areas that are normally “maintained locked” or to actual “locked high radiation areas” as in Tech Spec (i.e., >1000 mrem/hr) high radiation areas?*

Response: The regulatory guidance in this guide applies to the control of and access to high and very high radiation areas, as required by 10 CFR 20.1601 and 1602. With the exception of Regulatory Position 2.4, which provides guidance regarding the content of a request for approval of alternate controls under 10 CFR 20.1601(c), this guide does not address compliance with any particular set of alternative access controls approved as technical specifications to a license.

Although, it can be reasonably inferred that a staff position on what constitutes a “locked area” (for areas that 10 CFR Part 20 requires to be locked) also applies to radiological areas that specific license conditions (or technical specifications) require to be locked, it is not appropriate for regulatory guides to provide guidance regarding compliance with technical specifications.

Comment #16: *Section 2.2 - Consideration should be given to the deletion of the five numbered items.*

Response: The staff believes that deleting the specified items would not enhance the guide and would alter the staff’s position in a manner that would result in a backfit.

Comment #17: *Item (5) requires all authorized entries and exits into high radiation areas to be documented. This is not a new requirement, but what suffices as documentation? Would RWP login/out records suffice?*

Response: The staff believes that login/out records constitute documentation of entry/exit.

Regulatory Position 2.4. Alternative Methods for Access Control

Comment #18: *The “stay time” provisions appear to go beyond wording of regulation or Technical Specifications.*

Response: This comment suggests that the revised regulatory guide provide guidance on how licensees should demonstrate compliance with technical specifications that allow alternative access controls for high radiation areas. As such, this suggestion is outside the scope of this revision, which is intended to provide guidance on how to comply with NRC regulations (e.g., 10 CFR Part 20).

Regulatory Position 4.2. Spent Fuels Pools, Reactor Vessels, and Refueling Cavities

Comment #19: *In Section 4.2 the proposed item (4) regarding diving operations should be revised to clarify that the guidance is applicable to the diving operation itself, as it relates to accessible sources of high and very high radiation dose-rates within a spent fuel pool, reactor vessel, or refueling cavity area. As written, the proposed guidance may be misconstrued to imply that the entire spent fuel pool, reactor vessel, or refueling cavity area should be controlled as a high or very radiation area whenever diving operations are taking place.*

Response: The staff has deleted Item (4) from Regulatory Position 4.2, and added the following parenthetical statement between the second and third sentences:

“Diving operations can make the high and very high radiation areas in the pools accessible. See Regulatory Position 4.3, below, for guidance on access control of divers.”

Comment #20: *The draft adds item (4) Diving operations are not being conducted in the pool” as another requirement if the pool is not to be controlled as a very high radiation area. Many facilities use divers in either the spent fuel pool or the reactor cavity. Divers are sometimes physically restrained from entering areas where very high radiation levels may be encountered by use of a tether or underwater “cage.” For those cases, whether or not there is a diver in the pool should not be a criterion for not controlling the pool as a very high radiation area because, due to physical restraints, the places where very high radiation levels exist are not accessible. The question arises as to how a pool would be controlled as a very high radiation area. Would this require the floor to ceiling fence? There are typically no keys to control. It appears that all controls would be administrative.*

Response: The staff has deleted Item (4) from Regulatory Position 4.2, and revised the preceding text to note that the accessibility of the high and very high areas *within the pool* changes when divers are sent into the pool. This change clarifies the implication that areas above and around the spent fuel and refueling pools are required to be controlled as high or very high radiation areas when divers are in the pools.

Comment #21: *The Reg. Guide specifies these pool areas do not have to be controlled as high or very high radiation areas solely because of the materials in them, provided that the following criteria are fulfilled: Diving operations are not being conducted in the pool, has been added as one of the criteria listed. This would seem to imply that once a diver enters the water, that pool area should now be controlled as a Very High Radiation Area.*

- *These pools by design do not lend themselves well to locking as a means for VHRA access control, as required by section 3. Are the alternative methods for access control listed in section 2.4 intended to be employed during diving operations in a given pool?*
- *If diving in a refueling cavity when there is no nuclear fuel present, are VHRA controls still required? The way this guidance is written leaves its implementation subject to interpretation. A VHRA access violation based on an evaluator interpretation that is different than that perceived by the site would be a significant event.*

Response: The staff has deleted Item (4) from Regulatory Position 4.2, and revised the preceding text to note that the accessibility of the high and very high areas *within the pool* changes when divers are sent into the pool. This change clarifies the implication that areas above and around the spent fuel and refueling pools are required to be controlled as high or very high radiation areas when divers

are in the pools.

Regulatory Position 4.3. Procedures for Diving

Comment #22: *Consideration should be given to the deletion to the second sentence and to deletion of Appendix A. As necessary, some of the information in Appendix A could be written into the text section. An example might be reference to use of a specific Radiation Work Permit for diving operations.*

Response: The staff does not believe that the suggested deletions are warranted. However, the staff has replaced the phrase “increasingly being” with “commonly.”

Appendix B

Comment #23: *Appendix B - Via incorporation of the comments above, Appendix B should be considered for deletion. Much of Appendix B is informational in nature and not required to understand the methods deemed acceptable by NRC for implementing requirements. The list of operating-experience documents specified or described in the Appendix could be updated and placed into an informational document available to NRC inspectors, licensees, and the public. If deemed appropriate, limited information from the six sections of the Appendix (those with a section title) could be added into the text sections of the regulatory guide. Such a relocation should be considered only for information which is necessary and sufficient to understand the methods acceptable to NRC for implementing the regulations. An example might be reference to development of a specific Radiation Work Permit for the work activity and to development of elements of a contingency plan for a BWR drywell for a dropped fuel bundle (e.g., communications methods to ensure a prompt evacuation of upper elevations of the drywell).*

Response: The material in Appendices A and B is informational in nature and, therefore, is not included in the body of the regulatory guide. It is appropriate to maintain these appendices to distinguish between regulatory guidance and informational material.

General Comments

Comment #24: *There are several phrases that need to be more clearly defined for the document to be of real value to licensees. These include “inadvertent entry”, “prevent unauthorized personnel access”, and “exceptional measures”. Licensees should work with the NRC to achieve a consensus view regarding those terms as they apply to control of access to high radiation areas.*

Response: See the staff’s response to Comment #8.

Comment #25: *To enhance value to licensees, the document should be written to more directly correlate the level of control with the level of risk significance. Similarly, document utility may be enhanced by delineating what NRC considers to be a performance-based failure to implement regulatory requirements rather than delineating detailed administrative elements that NRC may consider to demonstrate compliance with the regulatory requirements.*

Response: This suggestion recommends a new or revised staff position. While this suggestion would marginally enhance the guide, it would constitute a backfit and, therefore, is outside the scope of this revision.

Comment #26: *Several occasions in the draft, the phrase “past experience” is used. Suggest just using “experience” since all experience is “past.”*

Response: The staff believes that the phrase “past experience” conveys the correct meaning. Experience can be past, recent, current, or even ongoing.