February 12, 2016

MEMORANDUM TO: Kenneth O'Brien, Director
Division of Reactor Safety
Region III

FROM: Mirela Gavrilas, Deputy Director ***/RA/***
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: FINAL RESPONSE TO TASK INTERFACE AGREEMENT 2014-09, RECORDING AND REPORTING OF OCCUPATIONAL RADIATION DOSE

By memorandum dated October 6, 2014 (Agencywide Documents Access and Management System Accession No. ML14279A551), the U.S. Nuclear Regulatory Commission (NRC) Region III office requested assistance from the Office of Nuclear Reactor Regulation to determine the appropriate threshold for recording and reporting occupational dose determined by calculation. The NRC identified this concern during an inspection in August 2014. Region III requested assistance answering the following three questions:

1. Under what conditions can a licensee establish a value below which occupational dose (whether determined by calculation, assessment, or measurement) is not recorded or reported to the NRC?

2. What is an acceptable minimum threshold for recording levels and/or reporting levels for occupational dose?

3. What are the appropriate mechanisms for communicating the results of this Task Interface Agreement to external stakeholders, including dialogue with the Electric Power Research Institute, regarding the language in *"Guidelines for Industry Response to Personnel Contaminations,"* Revision 1?

CONTACT: Holly D. Cruz, NRR/DPR
(301) 415-1053

NRC staff plans to discuss the closure of this issue with the nuclear power industry at annual Nuclear Energy Institute Health Physics INFO-Forums. However, based on the low safety significance, no further regulatory action is necessary. The basis for this position can be found in Section 3.0 of the enclosure.

Enclosure:
Task Interface Agreement

NRC staff plans to discuss the closure of this issue with the nuclear power industry at annual Nuclear Energy Institute Health Physics INFO-Forums. However, based on the low safety significance, no further regulatory action is necessary. The basis for this position can be found in Section 3.0 of the enclosure.

Enclosure:
Task Interface Agreement

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TASK INTERFACE AGREEMENT 2014-09

RECORDING AND REPORTING OF OCCUPATIONAL RADIATION DOSE

1.0 INTRODUCTION

By memorandum dated October 6, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14279A551), the U.S. Nuclear Regulatory Commission (NRC) Region III office requested assistance from the Office of Nuclear Reactor Regulation to determine the appropriate threshold for recording and reporting occupational dose determined by calculation. The NRC identified this concern during an inspection in August 2014. This request will require the development of a technical position that should apply to all NRC licensees, not just operating power reactors. To focus the effort, Region III requested assistance answering the following three questions, which are in alignment with the purpose of the assessment:

1. Under what conditions can a licensee establish a value below which occupational dose (whether determined by calculation, assessment, or measurement) is not recorded or reported to the NRC?

2. What is an acceptable minimum threshold for recording levels and/or reporting levels for occupational dose?

3. What are the appropriate mechanisms for communicating the results of this Task Interface Agreement to external stakeholders, including dialogue with Electric Power Research Institute (EPRI), regarding the language in *"Guidelines for Industry Response to Personnel Contaminations,"* Revision 1?

2.0 BACKGROUND

Region III inspectors identified several occasions in which the licensee calculated occupational exposure to radiation but did not report the results because the exposure did not exceed its self-imposed reporting threshold.

One example occurred during replacement of control rod drive housing at a Region III plant when a worker unexpectedly grabbed the highly contaminated thermal sleeve (4 R/hour) after cutting it from the reactor head. The licensee determined that using finger rings would have been required if touching the thermal sleeve had been a planned activity. Because finger rings were not issued or worn, the licensee performed a dose calculation to determine the magnitude of the shallow dose equivalent to the extremity. The results of the calculation were 116.7 millirem (mrem), which is less than the 500 mrem reporting threshold, so no dose was recorded or reported for this event (Ref. 1).

The inspectors determined the following:

- Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1502, "Conditions Requiring Individual Monitoring of External and Internal Occupational Dose," requires licensees to

MONITOR exposures to radiation of adults likely to exceed 10 percent of the occupational dose limits in 10 CFR 20.1201, "Occupational Dose Limits for Adults," or annual limits on intakes in Appendix B to 10 CFR Part 20, "Annual Limits on Intake and Derived Air Concentrations of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage," OR those individuals entering high radiation areas. The subject event occurred in a High Radiation Area.

- Regulations in 10 CFR 20.2106, "Records of Individual Monitoring Results," require NRC licensees to keep records of doses received for individuals that are required to be monitored by 10 CFR 20.1502.

- Regulations in 10 CFR 20.2206, "Reports of Individual Monitoring," require licensees in certain categories to submit an annual report of the results of individual monitoring carried out by the licensee for each individual for whom monitoring was required by 10 CFR 20.1502 during that year to the Radiation Exposure Information and Reporting System (REIRS) project manager.

Considering that the requirement to monitor exposure to radiation is the result of a prospective evaluation, the inspectors reviewed the method the licensee used to perform this evaluation. Licensee procedure EN-RP-202, Revision 9, defines the basis for determining if an individual requires monitoring as:

- individual's requirements to access radiologically controlled areas
- declared pregnant woman

Therefore, because the licensee had predetermined that the individual was required to be monitored, the inspectors concluded that the results of this dose calculation and other similar events should be recorded and reported on NRC Form 5, Occupational Dose Record for a Monitoring Period.

The inspectors believe this might be a generic issue because the licensee procedure appears to be based on EPRI guidance in which EPRI might have mischaracterized NRC requirements.

Licensee's Position

The licensee stated that the practice is aligned with fleet procedures for dose assessment (Ref. 2). The procedure is based on EPRI guidance found in "Guidelines for Industry Response to Personnel Contaminations," Revision 1 (Ref. 3), which states:

Regulatory Limits

The NRC requires a formal dose record to be maintained for any individual that is expected to receive 10% of the skin dose limit. This guideline recommends recording skin dose at 1% of the NRC skin dose limit. The annual limit for skin dose is 50 rem (0.50 Sv). Recent rulemaking has changed the definition and method for calculating shallow-dose equivalents (SDE's). The current rule specifies that the SDE is assigned by averaging the dose over 10 square

centimeters of skin receiving the highest exposure, rather than 1 square centimeter as previously required. In changing the SDE rule, the NRC noted the change could "permit a reduction in the overly conservative use of protective clothing and other devices intended to prevent contamination and skin doses.

The NRC further stated, "As a result, workers should experience reduced exposure to nonradiological health hazards such as heat stress, and be subject to fewer industrial accidents caused by impaired motion."

3.0 EVALUATION

Based on the NRR staff evaluation, the responses to the Region III questions follow:

1. Under what conditions can a licensee establish a value below which occupational dose (that is determined by calculation, assessment, or measurement) is not recorded or reported to the NRC?

NRC licensees are required under 10 CFR 20.2106 to maintain records of all individual monitoring that is required by 10 CFR 20.1502. In addition, 10 CFR 20.2206 requires licensees to report the results of this required monitoring to the NRC REIRS project manager. However, NRC staff recognizes that licensees may supply individual monitoring for personnel in situations that are not actually required by 10 CFR 20.1502 (i.e., voluntary monitoring). Licensees may establish recording and reporting thresholds for the results of voluntary individual monitoring.

An example of voluntary monitoring might be if a licensee prospectively determines that monitoring is not required by 10 CFR 20.1502(a), for external, or 10 CFR 20.1502(b), for internal, exposures but provides monitoring to ensure that the actual exposures received verify the validity of its prospective determination. Regulatory Guide (RG) 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses," Section 1.4, and NUREG/CR-6204, "Questions and Answers Based on Revised 10 CFR Part 20," May 1994, questions 43 and 212, provide additional guidance on voluntary monitoring.

There are several considerations in determining whether individual monitoring provided by the licensee is required by 10 CFR 20.1502 or is voluntary. These include:

- Unless there is a documented prospective determination that individual monitoring was not required (i.e., planned exposure or intakes would not meet any of the criteria in 10 CFR 20.1502(a) or (b)), the fact that monitoring was provided is considered de facto evidence that the licensee had previously determined the monitoring was required by 10 CFR 20.1502.

- If the prospective assessment determined that 10 CFR 20.1502 requires monitoring, recording and reporting of the monitoring results to the REIRS project manager are required under 10 CFR 20.2106 and 10 CFR 20.2206, respectively, even if the actual dose or intakes measured did not exceed the criteria in 10 CFR 20.1502(a) or (b).

- If the results of the confirmatory (voluntary) dosimetry indicate the actual exposure exceeded any of the criteria in 10 CFR 20.1502(a) or (b), the monitoring was required monitoring, regardless of the licensee's original intent.

- The first sentence in 10 CFR 20.1502 is: "Each licensee shall monitor exposures to radiation and radioactive materials at levels sufficient to demonstrate compliance with the occupational dose limits." Calculations of individual occupational dose performed to demonstrate compliance with the occupational dose limits in 10 CFR 20.1201 after an unmonitored, unintended, or uncontrolled exposure is also monitoring required under 10 CFR 20.1502, even if prospective determinations of likely doses from planned activities did not meet the criteria in 10 CFR 20.1502(a) or (b).

Also note that 10 CFR 19.13, "Notifications and Reports to Individuals," requires the licensee to provide an annual dose report to each individual monitored under 10 CFR 20.1502 that exceed 100 mrem, or at the request of the individual.

2. What is an acceptable minimum threshold for recording levels and/or reporting levels for occupational dose?

No provision in 10 CFR Part 20 sets a minimum dose threshold for recording or reporting to the NRC REIRS project manager the results of individual monitoring required by 10 CFR 20.1502. See RG 8.7, Section C.1.2, for additional guidance.

In the example given in the task interface agreement (TIA), the licensee's dose calculation is monitoring required by 10 CFR 20.1502 because it was necessary to demonstrate compliance with the shallow-dose limit to the skin of the extremity (hand) in 10 CFR 20.1201(c). Therefore, the results of that monitoring were subject to the requirements of 10 CFR 20.2106 and 20.2206, even though they were less than 1 percent of that dose limit.

NRC staff has provided guidance on the precision with which the licensees should keep dose records (on NRC Form 4, Cumulative Occupational Dose History) and report occupational doses (on NRC Form 5). The guidance in RGs 8.7, "Instructions for Recording and Reporting Occupational Radiation Exposure Data," and 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses," indicate that the licensee need not enter doses less than 0.001 rem on these forms.

3. What are the appropriate mechanisms for communicating the results of this Task Interface Agreement to external stakeholders, including dialogue with EPRI, regarding the language in *Guidelines for Industry Response to Personnel Contaminations* Revision 1?

The individual sentences in the EPRI TR-1911740 guidance (copied below) are true if applied to monitoring that is not required by 10 CFR 20.1502. However, the guidance, as written, could be read to imply that the NRC has a minimum recording or reporting level of 10 percent of the dose limit. The regulations have no minimum level for recording the results of required personal monitoring.

Regulatory Limits

The Nuclear Regulatory Commission (NRC) requires a formal dose record to be maintained for any individual that is expected to receive 10% of the skin dose limit. This guideline recommends recording skin dose at 1% of the NRC skin dose limit. The annual limit for skin dose is 50 rem (0.50 Sv).

Although NRC staff has not endorsed EPRI 1011740, some licensees (like the one in this TIA example) could incorrectly implement this guidance as a "minimum recording/reporting threshold," contrary to regulatory requirements at 10 CFR 20.2106 "Records of Individual Monitoring Results," and 10 CFR 20.2206, "Reports of Individual Monitoring" (in terms of recording and reporting required dose). However, because the amount of dose that would not be recorded is less than 1 percent of the applicable dose limit, it is unlikely that this performance deficiency would affect the licensee's ability to meet the objective of the Occupational Radiation Safety ROP Cornerstone (i.e., maintain the individual's dose within the limits of 10 CFR Part 20). NRC staff intends to enhance the current guidance on voluntary monitoring in RG 8.34, with other examples of what is, and is not, required monitoring under 10 CFR 20.1502, consistent with this TIA response.

4.0 CONCLUSION

Based on the above assessment, the NRR staff has concluded that there is no minimum threshold for recording or reporting the results of personnel monitoring required by 10 CFR 20.1502 at Palisades Nuclear Plant. However, if the dose results are from monitoring that was not required by 10 CFR 20.1502 (i.e., voluntary monitoring), licensees are free to establish criteria for how to record and report results. Additional discussion is provided to distinguish between required and voluntary personnel monitoring. NRC staff plans to address the recording and reporting requirements of 10 CFR Part 20 by revising the guidance on distinguishing between required and voluntary monitoring in the pending revision to RG 8.34.

5.0 POTENTIAL OUTCOME PATHS

Immediate Implications: Region III can use the clarifications and guidance in this TIA response as inspection program guidance for Palisades.

Generic Implications: The regions can use the clarifications and guidance in this TIA response as inspection program guidance. There are no new staff positions or guidance in this TIA response. NRC staff is revising the guidance in RG 8.34. NRC staff intends to enhance the current guidance on voluntary monitoring in RG 8.34, with examples of what is, and is not, required monitoring under 10 CFR 20.1502, consistent with this TIA response.

Backfit Considerations: Resolution of this issue does not constitute a backfit because it does not involve a new or different position from a previously applicable staff position.

6.0 REFERENCES

(1) Shallow Dose Evaluation Documentation, ADAMS Accession No. ML15187A451.

(2) EN-RP-203, “Dose Assessment,” ADAMS Accession No. ML15197A231.

(3) EPRI Guidelines for Industry Response to Personnel Contaminations, ADAMS Accession No. ML14279A553.

(4) 10 CFR 20.1502, “Conditions Requiring Individual Monitoring of External and Internal Occupational Dose.”

(5) 10 CFR 20.2106, “Records of Individual Monitoring Results.”

(6) 10 CFR 20.2206, “Reports of Individual Monitoring.”

(7) NUREG/CR-6204, “Questions and Answers Based on Revised 10 CFR Part 20, May 1994.”

(8) RG 8.7, “Instructions for Recording and Reporting Occupational Radiation Exposure Data.”

(9) RG 8.34, “Monitoring Criteria and Methods to Calculate Occupational Radiation Doses.”

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Date: