POLICY ISSUE
(Notation Vote)

July 6, 2007 SECY-07-0112

FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations /RA/

SUBJECT: STAFF EVALUATION AND PROPOSED REVISION TO THE PUBLIC RADIATION SAFETY SIGNIFICANCE DETERMINATION PROCESS TO ADDRESS RADIOACTIVE LIQUID SPILLS AND LEAKS

PURPOSE:

To request Commission approval of changes to the significance determination process (SDP). Staff is providing an evaluation on the need to revise the existing SDP for public radiation safety, as directed by the Commission in COMSECY-06-0023. This paper also addresses a recommendation from the Liquid Radioactive Release Lessons Learned Task Force Final Report to revise the Public Radiation Safety SDP to better address the range of events that can occur, including unplanned, unmonitored releases or spills of radioactive liquids.

BACKGROUND:

In May 2006, Region III completed an inspection at Braidwood of an estimated 6.25 million gallons of radioactive liquid which had leaked during several events over a number of years from the vacuum breakers along the circulating water blowdown line. The primary radioactive isotope released was tritium. The Region III inspection report documented a White finding and three violations which addressed several performance deficiencies in licensee performance in response to these leaks. The White finding and violations included the licensee's failure to perform adequate, timely radiological evaluations, which impacted the ability to assess the environmental impact from the releases and mitigate the releases. The licensee also failed to

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assess the potential public impact and did not adequately control licensed material. The inspection concluded that the radiation dose to the public was negligible (much less than 1 mrem). Nonetheless, the multiple failures to adequately evaluate the radiological hazards and assess the environmental impact were determined to be a White finding when evaluated using the Public Radiation Safety SDP. A copy of the current SDP is provided as Enclosure 1.

Additionally, in August 2005, Indian Point Unit 2 discovered a relatively small leak in the spent fuel pool. Indication of leakage from the Unit 1 spent fuel pool was also later identified. Region I completed a special inspection of the licensee's actions to address these leaks about the same time as the Braidwood inspections were completed. Region I found that the Indian Point licensee took prompt action and initiated extensive efforts to characterize the nature and source of the ground contamination and performed a radiological assessment. As a result of the licensee's timely and comprehensive response, the staff did not identify any significant licensee performance deficiencies. Similar to the Braidwood event, the estimated radiation dose to the public at Indian Point due to the leakage was negligible.

Prior to issuing the final Braidwood Inspection Report the staff documented the basis for the White finding in COMSECY-06-0023, dated April 25, 2006 (ADAMS Accession No. ML061390183). In the staff requirements memorandum (SRM) for COMSECY-06-0023, dated May 18, 2006, the Commission approved issuing the White finding for Braidwood, while at the same time directing the staff to make clear the insignificance of the potential public health and safety effects of the radioactive liquid leakage (ADAMS Accession No. ML061380645). The Commission also directed the staff to clearly explain why the current SDP leads to a White finding despite the lack of direct safety significance of the actual spills. The Commission further directed the staff to engage stakeholders to update the SDP to ensure it is consistent with the Reactor Oversight Process (ROP) program goals, including a risk-informed approach to radiation protection, and to make a recommendation to the Commission to either maintain the current SDP or to change it with appropriate justification. The Commission also directed the staff to update the ROP and SDP guidance documents to make them consistent with the NRC's current strategic plan goal of openness.

DISCUSSION:

The staff has worked with internal and external stakeholders and has received feedback on various aspects of the SDP to improve its effectiveness and efficiency. The scope of the review consisted of an evaluation of: (1) the current criteria for a White finding to ensure consistency with risk-informed goals of the ROP; (2) the entry conditions into the radioactive effluent release program branch of the SDP flowchart for spills and leaks; and (3) the SDP to ensure it reflects the strategic plan goal of openness.

Consistency With Risk-Informed ROP Goals

The staff evaluated the current threshold for a White finding to ensure consistency with the risk-informed goals of the ROP and other cornerstones of safety. When the ROP was first developed, it was recognized that probabilistic risk assessment techniques could not generally be applied to the ROP cornerstones of physical security, emergency preparedness, and radiation safety. Therefore, to establish the thresholds for categorizing the significance of findings, expert panels were formed during the ROP development in the late 1990's to define

those thresholds. In part, these panels were guided by what the expected agency response should be for various types of licensee performance deficiencies. These same principles applied to the current evaluation of the Public Radiation Safety SDP. The staff determined that the radioactive effluent release program branch of the current SDP (Enclosure 1) is consistent with a risk-informed approach. As the likelihood increases for a licensee performance deficiency to lead to a significant radiation dose to the public, the SDP significance outcome increases, thereby raising the color of the finding. Currently, the radioactive effluent release program branch of the SDP assigns a White finding to a performance deficiency where the licensee fails to collect data and assess the dose, or where the as low as reasonably achievable (ALARA) dose values in Appendix I to 10 CFR Part 50 are exceeded (e.g., 3 mrem total body dose from liquid effluents). The staff considers each of these events to present a public radiation issue of low to moderate significance.

The staff's evaluation concluded that a failure to evaluate the radiological hazards of a more than minor release of radioactive material is a substantial failure to implement the radioactive effluent release program. One premise of the ROP is that a single White finding is followed by an increased level of NRC engagement in the form of increased inspection (Supplemental Inspection Procedure 95001), which is the lowest level of increased interaction above the baseline inspection program with a licensee. Inspection Procedure 95001 is estimated to result in between 16 and 40 hours of additional inspection. A substantial failure to implement the radiological effluent release program which results in the failure to identify the event, assess the dose consequences, and the impact to the environment (such as occurred at Braidwood) represents a deficiency in licensee performance of enough significance to warrant additional followup inspection above the baseline program to independently review and evaluate licensee corrective actions. Therefore, the staff concluded that such a deficiency in licensee performance warrants the increased inspection effort associated with a White finding.

The staff concluded that the radioactive effluent release program branch of the SDP should be revised to specifically include spills and leaks under this program by adding a new criterion for a substantial failure to implement the radioactive effluent release program (Enclosure 3). The criteria for a failure to implement the program is a loss of effluent controls to an extent such that: (1) a substantial potential existed for exceeding the public ALARA dose criteria, but fortuitous events prevented the dose from exceeding ALARA thresholds; or (2) the licensee was negligent in identifying and evaluating the event. A finding for spills and leaks would be evaluated in a similar manner to planned effluent discharges, such that a failure to implement the program would encompass a finding for a failure to assess dose. The significance of this event would be classified as low significance (White finding).

The staff also evaluated the potential for confusion associated with the "Impaired Ability to Assess Dose" loop in the radioactive effluent release program branch of the SDP (Enclosure 1). The staff's evaluation concluded that the loop created confusion for many stakeholders, including licensees and inspectors. The staff, with stakeholder input, also recommends removing the distinction between a licensee having an impaired ability to assess dose and failing to assess dose (Enclosure 3).

Evaluation for Spills and Leaks

The staff evaluated the clarity of the entry conditions into the two branches (radioactive effluent release program branch and radioactive environmental monitoring program branch) of the Public Radiation Safety SDP (Enclosure 1). During the staff's assessment of the Braidwood event, it appeared that both of these branches of the SDP would apply. The staff concluded that the current Public Radiation Safety SDP should be modified: (1) to clarify entry into the radioactive effluent release program branch of the current SDP; and (2) to determine a threshold to address spills and leaks.

The staff evaluated the radioactive environmental monitoring program branch of the Public Radiation Safety SDP (Enclosure 1) and found that the criteria for a White finding is not consistent with the risk-informed goals of the ROP. The staff concluded that the radioactive environmental monitoring program branch would be better aligned with the risk-informed goals of the ROP by reducing the significance of a licensee's failure to assess the environmental impacts to very low significance (Green finding). This recommendation is based on the consideration that the radioactive effluent release program is functioning properly, and has prevented significant public dose. Thus, the radioactive environmental monitoring program is a verification process, and findings that are greater than very low significance would be captured by the radioactive effluent release program branch. The staff recommends modifying the radioactive environmental monitoring program branch of the SDP as shown in Enclosure 3.

Strategic Plan Openness Goal

The Public Radiation Safety SDP was developed in 2000 when public confidence was a strategic plan goal. Enclosure 2 is an excerpt from the SDP basis document which provides background on the staff's consideration of public confidence when the SDP was initially developed. The strategic plan goal of public confidence was revised by the agency with the goal of openness in 2004, which encompasses public confidence. The staff believes that to support the goal of openness within the Public Radiation Safety SDP, the public should have open access to information to conclude that a licensee is implementing adequate programs to identify events, take prompt corrective actions, and assess the dose consequences resulting from spills or leaks. The staff's proposed changes to the SDP support the strategic plan goal of openness. In addition, the staff has updated all ROP and SDP guidance documents to ensure consistency with this NRC goal.

Stakeholder Involvement

Consistent with ROP change guidelines, the staff has held numerous public meetings with external and internal stakeholders to discuss radioactive liquid spills and leaks and one public meeting on November 1, 2006, to specifically discuss the Public Radiation Safety SDP. During these meetings, the staff discussed the proposal that the Public Radiation Safety SDP should include criteria for a White finding for a substantial failure to implement the radioactive effluent release program. Stakeholders generally agreed with the staff's proposal that such a finding represented a significant deficiency in licensee performance that warranted additional inspection above the baseline program, commensurate with a White finding.

SCHEDULE:

The staff plans to revise the SDP by the end of the current calendar year.

RECOMMENDATIONS:

The staff recommends the Commission approve the following changes to the Public Radiation Safety SDP.

1. A White finding in the radioactive effluent release program branch of the Public Radiation Safety SDP for a substantial failure to implement the radiological effluent release program is consistent with the risk-informed approach of the ROP. This represents a finding indicative of a significant deficiency in licensee performance, and warrants the additional inspection above the baseline program commensurate with a White finding to independently verify licensee corrective actions.

2. The radioactive effluent release program branch and radioactive environmental monitoring program branch will remain in the SDP; and the radioactive effluent release program branch will be modified to specifically include spills and leaks as unplanned effluent releases.

3. The criteria for a White finding should be removed from the radioactive environmental monitoring program branch, since the significance of a performance deficiency identified by this branch will be evaluated by the effluent release program branch.

RESOURCES:

Resources required (0.3 FTE) to revise the SDP are currently budgeted for fiscal year 2007.

COORDINATION:

This paper has been reviewed by the Office of General Counsel and has no legal objection. The Office of the Chief Financial Officer has reviewed this paper for resource implications. Resources for fiscal year 2007 have been budgeted for this effort.

/RA William F. Kane Acting for/

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Enclosures:
1. Excerpt from Inspection Manual Chapter 0609, Appendix D, "Public Radiation Safety Significance Determination Process", October 16, 2006
2. Excerpt from Inspection Manual Chapter 0308, Attachment 3, Appendix D, "Technical Basis for Public Radiation Safety Significance Determination Process", June 25, 2004
3. Draft Public Radiation Safety Significance Determination Process Flowchart

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