April 5, 2004

MEMORANDUM TO: Cathy Haney, Program Director
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

FROM: Joseph L. Birmingham, Project Manager ***/RA/***
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

SUBJECT: SUMMARY OF MARCH 15, 2004, PUBLIC MEETING WITH THE NUCLEAR ENERGY INSTITUTE (NEI) TO DISCUSS OCCUPATIONAL AND PUBLIC RADIATION CORNERSTONE ISSUES

On March 15, 2004, Nuclear Regulatory Commission (NRC) staff met with a representative of NEI in a public meeting at NRC headquarters in Rockville Maryland. The meeting was on Occupational and Public Radiation Safety Cornerstones issues. Attachment 1 is a list of the meeting participants. Attachment 2 has draft Frequently Asked Questions (FAQs) discussed during the occupational part of the meeting. Attachment 3 is a revision to FAQ 37.1, OR1, discussed in Attachment 2. Attachment 4 is a proposed change to Sections V, VI, and VIII of Appendix D of the Public Radiation Safety Significance Determination Process.

After introductions, Roger Pedersen, of the NRC, led a discussion of three proposed FAQs. These included a FAQ (no. 36.5) concerning an event where the dose rate increased over what was assumed from past experience resulting in greater radiation exposure to workers than was expected; a re-drafted FAQ (no. 37.1,see revision in Attachment 3) on access control of a high radiation area, which was discussed in the February 25, 2004, meeting; and a FAQ (no. 37.3) on adequate controls of a locked high radiation area if an intentional act is needed to circumvent the controls.

A consensus agreement was reached that the re-drafted FAQ 37.1 and answer, could be recommended for approval (with a small revision to the question focusing on the technician's ability to provide direct surveillance of the entrance). NEI indicated that FAQ 36.5 may be substantially rewritten of withdrawn. However, it was pointed out that the original question with the revised answer should be recommended for approval as a separate FAQ. The discussion of FAQ 37.3 highlighted a significant misunderstanding over the use of the term "inadvertent" in both the NRC guidance in Regulatory Guide 8.38, and the NEI guidance in NEI 99-02. It was agreed that the appropriate long term resolution of this misunderstanding is to revise these guidance documents. In the short term, issuing FAQ 37.3 should resolve some of the misunderstandings. To that end, much of the discussion addressed the actual NRC position on the level of circumvention the physical controls around locked high radiation areas are required to be designed to prevent, and how best to clearly express this position. It was proposed that some of the definitions of "willful acts" found in the NRC Enforcement Policy, could provide a basis for the appropriate guidance to this question. The NRC staff indicated that they would re-draft the answer and submit it for discussion at the next public meeting.

The group briefly discussed the proposed revisions to Sections V, "Radioactive Material Control Program," and Section VII, "Transportation," of Appendix D of the Public Radiation Safety Significance Determination Process (SDP).

After some discussion, the group agreed to hold the next meeting in early April. As there were no public comments or questions and having completed the agenda, the group adjourned.

Project No. 689
Attachments: As stated
cc: w/atts: See list

List of Attendees for March 15, 2004
Meeting on Radiation Safety Cornerstones

NAME	ORGANIZATION
Roger Pedersen	NRC/DIPM/IEPB
Ronald Schmitt	NRC/DIPM/IEPB
Stephen Klementowicz	NRC/DIPM/IEPB
Joseph Birmingham	NRC/DRIP/RPRP
*Ronald Nimitz	NRC Region I
*Ryan Alexander	NRC Region III
*Mick Shannon	NRC Region IV
*Larry Ricketson	NRC Region IV
Ralph Andersen	Nuclear Energy Institute
Lane Hay	Bechtel/SERCH
*Mark Puckett	Omaha Public Power District
*Gary Cavanaugh	Omaha Public Power District
*Steve Gebers	Omaha Public Power District
*Mike Russell	Southern California Edison
*Jim Madigan	Southern California Edison
*Jeff Cook	Southern California Edison
*Mike McBrearty	Southern California Edison
*Roger A. Aguilera	South Texas Project
*Leonard M. Earls	South Texas Project
*Russell Gray	Pacific Gas & Electric
*Larry E. Haynes	Duke Energy
*Lance E. Loucks	Duke Energy
*Willard C. Osburn	Duke Energy
*Charles J. (Jeff) Thomas	Duke Energy
*Richard L. Doty	PPL Susquehanna
*Donald Schuelke	NMC
*Joe Beer	NMC
*Steve McCamy	Tennessee Valley Authority
*Pamela Bedgood	Wolf Creek
*Chuck Sibly	Wolf Creek
*Ron Gilliam	Wolf Creek
*Harold Trimble,	Exelon Corp.
*Kimberly Hobbs	Exelon Corp.
*David Nestle	Exelon Corp.
*Lee Thomasson	Dominion Generation
*David Mohl	Entergy
*Mike Lantz	Palo Verde

*via teleconference

36.5	OR1	Question: Two individuals enter an area of containment, previously surveyed and posted as a radiation area. They comply with all applicable RWPs and procedures. Additionally, they are continuously, remotely monitored by teledosimetry (Electronic Personnel Dosimeter, EPD). During the entry, their EPDs alarm on dose rate, which had been preset to alarm at 150 mrem/hr. The individuals detect the alarm and immediately exit the area to notify HP. Concurrently, HP technicians manning the Central Alarm Station detect the alarm condition and dispatch a nearby roving HP technician to the area to confirm the alarm and verify worker protection. The area is immediately surveyed by HP and found to contain dose rates of approximately 2 rem/hr at 12 inches; the area is reposted as a Locked High Radiation Area (LHRA). Investigation of the event reveals that the area entered contains a length of piping and a valve through which the reactor cavity is filled and drained. Shortly before this entry, the reactor cavity had been filled via this pipe. The specific area's dose rate had been confirmed by past experience to be unaffected by cavity filling and therefore was not flagged for resurvey following the fill evolution. It is hypothesized that a hot particle dislodged from an upstream location during filling and migrated into the vicinity of the work location prior to the worker's entry. The same area had been occupied numerous times after the last survey, before filling, with no problems. Should this be counted as a performance indicator event? Furthermore, should any event be counted against this PI in which an entry into an area occurs where the dose rate increased (to greater than 1 rem/hr) in a reasonably unanticipated manner?	1/22 Introduced	Vogtle
		Response: This is not a PI occurrence for either instance questioned above, particularly for a case where the area has been specifically considered for a possible dose rate increase. However, instances where the potential dose rate change is not considered and should have been, would be a PI event. Additionally, the unanticipated dose criteria would still apply. **NRC Response:** **This <u>is</u> a reportable Performance Indicator (PI) occurrence. The statement in this question that the "...dose rates had been confirmed by past experience..." is confusing. As described in this example, the dose rates in this area were *assumed*, not *confirmed* by a (pre-work or routine) survey. This is the heart of the performance deficiency. Placing direct (and, or remote) reading dosimeters on workers is not a substitute for adequate surveys as required by Part 20. The staff does not concur that this event was *reasonably* unanticipated, and sees this example as a lack of vigilance by the radiation protection program. The reactor refueling cavity drain and fill system clearly had the potential for high dose rates, and an adequate pre-work survey would have uncovered the radiological condition.**		

37.1	OR1	Question: Would the following example be considered a Performance Indicator Hit to the Occupational Cornerstone? A large check valve was required to be physically cut from the safety injection system. When the valve was cut out of the system and lowered to its resting place, the dose rates on the open pipe ends of the system were 5-rem/hr at the plane of the pipe and 1.5-rem/hr at 30-centimeters from the pipe. The open pipe was approximately 8-feet in the overhead and could only be accessed via scaffolding; and the scaffolding had been disassembled to lower the check valve into its resting place. This task was completed on night shift just prior turnover. The entrance to the Steam Generator Bay, where this valve was located, was posted as a Technical Specification Locked High Radiation Area (LHRA). The posting was on both the wire cage door, and hung from magnets on the door jam. An on-coming RP Technician came to the work area to obtain a turnover from the night shift RP Technician. This area was also under camera surveillance both inside and outside the Steam Generator Bay; however, no technician was assigned coverage responsibilities at the camera station during turnover. During the turnover, the off going and on coming RP Technicians decided to enter the bay to view the condition of the recently completed task. The RP technicians went into the bay approximately three feet past the entrance, leaving the door open and the entrance rope posting down to discuss radiological conditions associated with the task (e.g., the door was open unposted and not clearly guarded). The RP Technicians did not complete a required LHRA briefing to ensure administrative controls for the LHRA access were established The technicians did not have line of sight of the established LRHA boundary, but were physically between the entrance to the LHRA and the actual areas where dose rates were greater the 1 rem/hr (i.e., open pipe ends and Steam Generator Man ways). The RP Technicians indicated that they would have stopped any personnel from entering the area and had no intention of proceeding further into the Steam Generator Bay area. There was no intention on the part of the RP Technicians to leave the door unlooked. The door being left unlocked and the posting removed was an unintended human error. Response: This event should not be counted as a performance indicator event since fully qualified RP-Technicians (meeting ANSI 18.1 requirements) were physically between the sources of radiation (= 1,000 mrem/hr) and the entrance to the Steam Generator cubical. These technicians were authorized under the appropriate radiation work permit and were capable of warning individuals that any attempted entry is unauthorized, and able to alert proper authorities (via radio) of the improper entry attempt. While the posting was down the area was constantly attended by these RP-Technicians and they would have prevented unauthorized individuals from being exposed to radioactive material in excess of Part 20 limits. The station does not use standard technical specification and has conservatively designated this event as a violation of the stations technical specifications	2/19 Introduced	Ft. Calhoun

		NRC Response: **The question as posed contains number of confusing (and some non-relevant) statements that need clarification before an answer can be given. The first issue is whether the radiation field with dose rates greater than 1000 mrem/hr is accessible. The third sentence in the question indicates that, as configured, an individual could not be exposed to greater than 1000 mrem/hr. Therefore, as discussed in the guidance in Reg. Guide 8.38, this is not a high radiation area nor required to be locked. Therefore, this example is not a technical specification (TS) violation, and is not a PI occurrence. The rest of the question is moot.** **If someone could receive greater than 1000 mrem/hr in this area, there are a number of confounding issues in the example that could use clarification. The last statement in the draft answer raises the question of what this plant's alternate control of high radiation area TS actually require. Assuming that the TS requirements are similar to the standard TS, it is unclear whether the entry to the locked HRA was controlled by an appropriate RWP. Part 20 allows for direct surveillance to substitute for locking the access to a high radiation area. Although, it is not totally clear that the two RP Technicians were providing direct surveillance (as defined in Reg. Guide 8.38) of the HRA. However, irrespective of the above, direct surveillance of a HRA does not remove the HRA posting requirement(s). Unless the individuals were constantly attending the radiation source(s), as provided in 10 CFR 20.1903(a), the inadequate posting of the HRA described in the example is a violation of the TS (and, or, Part 20), and would constitute a PI occurrence.** **The draft answer confuses the safety significance of this event with the definition of a PI occurrence. By design, the threshold for a PI is of very little safety significance, and is intended to be a "leading" indicator of possible problems with, or challenges to, the RP program. Although not necessarily significant in themselves, it is the repetition of these "unintended human errors" that may indicate that additional inspection oversight is warranted.**		

XX.X	OR1	**Question:** **It was determined that a physical barrier being used to control access to a high radiation area (greater than 1000 mrem per hour) could easily be circumvented. However, to circumvent the controls that were in place would require an intentional act. An example of this might include one of the following;** **1. Fencing used as a barrier at the boundary of the high radiation area was not firmly secured (i.e., loosely secured, or just taped to a wall) such that an individual could, by hand, create an opening large enough to pass through.** **2. The barrier was constructed of a material that could easily be breached with a pocket knife (i.e., thin plastic sheeting or webbing).** **3. An individual could pass their hand through the barrier and open the locked door to the area from the inside.** **4. The barrier is a short fence (<6 foot high), or hand rail, such that an individual could step over, climb over, or crawl under, with little-to-moderate effort.** **5. A locked gate is provided at the top of a ladder to control access to a high radiation area on a lower level of the plant. However, by stepping around (or over) the gate, an individual can still access to the rungs of the ladder.** **Since the controls in place, as described above, were adequate to prevent an inadvertent entry (i.e., accidental or unintentional entry by an individual not paying sufficient attention), and the definition of terms on page 98 in NEI 99-02 Rev. 2, refers to "measures that provide assurance that inadvertent entry into the technical specification high radiation areas by unauthorized personnel," is this a (or are these) reportable PI occurrence(s)?** **Response:** **The first example on page 99 of NEI 99-02, Rev.2, clearly states that the failure to secure a high radiation area (>1000 mrem per hour) against unauthorized access is a reportable PI occurrence. Since the physical barriers provided for each of these areas can be easily circumvented (i.e., did not secure the area), they would each be a PI occurrence. The term "inadvertent entry" on page 98 of NEI 99-02, is used in the sense that the violation of the regulatory requirement (e.g., resulting from the unauthorized entry) was unintended, as opposed to whether the act itself was accidental or unintended. An unintentional violation could be a non-flagrant, intended, act resulting from a misunderstanding as to the existence the requirement, the meaning of the requirement, or that the action conformed to the requirement. If the unauthorized entry was an intended violation of the regulatory requirement, this would be a willful violation subject to normal NRC Enforcement Policy. A willful violation is outside the scope of this Performance Indicator.**	3/25 Introduced	NRC

Revised Proposed FAQ 37.1

Two job-coverage radiation protection technicians were performing a job turnover at the entrance to a steam generator bay. At the time, the steam generator bay was posted and locked as a Locked High Radiation Area. During the turnover process, the RP technicians entered into the posted region of the Locked High Radiation Area. When they entered a few feet past the doorway, the door was left open and the radiological posting was left down. However, during the time in question, the RP technicians were physically between the entrance to the Locked High Radiation Area and any sources of radiation greater than 1,000 mrem/hour. The RP technicians were cognizant of the need to control access to the area and did so throughout the turnover.

Is this event considered a performance indicator occurrence?

This event is not considered a performance indicator occurrence because the radiation protection technicians maintained positive control over access to the area.

Appendix D
PUBLIC RADIATION SAFETY
SIGNIFICANCE DETERMINATION PROCESS

This process is used in conjunction with Inspection Procedure 71122, "Public Radiation Safety," to determine the risk significance of a finding.

V. RADIOACTIVE MATERIAL CONTROL PROGRAM

A. Objective

This branch of the logic diagram focuses on the licensee's radioactive material control program. It assesses the licensee's ability to prevent the inadvertent release and/or loss of control of licensed radioactive material ~~to an unrestricted area that, cause an actual or credible radiation dose to members of the public~~.

B. Basis

10 CFR Part 20 contains the requirements for the control and disposal of licensed radioactive material. At a licensee's facility, any equipment or material that came into contact with licensed radioactive material or that had the potential to be contaminated with radioactive material of plant origin and are to be removed from the facility must be surveyed for the presence of licensed radioactive material. This is because NRC regulations, with one exception in 10 CFR 20.2005, provide no minimum level of licensed radioactive material that can be disposed of or released for use in an unrestricted area in a manner other than as radioactive waste or transferred to a licensed recipient.

VI. SDP DETERMINATION PROCESS

Is there a finding in the licensee's radiological material control program that is contrary to NRC regulations and/or the licensee's program? If yes, the question is what is the dose impact ~~(as calculated by the licensee).~~ of the event? Note: The dose assessment is to be based on an actual or credible scenario. If the dose impact was not more than 0.005 rem total effective dose equivalent (TEDE) and there were not more than 5 of these ~~events~~ occurrences in the inspection period, then the SDP classification is GREEN. If the dose impact was greater than 0.005 rem TEDE or there were more than 5 occurrences ~~that were not above 0.005 rem TEDE~~ in the inspection period (i.e., two years, based on 8 rolling calendar quarters), then the SDP classification is WHITE. If the dose impact is greater than 0.1 rem TEDE (exceeds 10 CFR Part 20 public dose limit), the SDP classification is YELLOW. If the dose impact was greater than 0.5 rem TEDE, the SDP classification is RED.

An occurrence, as used in this SDP, is defined as an inspection finding in which licensed radioactive material was identified; 1) outside of a Protected area, Restricted area, or an area defined by the licensee in which licensed radioactive material is controlled and 2) an evaluation concludes that the material was released as a result of a) not following plant procedures, b) not being in accordance with documented training, c) inadequate plant procedures, or d) inadequate training. An occurrence represents a failure or performance deficiency of the licensee's Radiation Protection program. The following would not be an

occurrence or performance deficiency; 1) licensed radioactive material that is below the radiation detection sensitivity of the instruments used in a manner that is reasonable under the circumstances for the survey and control of licensed radioactive material, or 2) licensed radioactive material that was released in accordance with the licensee's radioactive gaseous and liquid effluent release program.

~~Historically, these events have had calculated doses well below 0.001 rem TEDE, thus, in most cases a GREEN significance determination is likely. However, if there were more than 5 occurrences in the assessment period where licensed radioactive material was released, there is a potential for the cumulative dose from the occurrences to be 0.005 rem TEDE or greater. This will result in a WHITE classification.~~

For a finding which involves licensed radioactive material within the licensee's Protected Area, ~~or~~ Restricted Area (as defined in 10 CFR Part 73 and Part 20, respectively), or an area defined by the licensee in which licensed radioactive material is controlled, the finding will not be counted as an occurrence by the "greater than 5 Occurrences" decision block. This is because licensed radioactive material within a licensee's Protected Area or Restricted Area involves negligible risk to members of the public in an Unrestricted Area.

Individuals who have not been classified as receiving "occupational dose" are sometimes permitted access to a licensee's Protected or Restricted Area for job-related or public information purposes. Such individuals are either physically escorted or are granted limited unescorted access following the successful completion of appropriate orientation training and security screening. For the purposes of this SDP, such individuals are classified as "Members of the Public." Exposure received by such individuals associated with a radioactive material control finding involving licensed radioactive material in a Protected or Restricted Area will be evaluated using the dose-based criteria in the SDP (e.g., greater than 0.005, 0.1, or 0.5 rem TEDE, respectively), although, as stated above, such findings will not be counted as an occurrence.

For licensed radioactive material, found inside a licensee's protected or restricted area, consideration should be given to whether it is a minor issue or violation. To be considered minor, there must be no actual or credible dose impact to a member of the public. In practice, this means that the whole body dose rate (measured by a qualified individual, in a low background area, at a distance of 30 cm from the material with a "micro-rem" per-hour type instrument which typically uses a 1" by 1" scintillation detector) from the item or material is indistinguishable from background.

For licensed radioactive material found outside the licensee's protected area, restricted area, or an area defined by the licensee in which licensed radioactive material is controlled, the above criteria (no actual or credible dose impact to a member of the public, etc.) can be used to determine whether it is a minor issue or violation. However, licensed radioactive material in an unrestricted area is a condition that warrants documentation (i.e., brief description of event and a statement that there was "negligible risk" from the material) in an NRC Inspection Report (see NRC Manual Chapter 0612, section 06.01.c). This is because licensed radioactive material in the public domain directly relates to an issue of agency-wide concern (Control of Solid Material).

It is acceptable to document in an inspection report, multiple instances of licensed

radioactive material being identified outside of a Protected Area, Restricted Area, or an area defined by the licensee in which licensed radioactive material is controlled, as a single finding in the following circumstances; 1) instances that do not represent a performance deficiency and 2) licensee identified instances that represent a performance deficiency that stem from a common root cause or are the result of investigations and surveys conducted in conjunction with a corrective action plan or a general site survey upgrade program.

~~It should be noted that discrete radioactive particles (also known as hot particles or fuel fleas) are not applicable to this program if the dose from a discrete radioactive particle does not result in a TEDE dose as defined in 10 CFR Part 20. Generally, the dose from the particle is to a very small localized area of the skin and is not equivalent to the risk of a TEDE dose. However, if the discrete radioactive particle is of such a magnitude that a TEDE dose (i.e., equal to or greater than 1 mrem) is received, then the finding should be evaluated in the SDP. While the skin dose from discrete radioactive particle is not evaluated in the SDP, except as described above, it would still be counted as an occurrence.~~

A finding which involves discrete radioactive particles (also known as hot particles or fuel fleas) will be assessed in the same manner as discussed above (i.e., based on the actual or credible dose impact [TEDE] to a member of the public.

END

VIII. SDP DETERMINATION PROCESS

A. Radiation Limits Exceeded

The limits on radiation levels of a package offered for transport are found in 49 CFR 173. These include both limits for external and removable surface contamination. The external radiation level limits vary somewhat as a function of the type of shipment (non-exclusive and exclusive- use). Specific limits exist also as a function of distance from the package, such as the transport index (TI), and for the area occupied by the driver. These external radiation limits are found in 49 CFR 173.441 and are duplicated in 10 CFR Part 71.47 (as related to Type B radioactive material shipments).

The limits for removable (non-fixed) surface contamination on a package are found in 49 CFR 173.443 (Table 11) and vary as a function of type of shipment (non-exclusive and exclusive use), and vary relative to the type of nuclides (alpha, and beta/gamma emitters). Additionally for certain exclusive-use shipments, the surface contamination levels can be ten times higher during the shipment.

The external radiation level branch provides for a graded approach for assessing the level of significance of findings. Exceeding any of the limits and increasing multiplies of the limits provide for GREEN, WHITE, YELLOW and RED findings.

To assess the significance of a finding, consideration is given to the accessibility of the package. ~~An accessible area is defined as one that can reasonably be occupied by a major portion of an individual's whole body, which is defined in 10 CFR 20.1003.~~ An accessible area is defined as any exposed surface of the package. For example, consider a shipment that consists of a package loaded directly on a flat bed trailer, and is secured in place. An example of an inaccessible surface is the underside of the package, which is sitting directly on the trailer. It is highly improbable that any member of the public could gain access to that location, assuming normal conditions of transport. Examples of accessible areas include the underside of the trailer, the unlocked cab, all other surfaces of the package, and at two meters from the loaded package. Accessibility is not a factor that is considered if the dose rate on the external surface of the package is greater than two times the regulatory limit.

The removable surface contamination level branch provides for a graded approach for assessing the level of significance of findings. Exceeding any of the limits and increasing multiplies of the limits provide for GREEN, WHITE, YELLOW and RED findings. Note that to have a RED finding, the surface contamination levels must not only exceed 100 times the limit, but the unrestricted area must have been contaminated as well.

After some discussion, the group agreed to hold the next meeting in early April. As there were no public comments or questions and having completed the agenda, the group adjourned.

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Attachments: As stated
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