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DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Provides addl info re offsite dose calcualtion manual submitted on 850831,per 850404 request.Setpoint calculation for normal svc water monitor,basis for external radiation value & direct radiation dose estimates provided.

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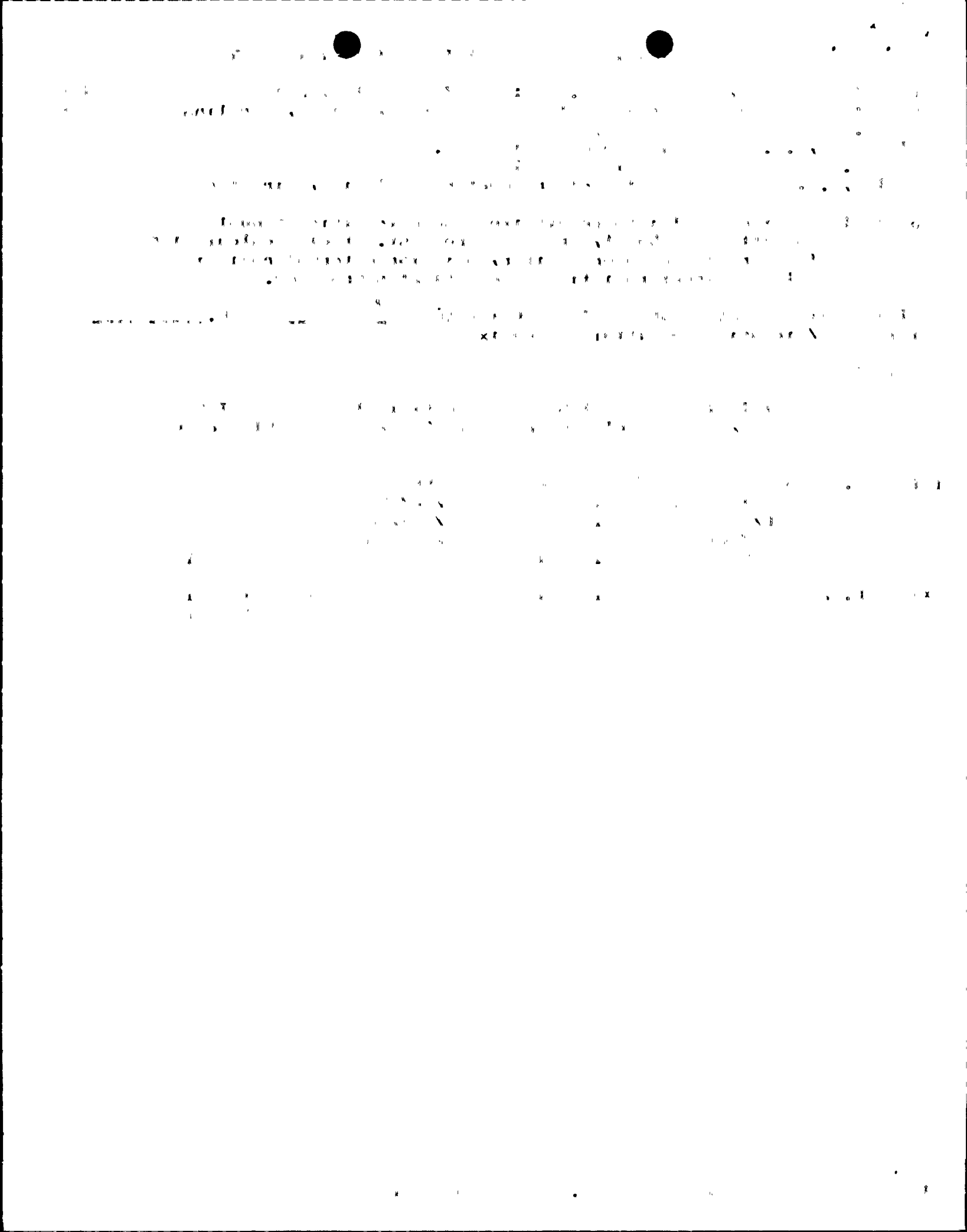

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SERIAL: NLS-85-226

JUL 01 1985

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NO. 1 - DOCKET NO. 50-400
OFFSITE DOSE CALCULATION MODEL

REFERENCE: Letter from George W. Knighton (NRC) to Mr. E. E. Utley (CP&L) dated April 4, 1985.

Dear Mr. Denton:

The referenced letter transmitted a request for additional information in regard to the Shearon Harris Nuclear Power Plant Offsite Dose Calculation Manual that was submitted to you on August 31, 1984. Carolina Power & Light provides responses to your request for additional information in Enclosure 1.

If you have any questions, please contact Mr. Gregg A. Sinders at (919) 836-8168.

Yours very truly,

S. R. Zimmerman
Manager
Nuclear Licensing Section

GAS/crs (1649GAS)

Enclosure

cc: Mr. B. C. Buckley (NRC)
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ENCLOSURE 1

RESPONSES TO U. S. NUCLEAR REGULATORY COMMISSION REQUEST FOR ADDITIONAL INFORMATION IN REGARD TO THE SHEARON HARRIS NUCLEAR POWER PLANT (SHNPP) OFF-SITE DOSE CALCULATION MANUAL (ODCM)

Comment 1:

Although the Applicant indicated that the normal service water (NSW) is monitored and covered by T/S 3.3.3.0, the Applicant has not provided a setpoint calculation of such a monitor. Also, the Applicant's Figure 2.1-2 does not show such a flow path in the flow stream diagram. Provide the setpoint calculation for the NSW monitor, and revise Figure 2.1-2 as appropriate.

Response:

The setpoint for the normal service water (NSW) monitors will be determined by either of the two methods listed below:

Method 1 - This method determines the alarm setpoint using the following formula:

$$MDC = \frac{2\sqrt{\frac{cpm_{bkg}}{2\tau}}}{sensitivity}$$

where:

	MDC	=	Minimum detectable concentration for a given isotope (μCi/ml).
	cpm	=	Ambient cpm + (mR/hr_{bkg} * cpm/mR/hr).
	τ	=	Time constant of signal processor in minutes (a function of cpm_{bkg}).
	Sensitivity	=	For selected isotope (cpm/μCi/ml).

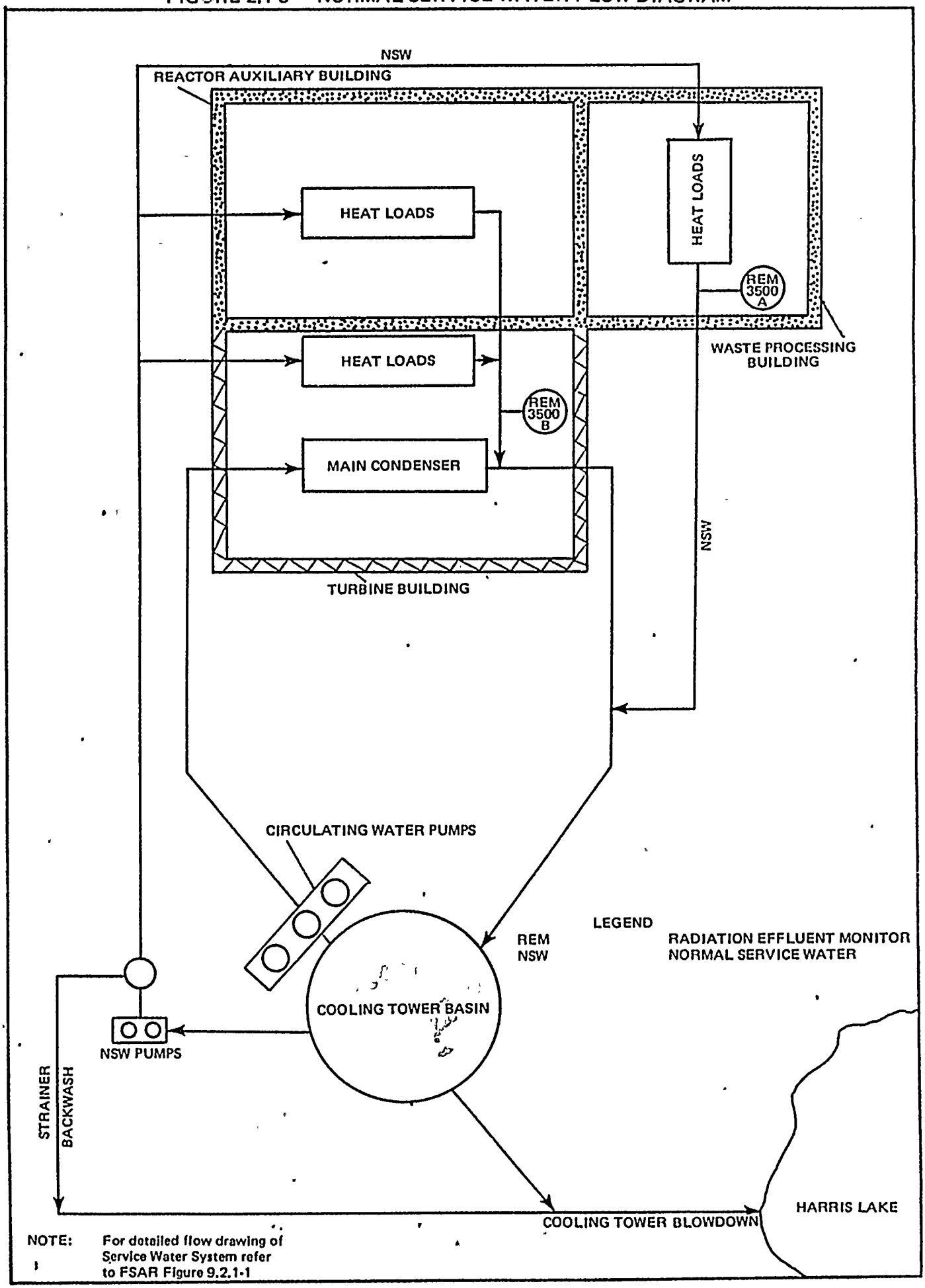
Method 2 - This method determines the alarm setpoint as 2 x background.

This latter technique is acceptable from an effluent release standpoint because NSW is not discharged directly to the environment and it undergoes significant dilution in the cooling tower basin. Downstream monitoring for ODCM effluent accountability purposes is provided by the continuous grab sampler in the cooling tower blowdown.

The methods listed above will be incorporated into the ODCM. To show the NSW flow paths, Figure 2.1-3 entitled "Normal Service Water Flow Diagram" will be added to the ODCM. The diagram is included here as Attachment 1.

ATTACHMENT 1

FIGURE 2.1-3 NORMAL SERVICE WATER FLOW DIAGRAM



Comment 2:

Under Assumption (4), the Applicant stated, "To sum numbers represented as less than (<), use the value of the largest number in the group (i.e., <5+<1+<1+<3+ = <5) [sic]." Provide the basis for this assumption.

Response:

Should the technical specifications as stated in Section 6.1 of the ODCM be exceeded, it is the purpose of Chapter 6.0 to evaluate compliance with 40 CFR 190 on as realistic a basis as possible. Since a total dose estimate must be obtained, the process will require the summation of dose from several dose pathways; and for each pathway, a series of numbers may also require summation. In each of these processes, measurements may provide values that are less than the lower limit of detection (LLD) for the analytical system. From the theory of analytical sensitivity (see NCRP-58 1978), it is conceivable that the < LLD values actually range from negative numbers to the LLD itself. Clearly, if zero or negative numbers are used in the dose estimate processes, it would bias the results in a nonconservative manner. Similarly, if the LLD value is used, an overly conservative bias may result. Assumption (4) provides a reasonable "middle course" that seeks to eliminate unnecessary bias in either nonconservative or overly conservative directions.

Comment 3:

Under Applicant's Step (1), the Applicant stated that the direct radiation dose at the plant boundary in each sector will be determined. The Applicant, however, has not indicated by what method this direct radiation dose will be obtained. Provide the method for estimating doses from direct radiation.

Response:

It is the Applicant's intention to evaluate the direct radiation dose at the site boundary in both the preoperational and operational phases of the plant. Measurements will be performed with pressurized ionization chambers or equivalent devices. Measurements will be performed at the same locations in each phase to discern the direct radiation contribution from plant operation. After these baseline values are obtained, the in-place thermoluminescent detector (TLD) network will be relied upon to indicate any upward trends in direct radiation. If a significant increase is observed in the direct radiation intensity, it will be reevaluated utilizing the method described above.

Comment 4:

The Applicant stated that dose from other fuel cycle sources will be treated as < 1 mrem/yr. Provide the basis for this statement.

Response:

There are no other uranium fuel cycle sources within a 50-mile radius of SHNPP as defined in 40 CFR 190. Thus, the < 1 mrem figure would be reasonable.

(1649GAS/crs)