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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Questions Concerning the Potential Effects of STP 1 & 2
Independent Spent Fuel Storage Installation on STP 3 & 4

During discussions with the NRC Staff a question was asked about the effect of the proposed Independent Spent Fuel Storage Installation (ISFSI) at STP 1 & 2. The purpose of this letter is to answer that question.

South Texas Project Nuclear Operating Company (STPNOC) is in the process of designing and constructing an ISFSI for STP Units 1 & 2. This facility is not expected to be completed and in service until 2017. Since the facility does not yet exist there is no current effect on the STP Units 3 & 4 Final Safety Analysis Report (FSAR). Once the STP Units 1 & 2 ISFSI is placed in service the STP 3 & 4 FSAR will be updated as required by 10CFR50.71(e).

To assist the NRC Staff in understanding the possible future impacts of the ISFSI on the dose to construction workers, Nuclear Innovation North America (NINA) is providing a bounding assessment based on the very conservative calculations performed by the STPNOC ISFSI vendor. NINA has also benchmarked existing similar ISFSIs to determine the real measured dose impacts, which are substantially smaller than the conservative calculations. In all cases the STPNOC ISFSI will have little effect to the overall dose consequences and remain a fraction of the allowable value. This information is contained in the Attachment to this letter.

There are no commitments in this letter.

If you have any questions regarding this letter, please contact me at 979-316-3011 or Bill Mookhoek at 979-316-3014.

D091
MRO

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 7/16/15



Scott Head
Manager, Regulatory Affairs
NINA STP Units 3 & 4

wem

Attachment: Total Direct Dose to STP 3&4 Construction Workers from Units 1&2 Including the
Impact of a Future ISFSI

cc: w/o attachment except*

(paper copy)

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***Total Direct Dose to STP 3&4 Construction Workers
From Units 1&2 Including the Impact of a Future ISFSI***

STPNOC is constructing an Independent Spent Fuel Storage Installation (ISFSI) for Units 1&2. This ISFSI will have a direct dose contribution to construction workers on STP Units 3&4 at some point in the future when the ISFSI becomes operational and Units 3&4 are in the construction phase.

Reg Guide 1.206, C.I.12.3.5, states, "For multiunit plants, the applicant should provide estimated annual doses to construction workers in a new unit construction area, as a result of radiation from onsite radiation sources from the existing operating plant(s). Examples of typical onsite radiation sources include the turbine systems (for BWRs), stored radioactive wastes, the independent spent fuel storage facility, auxiliary and reactor buildings, and radioactive effluents (direct radiation from the gaseous radioactive effluent plume)." Although the STP 1&2 ISFSI does not yet exist, NINA has performed an assessment of this future source of direct radiation.

The dose to construction workers is discussed in section 12.3.8 of the FSAR. More detail is contained in section 4.5 of the STP 3&4 Environmental Report.

The direct radiation dose rate to construction workers is composed of dose rates from:

1. STP Units 1&2,
2. the Units 1&2 Old Steam Generator Storage Facility (OSGSF),
3. the Long-Term Storage Facility (LTSF) for reactor heads from Units 1&2,
4. the Onsite Staging Facility (OSF) for Units 1&2 radwaste processing, and
5. STP Unit 3 operational dose during construction of STP Unit 4.

The future Units 1&2 ISFSI would become an additional direct source.

This assessment will estimate the direct dose contribution from the future ISFSI and demonstrate the ability to meet the requirements of 10CFR Part 20 for construction workers.

The distance from the ISFSI to the center of the Unit 3 construction area is approximately 1600 feet. The distance from the ISFSI to the center of the Unit 4 construction area is approximately 2180 feet.

Since the ISFSI is currently not operational, measured dose rate data are not available. The ISFSI vendor has performed bounding dose rate calculations to show compliance with the site boundary dose limits per 10 CFR 72.104(a). The calculation conservatively assumes all 180 casks of the ISFSI (full capacity) contain spent fuel assemblies with a burnup of 54000 MWD/MTU, an initial 235U enrichment of 2.95 wt%, and a cooling time of 5 years. This significantly overestimates the doses. The actual loading will contain fuel significantly older than five years, and the ISFSI will not be at full capacity during the Units 3&4 construction period.

A more realistic ISFSI configuration is based on a loading plan of 6 casks (222 FAs) per unit (2 units, total 12 casks) beginning in 2017 and 6 casks per unit (2 units, total 12 casks) every third year through 2053. The timetable for construction of STP 3&4 is indeterminate, however, for purposes of this assessment construction of Unit 3 is assumed to begin in 2020 and Unit 4 in 2021. The construction period would end in 2025, based on a 5-year estimate for construction of each unit, as shown in the shaded region in the table below.

Year	Casks Added	Total	Unit 3 Const	Unit 4 Const
2017	12	12		
2018	-	12		
2019	-	12		
2020	12	24		
2021	-	24		
2022	-	24		
2023	12	36		
2024	-	36		
2025	-	36		

However, for purposes of this assessment, the ISFSI is assumed to contain 36 casks with the conservative spent fuel described above.

The dose rate to construction workers is determined from a curve of dose rate vs. distance provided by the vendor. The dose rates are scaled by a factor of 36/180 and multiplied by 2080 hours per year to determine the annual dose to construction workers.

The dose rate at the center of the STP Unit 3 construction area (1600 feet from the ISFSI) is 2.08E-02, resulting in an annual dose of $(2.08E-02)(36/180)(2080) = 8.7$ mr/year. The dose rate at the center of the STP Unit 4 construction area (2183 from the ISFSI) is 4.6E-03 mr/hr, resulting in an annual dose of $(4.6E-03)(36/180)(2080) = 1.9$ mr/year.

The results of the additional direct radiation dose are shown in the following table.

Radiation Source	Annual Dose to Construction Workers (mrem/yr)
Total Direct Dose to STP Units 3&4 Construction Workers From Units 1&2 Without ISFSI	2.4 ¹
STP 1&2 ISFSI to Unit 3	8.7
Total Direct Dose to STP 3&4 Construction Workers From Units 1&2 With ISFSI Dose Calculated To Unit 3 Construction Area	$2.4 + 8.7 = 11.1$
Total Body Gaseous Effluent Annual Dose from Units 1&2	1.7 ¹
Total Body Liquid Effluent Annual Dose from Units 1&2	0.032 ¹
Total Dose (Direct, Gaseous, Liquid) to STP 3&4 Construction Workers From Units 1&2 With ISFSI Dose Calculated To Unit 3 Construction Area	$11.1 + 1.7 + 0.032 = 12.8$
Total Direct Dose to Unit 4 Construction Workers From Units 1&2 Without ISFSI	9.3 ¹
STP 1&2 ISFSI to Unit 4	1.9
Total Direct Dose to STP 4 Construction Workers From Units 1, 2 & 3 With ISFSI Dose Calculated To Unit 4 Construction Area	$9.3 + 1.9 = 11.2$
Total Body Gaseous Effluent Annual Dose from Units 1, 2, and 3	8.3 ¹
Total Body Liquid Effluent Annual Dose from Units 1, 2 and 3	0.032 ¹
Total Dose (Direct, Gaseous, Liquid) to STP 4 Construction Workers From Units 1, 2 & 3 With ISFSI Dose Calculated To Unit 4 Construction Area	$11.2 + 8.3 + 0.032 = 19.5$

These conservatively high ISFSI direct dose estimates will not result in exceeding the 10CFR20 100 mrem/year limit. When the ISFSI becomes operational, actual dose measurement data will be used to project more realistic doses to construction workers, and the FSAR will be updated.

Based on other comparable ISFSI sites, these ISFSI direct dose estimates are conservative. For example, based on TLD measurements at the North Anna ISFSI, Dominion has calculated an annual ISFSI direct dose to construction workers of 1.5 mrem/yr.²

¹ STP 3&4 FSAR, p. 12.3-10

² Letter from Mark D. Mitchell to USNRC re North Anna Unit 3 Combined License Application, SRP 12.03-12.04:Response to RAI Letter 135, dated January 23, 2015