L. M. Stinson (Mike)
Vice President

Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205.992.5181
Fax 205.992.0341

SOUTHERN COMPANY
Energy to Serve Your World℠

November 27, 2006

Docket Nos.: 50-321
50-366

NL-06-2550

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant
Request to Implement an Alternative Source Term
RADTRAD Input Files

Ladies and Gentlemen:

On August 29, 2006, Southern Nuclear Operating Company (SNC) submitted a request to revise the Edwin I. Hatch Nuclear Plant (HNP) licensing/design basis with a full scope implementation of an alternative source term (AST).

In response to several conversations with NRC staff reviewing the HNP AST submittal, this letter provides RADTRAD input files intended to facilitate the NRC staff review of the HNP AST submittal. It is noted that the LocaDose code has been used for the HNP AST design basis accident dose calculations; therefore, the RADTRAD results are not intended to replace those results in the AST submittal calculated with LocaDose. Also provided, for reference, is a comparison of the RADTRAD results with the LocaDose results.

Sincerely,

L. M. Stinson

L. M. Stinson

LMS/CLT/daj

A001

Enclosures: 1) Compact Disc (CD) of RADTRAD Input Files
2) Comparison of the RADTRAD Results with the LocaDose Results

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. D. R. Madison, General Manager – Plant Hatch
RType: CHA02.004

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. R. E. Martin, NRR Project Manager – Hatch
Mr. D. S. Simpkins, Senior Resident Inspector – Hatch

Enclosure 1

Edwin I. Hatch Nuclear Plant
Request to Implement an Alternative Source Term
RADTRAD Input Files

Compact Disc (CD) of RADTRAD Input Files

Enclosure 2

Edwin I. Hatch Nuclear Plant
Request to Implement an Alternative Source Term
RADTRAD Input Files

Comparison of the RADTRAD Results with the LocaDose Results

Enclosure 2

Edwin I. Hatch Nuclear Plant
Request to Implement an Alternative Source Term - RADTRAD Input Files
Comparison of the RADTRAD Results with the LocaDose Results

The following tables and notes provide a comparison of RADTRAD results and LocaDose results for each of the four licensing basis radiological accidents analyzed in the Hatch Alternative Source Term submittal. The submittal used LocaDose to calculate doses. For comparison and or validation of results, another widely available code, RADTRAD, can be used. Enclosure 1 provides input files for use in modeling Hatch using RADTRAD. This enclosure summarizes and compares those results using RADTRAD Version 3.0.2a.

Table 1

LocaDose/RADTRAD Comparison for LOCA

LOCA	*CR Immersion and Inhalation*	*EAB Ground*	*EAB Elevated*	*LPZ Ground*	*LPZ Elevated*	EAB Total	LPZ Total
RADTRAD	4.13	*0.275*	*0.037*	*0.626*	*0.118*	0.312	0.744
Submittal	4.32	*0.307*	*0.033*	*0.644*	*0.110*	0.340	0.754
Δ RADTRAD	**-4.4%**	*-10.4%*	*12.1%*	*-2.8%*	*7.3%*	**-8.2%**	**-1.3%**

Notes:

1. Generally speaking, 5% is considered good agreement for dose codes. The EAB dose is somewhat greater than 5% different, but the largest contributor is the EAB ground release (secondary containment bypass) where the peak dose period (as determined by RADTRAD) starts at 0.6 hours. At this time, the RADTRAD dose rate is increasing from ~0.07 rem/hr just before 0.6 hours to ~0.12 rem/hr just after, a 0.05 rem/hr change. By way of contrast, at 2.6 hours (two hours later), the rate of dose increase is much steadier (~0.10 rem/hr both before and after 2.6 hours). Since RADTRAD evaluates the 2-hour dose on a different periodicity than LocaDose, the result could easily vary by 0.01-0.02 rem. If the RADTRAD EAB ground dose were ~0.015 rem higher, the 5% criterion would be met.
2. Rb88 is included as Kr88 daughter (not RADTRAD default).
3. The .RFT files include a 0.033 hour delay in release (not RADTRAD default).
4. For ESF leakage, the .PSF file uses "WW" to represent the suppression pool instead of the torus gas space.
5. The .RFT file for ESF leakage includes 2 x iodine release. Aerosol is then removed in the release path by DF = 1E6. This leaves 10% iodine (97% elemental and 3% organic) as the release.
6. The LocaDose results for the AST submittal employ a correction factor to reduce shine dose in control room based on a more careful evaluation of finite volume correction. To mimic this in RADTRAD, the control room volume was reduced to 10,200 ft^3. All relevant flows (makeup, inleakage, recirculation, and outleakage) were reduced accordingly to preserve fractional rates.

Table 2

LocaDose/RADTRAD Comparison for MSLB

MSLB	*CR Immersion and Inhalation*	*EAB Total*	*LPZ Total*
RADTRAD	3.72	0.154	0.154
Submittal	3.70	0.150	0.150
Δ RADTRAD	**0.5%**	**2.7%**	**2.7%**

Notes:

1. Generally speaking, 5% is considered good agreement for dose codes.
2. The activity to be released is placed in a unique .nif file. The .rft file then releases it all over 3E-4 hours (about one second) to a one ft^3 "Plume." The plume then releases the activity either to the environment or to the turbine building, depending on the case.

Table 3

LocaDose/RADTRAD Comparison for CRDA

CRDA	*CR Immersion and Inhalation*	*EAB Total*	*LPZ Total*
RADTRAD	3.31	0.044	0.086
Submittal	3.61	0.047	0.094
Δ RADTRAD	**-8.3%**	**-6.4%**	**-8.5%**

Notes:

1. Generally speaking, 5% is considered good agreement for dose codes. These deviations are slightly greater. It may be that certain decay daughters not included in the RADTRAD default decay schemes are making a contribution via decay in the main condenser.
2. Rb88 is included as Kr88 daughter (not RADTRAD default).
3. The fractional releases in the .rft file are based on 1189 pins out of 48888 being damaged (gap release) and 11 melting (fuel release).
4. The DF of 10 for gaseous iodine and the DF of 100 for particulate associated with steam line transport is built into the .rft file. Note that all iodine released is assumed to be gaseous.
5. The gap fractions are 10% for noble gas and iodine, 12% for Cs-Rb.
6. The DF of 10 for iodine transport and the DF of 100 for particulate transport from the main condenser to the turbine building is included in the MC to TB junction.

Table 4

LocaDose/RADTRAD Comparison for FHA

FHA	*CR Immersion and Inhalation*	*EAB Total*	*LPZ Total*
RADTRAD	3.50	1.140	1.140
Submittal	3.50	1.200	1.200
Δ RADTRAD	**0%**	**-5.0%**	**-5.0%**

Notes:

1. Generally speaking, 5% is considered good agreement for dose codes.
2. The GAP control volume contains the gap activity (based on 0.05% of the core inventory multiplied by the peaking factor of 1.5).
3. The .nif file includes additional Kr-85 and I-131 to account for the higher gap fractions.
4. The gap release to the RB occurs at 24 hours. The release is based on 172 out of 48888 pins failing. This fraction (3.52E-3) is multiplied by 100 to obtain a percentage of 0.352. This becomes the flowrate from the 100 ft^3 "GAP" for 0.017 hours (one minute) to release the fraction of 3.52E-3. Immediately, this is released to the environment. The release rate is 5.8 cfm per minute from a 100 ft^3 volume ("RB") or 5.8% per minute. The release duration is 119 minutes. The result is a 99.9% release of the activity in two hours.
5. 10,000 cfm unfiltered CR inleakage is used. A ground level release is assumed.