

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Terry J. Garrett
Vice President, Engineering

January 8, 2008

ET 08-0001

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Reference: Letter ET 06-0038, dated September 27, 2006, from T.J. Garrett, WCNOG, to USNRC

Subject: Docket No. 50-482: Summary of the Impact to Wolf Creek Generating Station License Renewal Application Severe Accident Mitigation Alternatives Analysis due to Computer Program Errors

Gentlemen:

The reference provided Wolf Creek Nuclear Operating Corporation's (WCNOG) License Renewal Application (LRA) for the Wolf Creek Generating Station (WCGS). Three problems with a computer program used to generate some portions of the Severe Accident Mitigation Alternatives (SAMA) analysis have been discovered that have impacted the WCGS SAMA analysis report. The WCGS SAMA analysis is Attachment F, "Severe Accident Mitigation Alternatives Analysis," to LRA Appendix E, "Applicant's Environmental Report Operating License Stage."

The Wolf Creek severe accident baseline cost and dose risk were calculated using the MELCOR ACCIDENT CONSEQUENCE CODE SYSTEM (MACCS2) code. The Sector Population, Land Fraction, and Economic Estimation Program (SECPOP2000) code served as an ancillary code for the analysis. Three problems related to the use of the SECPOP2000 code have recently been identified and publicized throughout the industry.

All three SECPOP2000 problems have been corrected and new MACCS2 results calculated. The WCGS SAMA analysis was reanalyzed using the corrected SECPOP input. The attachment to this letter provides an analysis and summary of the impact of the re-analysis to conclusions reached in Attachment F of LRA Appendix E.

No commitments are identified in this submittal. If you have any questions concerning this matter, please contact me at (620) 364-4084, or Mr. Richard Flannigan at (620) 364-4117.

Sincerely,



Terry J. Garrett

TJG/rlt

Attachment - Revisions to WCGS SAMA Analysis

cc: E. E. Collins (NRC), w/a
V. G. Gaddy (NRC), w/a
B. K. Singal (NRC), w/a
T. Tran (NRC), w/a
Senior Resident Inspector (NRC), w/a

STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Terry J. Garrett, of lawful age, being first duly sworn upon oath says that he is Vice President Engineering of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the contents thereof; that he has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By 
Terry J. Garrett
Vice President Engineering

SUBSCRIBED and sworn to before me this 8th day of January, 2008.


Notary Public



Expiration Date 7/24/2011

Attachment

**Summary to the Impact to Wolf Creek Generating Station (WCGS) Severe Accident
Mitigation Alternatives (SAMA) Analysis Resulting from Corrections to the Sector
Population, Land Fraction, and Economic Estimation (SECPOP) Code**

The Wolf Creek Generating Station (WCGS) severe accident baseline cost and dose risk were calculated using the MELCOR ACCIDENT CONSEQUENCE CODE SYSTEM (MACCS2) code. The Sector Population, Land Fraction, and Economic Estimation Program (SECPOP2000) code served as an ancillary code for the analysis; output from SECPOP2000 was used to specify year 2000 residential population distribution and agricultural (e.g., fraction of land used in farming, farm sales) and economic (e.g., farm land property value, non-farm property value) parameters for the 50-mile area surrounding the site. Values for those parameters are used in the MACCS2 consequence calculations, which are combined with accident probabilities to produce the risks.

Three problems related to the use of the SECPOP2000 code have recently been identified and publicized throughout the industry. Problems identified are: (1) a formatting error in the regional economic data block text file generated by SECPOP2000 for input to MACCS2, which results in MACCS2 misreading the data, (2) an error associated with the formatting of the COUNTY97.DAT economic database file used by SECPOP2000, which results in SECPOP2000 processing incorrect economic and land use data (i.e., missing entries in the "Notes" column result in data being output for the wrong county), and (3) gaps in the numbered entries in the COUNTY97.DAT economic database file which result in any county beyond county number 955 being handled incorrectly in SECPOP2000. All of these problems affect the agricultural and economic parameters input to MACCS2 for WCGS. None of these problems affect the population distribution specification.

All three SECPOP2000 problems have been corrected and new MACCS2 results calculated. Table 1 shows the original and corrected total baseline dose and cost risk.

Table 1. Baseline Risks for Wolf Creek SAMA as Affected by SECPOP2000 Errors

Revision	Dose Risk (person-rem/Ryr)	Cost Risk (\$/Ryr)
Results from the License Renewal Application	2.86	\$1,974
Results from Corrected SECPOP2000	3.27	\$2,975

The corrections to the SECPOP2000 input to the MACCS analysis impacted the conditional dose and economic costs associated with each of the accident scenarios considered in the WCGS SAMA analysis. Table 2 shows the baseline risks by release category.

Table 2. MACCS2 Revision 3 Results for Wolf Creek by Release Category

Release Category	Annual Frequency	Population Dose-Risk 0-50 miles (person-rem/yr)	Total Economic Cost-Risk 0-50 miles (\$/yr)
Leakage/No Cfail	2.80×10^{-05}	0.232	2
Late Cfail	1.13×10^{-06}	0.10	6
SGTR	1.65×10^{-07}	0.05	98
ISLOCA	1.92×10^{-06}	2.71	2,534
Cont Iso	3.42×10^{-09}	0.0	2
Early Cfail	4.48×10^{-07}	0.18	333
TOTAL	3.17×10^{-05}	3.27	\$2,975

The WCGS modified Maximum Averted Cost Risk (MACR), which accounts for external events, has been recalculated to determine the potential impact on the SAMA analysis. The modified MACR based on the mean Probabilistic Risk Assessment (PRA) results increased from the Environmental Report (ER) submittal value of \$1,852,000 to \$1,908,000 (3.0 percent increase). The 95th percentile PRA results sensitivity case was also recalculated and it was determined that the modified MACR increased from the ER submittal value of \$3,518,800 to \$3,625,200 (also a 3.0 percent increase). The changes to the modified MACR estimates did not impact the analysis.

In addition to the impact on the modified MACR, the SECPOP2000 errors also impacted the averted cost-risks that were calculated for each of the SAMAs. Table 3 provides a summary of the impact of using the corrected results in conjunction with the mean PRA results in the detailed cost-benefit calculations that were performed.

Table 3. Results Summary after Correction of SECPOP2000 Errors 1 Through 3 (Mean PRA Results)

SAMA ID	Cost of Implementation	Averted Cost-Risk (ER Submittal)	Net Value (ER Submittal)	Averted Cost- Risk (Corrected)	Net Value (Corrected)	Change in Cost Effectiveness ?
SAMA 1	\$800,000	\$799,882	-\$118	\$808,634	\$8,634	Yes
SAMA 2	\$400,000	\$655,712	\$255,712	\$664,346	\$264,346	No
SAMA 3	\$328,000	\$293,252	-\$34,748	\$296,952	-\$31,048	No
SAMA 4 - Case 1	\$600,000	\$243,368	-\$356,632	\$271,464	-\$328,536	No
SAMA 4 - Case 2	\$50,000	\$173,050	\$123,050	\$193,114	\$143,114	No
SAMA 5	\$50,000	\$54,576	\$4,576	\$56,502	\$6,502	No
SAMA 8	\$565,000	\$43,492	-\$521,508	\$44,094	-\$520,906	No
SAMA 13	\$150,000	\$111,168	-\$38,832	\$112,038	-\$37,962	No
SAMA 14	\$1,200,000	\$882,152	-\$317,848	\$892,196	-\$307,804	No
SAMA 15 - Case 1	\$3,250,000	\$404,219	-\$2,845,781	\$416,442	-\$2,833,558	No
SAMA 15 - Case 2	\$1,000,000	\$404,219	-\$595,781	\$416,442	-\$583,558	No
SAMA 16	\$565,000	\$22,648	-\$542,352	\$23,372	-\$541,628	No
SAMA 17	\$550,000	\$65,328	-\$484,672	\$66,592	-\$483,408	No

As demonstrated in Table 3, the SECPOP2000 corrections had a minimal impact on the averted cost-risk estimates and only one SAMA (SAMA 1) that was originally classified as “not cost beneficial” was re-classified as “cost beneficial” based on the use of the corrected SECPOP2000 results. Given that SAMA 1 was identified as potentially cost beneficial in the original 95th percentile PRA results sensitivity analysis that was performed in the ER submittal, this change did not result in the identification of any new potentially cost beneficial SAMAs.

In addition to the review of the mean PRA results quantifications, it was necessary to examine how the 95th percentile PRA results quantifications were impacted given that they were also used to identify potentially cost beneficial SAMAs. Table 4 provides a summary of the cost benefit calculations using the corrected SECPOP2000 results in conjunction with the 95th percentile PRA results. In this case, no SAMAs were identified as potentially cost beneficial that were not already identified in the ER submittal.

Table 4. Results Summary after Correction of SECPOP2000 Errors 1 Through 3 (95th Percentile PRA Results)

SAMA ID	Cost of Implementation	Averted Cost-Risk (ER Submittal)	Net Value (ER Submittal)	Averted Cost- Risk (Corrected)	Net Value (Corrected)	Change in Cost Effectiveness?
SAMA 1	\$800,000	\$1,519,776	\$719,776	\$1,536,405	\$736,405	No
SAMA 2	\$400,000	\$1,245,853	\$845,853	\$1,262,257	\$862,257	No
SAMA 3	\$328,000	\$557,179	\$229,179	\$564,209	\$236,209	No
SAMA 4 - Case 1	\$600,000	\$462,399	-\$137,601	\$515,782	-\$84,218	No
SAMA 4 - Case 2	\$50,000	\$328,795	\$278,795	\$366,917	\$316,917	No
SAMA 5	\$50,000	\$103,694	\$53,694	\$107,354	\$57,354	No
SAMA 8	\$565,000	\$82,635	-\$482,365	\$83,779	-\$481,221	No
SAMA 13	\$150,000	\$211,219	\$61,219	\$212,872	\$62,872	No
SAMA 14	\$1,200,000	\$1,676,089	\$476,089	\$1,695,172	\$495,172	No
SAMA 15 - Case 1	\$3,250,000	\$768,017	-\$2,481,983	\$791,240	-\$2,458,760	No
SAMA 15 - Case 2	\$1,000,000	\$768,017	-\$231,983	\$791,240	-\$208,760	No
SAMA 16	\$565,000	\$43,031	-\$521,969	\$44,407	-\$520,593	No
SAMA 17	\$550,000	\$124,123	-\$425,877	\$126,525	-\$423,475	No