



**WITHHOLD ENCLOSURES 2, 3, 4, 5 and 6 FROM PUBLIC  
DISCLOSURE UNDER 10 CFR 2.390**

May 20, 2008

L-MT-08-036  
10 CFR 50.90

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

Monticello Nuclear Generating Plant  
Docket 50-263  
Renewed Facility Operating License  
License No. DPR-22

Monticello Extended Power Uprate (USNRC TAC MD8398):  
Acceptance Review Supplement Regarding Radiological Analysis

References 1) NMC Letter to USNRC, "License Amendment Request: Extended Power Uprate," dated March 31, 2008

Pursuant to 10 CFR 50.90, Nuclear Management Company, LLC (NMC), requested in Reference 1 approval of amendments to the Monticello Nuclear Generating Plant (MNGP) Renewed Operating License (OL) and Technical Specifications (TS) to increase the maximum power level authorized from 1775 megawatts thermal (MWt) to 1870 MWt, an approximate five percent increase in the current licensed thermal power (CLTP). The proposed request for Extended Power Uprate (EPU) represents an increase of approximately 12 percent above the Original Licensed Thermal Power (OLTP).

In a teleconference held May 6, 2008, the NRC staff indicated that certain radiological calculations would be necessary for the NRC to complete the acceptance review. Enclosure 1 contains a general description of accident radiological analysis changes. This description is an extraction of several appendices from radiological evaluations performed to support the EPU. Enclosures 2, 3, 4, 5, and 6 provide the proprietary radiological calculations requested by the NRC staff.

The supplemental information provided in Enclosures 2, 3, 4, 5 and 6 are considered proprietary by Alion Science and Technology. Alion requests that the proprietary information be withheld from public disclosure in accordance with 10 CFR 2.390(a)4 and 9.17(a)4. An Affidavit supporting this request is provided in Enclosure 7.

A001  
NRC

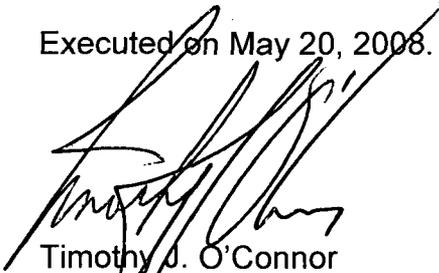
NMC has reviewed the No Significant Hazards Consideration and the Environmental Consideration submitted with Reference 1 relative to this supplemental information. NMC has determined that there are no changes required to either of these sections of Reference 1.

Commitment Summary

This letter makes no new commitments and does not change any existing commitments.

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

Executed on May 20, 2008.



Timothy J. O'Connor  
Site Vice President, Monticello Nuclear Generating Plant  
Nuclear Management Company, LLC

cc: Administrator, Region III, USNRC  
Project Manager, Monticello, USNRC  
Resident Inspector, Monticello, USNRC  
Minnesota Department of Commerce w/o enclosures 2 through 6

Enclosures (7)

1. Enclosure 1, General Description of Accident Radiological Analysis Changes
2. Enclosure 2, MNGP-003, "MNGP AST - LOCA Radiological Consequence Analysis", Rev 3
3. Enclosure 3, MNGP-005, "MNGP AST - CRDA Radiological Consequence Analysis," Rev 2
4. Enclosure 4, MNGP-006, "MNGP AST - FHA Radiological Consequence Analysis," Rev 2
5. Enclosure 5, ALION-CAL-MNGP-4370-02, "MNGP EPU - CR and TSC Direct Dose," Rev 0
6. Enclosure 6, ALION-CAL-MNGP-4370-03, "MNGP EPU - TSC Internal Dose," Rev 0
7. Enclosure 7, Alion Science and Technology Affidavit

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Enclosure 1 to L-MT-08-036

General Description of Accident  
Radiological Analysis Changes

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## ENCLOSURE 1

Enclosure 1 contains appendices that were extracted from the Extended Power Uprate (EPU) Final Task Report evaluation titled, "Accident Radiological Analysis." These appendices are being provided as supplementary information. Note that Nuclear Management Company (NMC) is not providing all of the appendices from this task report.

Appendix A below contains a summary of the core inventory. Appendix B from the task report is not being provided. Appendix C provides information regarding the offsite and onsite atmospheric dispersion factors and the associated  $\chi/Q$  data. Note that the atmospheric dispersion factors summarized in Appendix C below are unchanged from values used to support the Monticello conversion to alternate source term (AST) and the modification for the new Technical Support Center (TSC). Appendix D provides a summary of the evaluation changes from the current licensed thermal power (CLTP) to EPU. A list of references that are referred to in the extracted appendices is also provided at the end of Enclosure 1.

### Appendix A

#### Core Inventory @ T = 0 Hours in Ci/MWt

Nuclide	EPU	Nuclide	EPU	Nuclide	EPU
Co-58	1.379E+02	Ru-103	4.049E+04	Cs-136	1.863E+03
Co-60	1.329E+02	Ru-105	2.708E+04	Cs-137	3.470E+03
Kr-85	3.327E+02	Ru-106	1.409E+04	Ba-139	4.965E+04
Kr-85m	7.383E+03	Rh-105	2.461E+04	Ba-140	4.774E+04
Kr-87	1.424E+04	Sb-127	2.795E+03	La-140	4.915E+04
Kr-88	2.005E+04	Sb-129	8.518E+03	La-141	4.530E+04
Rb-86	6.346E+01	Te-127	2.838E+03	La-142	4.388E+04
Sr-89	2.684E+04	Te-127m	3.703E+02	Ce-141	4.534E+04
Sr-90	2.637E+03	Te-129	8.381E+03	Ce-143	4.228E+04
Sr-91	3.365E+04	Te-129m	1.243E+03	Ce-144	3.682E+04
Sr-92	3.621E+04	Te-131m	3.842E+03	Pr-143	4.134E+04
Y-90	2.805E+03	Te-132	3.817E+04	Nd-147	1.807E+04
Y-91	3.439E+04	I-131	2.677E+04	Np-239	5.223E+05
Y-92	3.636E+04	I-132	3.896E+04	Pu-238	9.040E+01
Y-93	4.177E+04	I-133	5.513E+04	Pu-239	1.086E+01
Zr-95	4.851E+04	I-134	6.087E+04	Pu-240	1.408E+01
Zr-97	4.993E+04	I-135	5.174E+04	Pu-241	4.092E+03
Nb-95	4.869E+04	Xe-133	5.478E+04	Am-241	4.610E+00
Mo-99	5.124E+04	Xe-135	2.532E+04	Cm-242	1.085E+03
Tc-99m	4.537E+04	Cs-134	5.346E+03	Cm-244	5.238E+01

Note: Information is from Reference 3 with the exception of Co-58 and Co-60. Data for C-58 and C0-60 are the BWR default source term values from Reference 14, NUREG/CR-6604, Table 1.4.3.2-3.

# ENCLOSURE 1

## Appendix C

### Atmospheric Dispersion Factors

#### C.1 Offsite Atmospheric Dispersion Factors

Offsite atmospheric dispersion factors are calculated in accordance with Regulatory Guide (RG) 1.145, Reference 27, using the PAVAN code, Reference 28. Site meteorology for the five year period of January 1, 1998 to December 31, 2002 was used. The MNGP site meteorology measurement program meets the recommendations of RG 1.23, "Onsite Meteorological Programs" (Reference 29) and maintained a data recovery rate of greater than 90 percent during the above time period.

The offsite atmospheric dispersion factor calculations use a low population zone (LPZ) distance of 1609 meters and variant exclusion area boundary (EAB) distances ranging from 450 to 1283 meters depending on the release point and directional sector. For both the EAB and the LPZ, the calculated five percent overall site  $\chi/Q$  (RG 1.145 regulatory position 3) is the limiting  $\chi/Q$  since it exceeds the individual sector's  $\chi/Q$ . The calculated EAB  $\chi/Q$  data for the elevated stack release was confirmed conservative by performing calculations beyond the EAB minimum sector distance in accordance with regulatory position 1.2 of RG 1.145. The calculated offsite  $\chi/Q$  data is as follows:

TABLE C.1-1: Offsite  $\chi/Q$ 's

Release Type	$\chi/Q$ (sec/m <sup>3</sup> )				
	0-2 hours	0-8 hours	8-24 hours	1-4 days	4-30 days
EAB – Ground Release	7.86E-04 <sup>1</sup>	N/A	N/A	N/A	N/A
EAB – Elevated Release <sup>1</sup>	4.22E-06 <sup>2,3</sup>	N/A	N/A	N/A	N/A
LPZ – Ground Release	1.53E-04	8.83E-05	6.71E-05	3.70E-05	1.57E-05
LPZ – Elevated Release	3.79E-06 <sup>4</sup>	2.14E-06	1.61E-06	8.64E-07	3.54E-07

- (1) Limiting 5% overall site ground level release distance conservatively assumed as 450 meters, or shortest ground release EAB sector distance.
- (2) 1.11E-04 calculated for fumigation period.
- (3) Limiting 5% overall site elevated release EAB distance conservatively assumed as 500 meters, or shortest elevated release EAB sector distance.
- (4) 3.860E-05 calculated for fumigation period.

## ENCLOSURE 1

### C.2 Onsite Atmospheric Dispersion Factors

Onsite atmospheric dispersion factors are calculated for the control room (CR) and the TSC in accordance with RG 1.194, Reference 30, using the ARCON96 (Reference 31) and PAVAN (Reference 28) codes. Site meteorology for the five year period of January 1, 1998 to December 31, 2002 is used. The MNGP site meteorology measurement program meets the recommendations of USNRC RG 1.23, "Onsite Meteorological Programs" (Reference 29) and maintained a data recovery rate of greater than 90 percent during the above time period.

The onsite atmospheric dispersion factor calculations use inputs and assumptions in accordance with RG 1.194 including:

- ARCON96 Meteorology Data Set structure per Appendix A of Reference 30
- ARCON96 Input Parameters per recommendations in Appendix A of Reference 30 including use of site instrumentation data from the tower elevation closest to the release height
- Use of "taut string length" source-receptor distances as allowed for releases within building complexes (Reference 30, Section 3.4)
- Limiting source-receptor distances take into consideration the requirements of Section 3.3.3 of Reference 30 as it relates to infiltration pathways.
- Consistent with Section 3.2.2 of Reference 30, elevated stack release  $\chi/Q$  for onsite receptors (CR) calculated using PAVAN code. Conservatively, the PAVAN  $\chi/Q$ 's are used for all post-accident time periods. The effective release height is adjusted for the difference between plant grade and the CR ventilation intake elevation.

The calculated onsite  $\chi/Q$  data is shown in the following tables:

**TABLE C.2-1:  $\chi/Q$ , Ground Level Release from Reactor Building (RB) Nearest Wall to CR**

Time Period	CR Intake, $\chi/Q$ (sec/m <sup>3</sup> )	Administrative Building Intake, $\chi/Q$ (sec/m <sup>3</sup> )
0-2 hours	1.00E-02	1.43E-02
2-8 hours	7.09E-03	9.69E-03
8-24 hours	2.75E-03	3.82E-03
1-4 days	1.90E-03	2.65E-03
4-30 days	1.42E-03	1.98E-03

**ENCLOSURE 1**

**TABLE C.2-2:  $\chi/Q$ , Ground Level Release from RB Vent to CR**

<b>Time Period</b>	<b>CR Intake, <math>\chi/Q</math> (sec/m<sup>3</sup>)</b>	<b>Administrative Building Intake, <math>\chi/Q</math> (sec/m<sup>3</sup>)</b>
0-2 hours	2.48E-03	2.47E-03
2-8 hours	1.81E-03	1.76E-03
8-24 hours	6.58E-04	6.31E-04
1-4 days	4.67E-04	4.57E-04
4-30 days	3.49E-04	3.41E-04

**TABLE C.2-3:  $\chi/Q$ , Ground Level Release from Turbine Building Vent to CR**

<b>Time Period</b>	<b>CR Intake, <math>\chi/Q</math> (sec/m<sup>3</sup>)</b>	<b>Administrative Building Intake, <math>\chi/Q</math> (sec/m<sup>3</sup>)</b>
0-2 hours	2.51E-03	2.58E-03
2-8 hours	1.73E-03	1.85E-03
8-24 hours	6.86E-04	7.37E-04
1-4 days	4.70E-04	4.90E-04
4-30 days	3.52E-04	3.84E-04

**TABLE C.2-4:  $\chi/Q$ , Elevated Release from Offgas Stack to CR**

<b>Time Period</b>	<b>CR Intake, <math>\chi/Q</math> (sec/m<sup>3</sup>)</b>	<b>Administrative Building Intake, <math>\chi/Q</math> (sec/m<sup>3</sup>)</b>
Fumigation	3.37E-04	3.59E-04
0-2 hours	3.77E-06	4.06E-06
0-8 hours	5.74E-07	5.75E-07
8-24 hours	2.24E-07	2.17E-07
1-4 days	2.90E-08	2.60E-08
4-30 days	1.54E-09	1.24E-09

## ENCLOSURE 1

**TABLE C.2-5:  $\chi/Q$ , Ground Level Release from RB Nearest Wall to TSC**

<b>Time Period</b>	<b><math>\chi/Q</math> (sec/m<sup>3</sup>)</b>
0-2 hours	3.99E-04
2-8 hours	2.78E-04
8-24 hours	1.10E-04
1-4 days	7.62E-05
4-30 days	5.67E-05

**TABLE C.2-6:  $\chi/Q$ , Ground Level Release from TB Vent to TSC**

<b>Time Period</b>	<b><math>\chi/Q</math> (sec/m<sup>3</sup>)</b>
0-2 hours	3.13E-04
2-8 hours	2.21E-04
8-24 hours	8.87E-05
1-4 days	5.99E-05
4-30 days	4.49E-05

**TABLE C.2-7:  $\chi/Q$ , Elevated Release from Offgas Stack to TSC**

<b>Time Period</b>	<b><math>\chi/Q</math> (sec/m<sup>3</sup>)</b>
Fumigation	3.13E-04
0-2 hours	3.50E-06
2-8 hours	3.97E-07
8-24 hours	1.34E-07
1-4 days	1.31E-08
4-30 days	4.90E-10

# ENCLOSURE 1

## APPENDIX D

### SUMMARY OF CHANGES FROM CLTP

**Table D.1 - Loss of Coolant Accident (LOCA)**

<b>Item</b>	<b>Parameter Change From CLTP</b>
1	Updated Source Term. See Appendix A
2	Increased Primary Leakage Rates after 24 hours post-LOCA
3	Main Steam Isolation Valve (MSIV) Leakage – Increased MS pipe temperature assumption resulting in decrease in radionuclide deposition within MS piping and main condenser.

**Table D.2 - Fuel Handling Accident (FHA)**

<b>Item</b>	<b>Parameter Change From CLTP</b>
1	Updated Source Term

**Table D.3 - Control Rod Drop Accident (CRDA)**

<b>Item</b>	<b>Parameter Change From CLTP</b>
1	Updated Source Term

**Table D.4 - Main Steam Line Break (MSLB)**

<b>Item</b>	<b>Parameter Change From CLTP</b>
1	Updated Source Term

**Table D.5 – Suppression Pool pH**

<b>Item</b>	<b>Parameter Change From CLTP</b>
1	Updated Source Term resulting in acid production increase.
2.	Increased Equipment Qualification dose resulting in acid production increase.

## ENCLOSURE 1

### Extracted References

Item	Description
3	GE Nuclear Energy "Project Task Report Nuclear Management Company, LLC (NMC), Monticello Nuclear Power Plant, Extended Power Uprate, Task T0802, Core Source Term", GE-NE-0000-0064-6767-TR-R0, Rev. 0, Class III, July, 2007
14	"RADTRAD: A Simplified Model for <u>RAD</u> ionuclide <u>T</u> ransport and <u>R</u> emoval <u>A</u> nd <u>D</u> ose Estimation", NUREG/CR-6604, April 1998, Supplement 1, June 8, 1999, and Supplement 2, October 2002.
27	USNRC RG 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments of Nuclear Power Plants," Rev. 2.
28	"PAVAN: An Atmospheric Dispersion Program for Evaluating Design Bases Accidental Releases of Radioactive Materials from Nuclear Power Stations," NUREG-2858, November 1982. RSICC Computer Code Collection No. CCC-445.
29	USNRC RG 1.23, "Onsite Meteorological Programs."
30	USNRC Regulatory Guide 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants."
31	"Atmospheric Relative Concentrations in Building Wakes," NUREG-6331, Rev. 1, May 1997. ARCON96, RSICC Computer Code Collection No. CCC-664.

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Enclosure 7 to L-MT-08-036

Alion Science and  
Technology Affidavit

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# Alion Science and Technology

## AFFIDAVIT

I, Peter K. Mast, state as follows:

- (1) I am Vice President, Innovative Technology Solutions Operations, Alion Science and Technology Corporation (ALION) and have the responsibility for reviewing the information described in paragraph (2) that is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in the proprietary calculations listed in Attachment A.
- (3) In making this application for withholding of proprietary information of which it is the owner, ALION relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The materials for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information that fit into the definition of proprietary information are:
  - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by ALION's competitors without license from ALION constitutes a competitive economic advantage over other companies;
  - b. Information that, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, preparation, manufacture, shipment, installation, assurance of quality, or licensing of a similar product or service;
  - c. Information that reveals cost or price information, production capacities, budget levels, or commercial strategies of Alion, its customers, or its suppliers;
  - d. Information that reveals aspects of past, present, or future ALION customer-funded development plans and programs, resulting in potential products to ALION;
  - e. Information that discloses patentable subject matter for which it may be desirable to obtain patent protections.

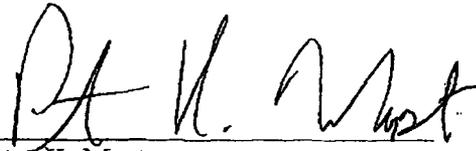
The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a, and (4)b, above.

- (5) To address 10 CFR 2.390 (a)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by ALION, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by ALION, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating division, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within ALION is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the manager, project manager, principal engineer or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by Contracts, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside ALION are limited to regulatory bodies, customers and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information identified in paragraph (2), above, is classified as proprietary because it contains detailed methods and processes, which Alion has developed for the preparation of detailed safety analyses in support of the design and licensing of nuclear facilities. The development of these methods and processes along with the interpretation and application of the analytical results was derived from extensive company experience that constitutes a major ALION asset.
- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to ALION's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of ALION's comprehensive nuclear safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical databases used and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation processes. The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial. ALION's competitive advantage will be lost if its competitors are able to use the results of the ALION experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions. The value of this information to ALION would be lost if the information were disclosed to the public. Making such information available to competitors

without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive ALION of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 19th day of May, 2008.

A handwritten signature in black ink, appearing to read "Peter K. Mast". The signature is written in a cursive style with a horizontal line underneath it.

Peter K. Mast

Vice President, Alion Science and Technology

## ATTACHMENT A

1. MNGP-003, R3, "MNGP AST – LOCA Radiological Consequence Analysis."
2. MNGP-005, R2, "MNGP AST – CRDA Radiological Consequence Analysis."
3. MNGP-006, R2, "MNGP AST – FHA Radiological Consequence Analysis."
4. ALION-CAL-MNGP-4370-02, R0, "MNGP EPU – CR & TSC Direct Dose."
5. ALION-CAL-MNGP-4370-03, R0, "MNGP EPU – TSC Internal Dose."