

Appendix B

Contributors to the Supplement

Appendix B: Contributors to the Supplement

The overall responsibility for the preparation of this supplement was assigned to the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission (NRC). The statement was prepared by members of the Office of Nuclear Reactor Regulation with assistance from other NRC organizations, the Lawrence Livermore National Laboratory, Argonne National Laboratory, Energy Research Incorporated, and the Information Systems Laboratory.

Name	Affiliation	Function or Expertise
NUCLEAR REGULATORY COMMISSION		
Leslie C. Fields	Nuclear Reactor Regulation	Project Manager
Rani L. Franovich	Nuclear Reactor Regulation	Branch Chief
Jennifer A. Davis	Nuclear Reactor Regulation	Backup Project Manager/Cultural Resources
Michael T. Masnik	Nuclear Reactor Regulation	Aquatic and Terrestrial Resources
Stacey Imboden	Nuclear Reactor Regulation	Health Physics
Richard Emch	Nuclear Reactor Regulation	Health Physics
Robert Palla	Nuclear Reactor Regulation	Severe Accident Mitigation Alternatives
William L. Dam ^(A)	Nuclear Reactor Regulation	Socioeconomics/Land Use
Samuel Hernandez Quinones	Nuclear Reactor Regulation	Project Support/Backup Project Manager
LAWRENCE LIVERMORE NATIONAL LABORATORY^(B)		
Bruce McDowell		Task Leader
Lily A. Sanchez		Deputy Task Leader
Jessie Coty		Aquatic Ecology
Lisa Crawford		Alternatives
Paul McGuff		Cultural Resources
Crystal Quinly		Land Use, Related Federal Programs
Warren Rued		Socioeconomics
Karen McWilliams		Technical Editor
Nancy Woods		Technical Editor

Appendix B

Name	Affiliation	Function or Expertise
Celina Chance		Administrative Support
Kim Martin		Administrative Support
ARGONNE NATIONAL LABORATORY^(C)		
Timothy Allison		Socioeconomics
Halil I. Avci		Radiation Protection
John Krummel		Terrestrial Ecology
Mike Lazaro		Meteorology, Air Quality
David S. Miller		Water Use; Hydrology
INFORMATION SYSTEMS LABORATORY		
Kim Green		Severe Accident Mitigation Alternatives
Bob Schmidt		Severe Accident Mitigation Alternatives
<p>(A) No longer with the NRC.</p> <p>(B) Lawrence Livermore National Laboratory is operated for the U.S. Department of Energy by the University of California.</p> <p>(C) Argonne National Laboratory is operated for the U.S. Department of Energy by the University of Chicago.</p>		

Appendix C

Chronology of NRC Staff Environmental Review Correspondence Related to Nine Mile Point Nuclear Station, LLC's Application for License Renewal of Nine Mile Point, Units 1 and 2

Appendix C: Chronology of NRC Staff Environmental Review Correspondence Related to Nine Mile Point Nuclear Station, LLC's Application for License Renewal of Nine Mile Point, Units 1 and 2

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC) and Nine Mile Point Nuclear Station, LLC (NMPNS), and other correspondence related to the NRC staff's environmental review, under Title 10 of the Code of Federal Regulations (CFR) Part 51, of NMPNS's application for renewal of Nine Mile Point, Units 1 and 2, operating licenses. All documents, with the exception of those containing proprietary information, are available for public inspection in the NRC's Agencywide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible at <http://adamswebsearch.nrc.gov/dologin.htm>. From this site, the public can gain access to text and image files of NRC's public documents. The ADAMS accession number for each document is included below.

- | | |
|---------------|--|
| May 26, 2004 | Letter from Mr. James A. Spina, Constellation, to NRC submitting the applications for the renewal of the operating licenses for NMP, Units 1 and 2 (Accession No. ML041490213 and ML041490213). |
| May 28, 2004 | NRC Press Release No. 04-065 "NRC Announces Availability of License Renewal Application for Nine Mile Point, Units 1 and 2" (Accession No. ML041490358). |
| June 1, 2004 | NRC staff letter to Mr. Peter E. Katz, Constellation, regarding the receipt and availability of the license renewal applications for Nine Mile Point, Units 1 and 2 (Accession No. ML041540092). |
| June 8, 2004 | Federal Register Notice of Receipt and Availability of Application for Renewal of Nine Mile Point Nuclear Station Facility Operating Licenses No. DPR-63 and NPF-69 for an Additional 20-Year Period (69 FR 32069-32070) |
| June 28, 2004 | NRC staff letter to Ms. Mary Bennett, Penfield Library, regarding the maintenance of documents related to the NMP Units 1 and 2 license renewal review (Accession No. ML041830631). |
| July 21, 2004 | NRC Press Release No. 04-088 "NRC Announces Opportunity for Hearing on Application to Renew Nine Mile Point Operating Licenses (Accession No. ML042030444). |

Appendix C

- July 21, 2004 Federal Register Notice of Acceptance for Docketing of the Application and Notice of Opportunity for Hearing Regarding the Renewal of Facility Operating Licenses Nos. DPR-63 and NPF-69 for an Additional 20-Year Period (69 FR 43631-43633).
- July 29, 2004 NRC staff letter to Mr. Don Klima, Director, Advisory Council on Historic Preservation, regarding the Nine Mile Point license renewal review (Accession No. ML042160074).
- August 2, 2004 Letter from the NRC to Mr. James A. Spina, NMPNS, forwarding the Notice of Intent to Prepare an environmental impact statement and conduct scoping process for Nine Mile Point Nuclear Station, Units 1 and 2 license renewal (Accession No. ML042160153).
- August 6, 2004 Letter from Constellation Energy to Mr. Vance Bar, New York State Department of State, relating to the Coastal Management Program Consistency Determination (Accession No. ML042300154).
- August 9, 2004 Letter to Mr. Raymond A. Mosley, Office of the Federal Register, requesting for immediate public inspection regarding the Notice of Intent to prepare an environmental impact statement and conduct scoping process for Nine Mile Point Nuclear Station, Units 1 and 2 license renewal (Accession No. ML042230182).
- August 11, 2004 Federal Register Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process of Facility Operating License Nos. DPR-63 and NPF-69 (69 FR 48900-48901).
- August 11, 2004 Letter from the NRC to Ms. Bernadette Castro, Commissioner, New York State Office of Parks, Recreation and Historic Preservation, inviting participation in the scoping process relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042250207).
- August 11, 2004 NRC staff letter to Mr. Leo R. Henry, Chief, Tuscarora Nation, inviting participation in the scoping process relating to Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042250372).
- August 11, 2004 NRC staff letter to Mr. Emerson Webster, Chief, Tonawanda Band of Senecas, relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042250412).

August 11, 2004 NRC staff letter to Mr. Ricky L. Armstrong, President, Seneca Nation of Indians, relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042250437).

August 11, 2004 NRC staff letter to Mr. Raymond Halbritter, Representative, Oneida Indian Nation of New York, relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042260238).

August 11, 2004 NRC staff letter to Mr. Clint Half Town, Chief, Cayuga Nation of New York, relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042260230).

August 11, 2004 NRC staff letter to Mr. Irving Powless, Jr., Chief, Onondaga Nation, relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042260213).

August 12, 2004 NRC staff letter to Mr. Jim Ransom, Chief, St. Regis Band of Mohawk Indians, relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042260408).

August 12, 2004 NRC staff letter to Ms. M. Terrance, Chief, St. Regis Band of Mohawk Indians, relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042260460).

August 12, 2004 NRC staff letter to Ms. Barbara Lazore, Chief, St. Regis Band of Mohawk Indians, relating to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042260489).

August 20, 2004 NRC meeting notice informing public of meetings to be held in Oswego, New York, to discuss the environmental scoping process for Nine Mile Point Nuclear Station, Units 1 and 2 license renewal application (Accession No. ML042330512).

August 24, 2004 NRC staff letter to Mr. Marvin Moriarty, U.S. Fish and Wildlife Service, requesting a list of protected species within the area under evaluation for the Nine Mile Point Nuclear Station, Units 1 and 2 (Accession No. ML042380602).

September 9, 2004 NRC Press Release No. I-04-042, "NRC Seeks Public Input on Environmental Impact Statement for Proposed Nine Mile Point Nuclear Plant License Renewal" (Accession No. ML042530638).

Appendix C

- September 16, 2004 NRC staff letter to Ms. Natalie Roy, Oswego County Health Department, regarding the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML042610263).
- September 18, 2004 Email from Mr. Farouk Baxter providing scoping comments related to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. 050040016).
- October 12, 2004 Letter to NRC from Mr. William A. Barclay, Assemblyman, 12th District, providing scoping comments related to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. ML050050455).
- October 20, 2004 NRC staff letter to Mr. James Spina, NMP, forwarding request for additional information regarding severe accident mitigation alternatives for the Nine Mile Point Nuclear Station, Units 1 and 2 (Accession No. ML042940508).
- November 3, 2004 Letter from Mr. David A. Stilwell, U.S. Fish and Wildlife Service, providing a list of protected species within the area under evaluation for the Nine Mile Point Nuclear Station, Units 1 and 2 (Accession No. ML043240317).
- November 4, 2004 Summary of public scoping meetings to support the review of Nine Mile Point Nuclear Station, Units 1 and 2 license renewal application (Accession Nos. [ADAMS Package No., ML043130403], ML043130425 - [Meeting Summary], ML043130369 [Afternoon Transcript], ML043130393 [Evening Transcript], ML043130442 [Meeting Slides]).
- November 5, 2004 Summary of telephone conference conducted on October 4, 2004, with Constellation to discuss severe accident mitigation alternative request for additional information for Nine Mile Point Nuclear Station, Units 1 and 2 (Accession No. ML043130260).
- November 7, 2004 NRC staff letter to Mr. Michael Stoll, U.S. Fish and Wildlife Service, requesting a list of protected species within the area under evaluation for the Nine Mile Point Nuclear Station, Units 1 and 2 (Accession No. ML043140284).
- December 6, 2004 Letter from NMPNS to NRC supplying additional information regarding severe accident mitigation alternatives for the Nine Mile Point Nuclear Station, Units 1 and 2 (Accession No. ML043490360).

December 29, 2004	NRC staff email to Mr. Farouk Baxter, regarding scoping comments related to the Nine Mile Point Nuclear Station, Units 1 and 2 license renewal review (Accession No. MLML043650417).
January 5, 2005	NRC staff letter to Mr. James A. Spina, NMPNS, transmitting the environmental scoping summary report associated with the staff's review of the Nine Mile Point Nuclear Station, Units 1 and 2 (Accession No. ML040900537).
March 3, 2005	Letter from Mr. Timothy J. O'Connor, Constellation, to NRC submitting a request to recover the quality of the License Renewal Application for Nine Mile Point Units 1 and 2. (Accession No. ML050680270).
June 30, 2005	Letter from Constellation Energy to Mr. John Feltman, New York State Department of Environmental Conservation, relating to the Joint Application for Permit 401 Water Quality Certification (Accession No. ML052310320)
July 14, 2005	Letter from Mr. James A. Spina, Constellation, to NRC submitting the Nine Mile Point amended license renewal application to the original license renewal application for NMP, Units 1 and 2 (Accession No. ML052000163).
August 5, 2005	Letter from Constellation to Mr. John Feltman, New York State Department of Environmental Conservation, providing a CD containing a copy of the amended LRA and a copy of the transmittal letter. (Accession No. ML052310319).
August 5, 2005	Letter from Constellation to Ms. Alyse Peterson, New York State Energy Research and Development Authority, providing a CD containing a copy of the amended LRA and a copy of the transmittal letter. (Accession No. ML052310317).
August 5, 2005	Letter from Constellation to Mr. Vance Barr, New York State Department of State division of Coastal Resources, providing a CD containing a copy of the amended LRA and a copy of the transmittal letter. (Accession No. ML052310315).
September 29, 2005	NRC staff letter to Mr. James A. Spina, Nine Mile Point Nuclear Station, regarding the availability of the Draft Supplement 24 to the GEIS, related to the license renewal application for Nine Mile Point, Units 1 and 2 (Accession No. ML052720589)

Appendix C

- September 29, 2005 NRC staff letter to U.S. Environmental Protection Agency transmitting Draft Supplement 24 to the GEIS, regarding the license renewal application for Nine Mile Point, Units 1 and 2 (Accession No. ML052730073)
- October 6, 2005 Federal Register Notice of Availability of the Draft Supplement 24 to the Generic Environmental Impact Statement and Public Meeting for the License Renewal of Nine Mile Point, Units 1 and 2 (70 FR 58489-58490)
- October 13, 2005 NRC meeting notice announcing public meeting in Oswego, New York on November 17, 2005, to discuss the Draft Supplemental Environmental Impact Statement for license renewal of Nine Mile Point, Units 1 and 2 (Accession No. ML052900180)
- October 20, 2005 NRC Press Release No. I-05-053, "NRC issues draft environmental report for Nine Mile Point license renewal, announces November 17th public meeting" (Accession No. ML052930368)
- November 25, 2005 Letter from Ms. Nancy Herter, New York State Office of Parks, Recreation and Historic Preservation, to NRC transmitting comments on the Draft Supplement 24 to the GEIS, related to the license renewal application for Nine Mile Point, Units 1 and 2 (Accession No. ML053430114)
- December 15, 2005 Letter from Mr. James Spina, NMP, to NRC transmitting comments on the Draft Supplement 24 to the GEIS, related to the license renewal application for Nine Mile Point, Units 1 and 2 (Accession No. ML053640304)
- December 8, 2005 Email from Mr. Tom Gurdziel, to NRC transmitting comments on the Draft Supplement 24 to the GEIS, related to the license renewal application for Nine Mile Point, Units 1 and 2 (Accession No. ML060310472)
- December 13, 2005 Letter from Mr. Andrew Raddant U.S. Department of the Interior, to NRC transmitting comments on the Draft Supplement 24 to the GEIS, related to the license renewal application for Nine Mile Point, Units 1 and 2 (Accession No. ML060310474)
- December 19, 2005 Letter from Ms. Linda Bond-Clark to NRC transmitting comments on the Draft Supplement 24 to the GEIS, related to the license renewal application for Nine Mile Point, Units 1 and 2 (Accession No. ML060310475)

- December 21, 2005 Summary of public meetings conducted to discuss the draft supplemental environmental impact statement related to the review of the Nine Mile Point Nuclear Station, Units 1 and 2, license renewal application (Accession No. ML053550507)
- December 23, 2005 Letter from John Filippelli, EPA, to NRC transmitting comments on the Draft Supplement 24 to the GEIS, related to the license renewal application for Nine Mile Point, Units 1 and 2 (Accession No. ML060110223)
- January 20, 2006 E-mail sent by Kent Stoffle of Constellation to NRC contractor David Miller regarding information related to the hydrology in the Nine Mile Point area (Accession No. ML060620591)
- January 27, 2006 E-mail sent by Kent Stoffle of Constellation to Leslie Fields of NRC forwarding documents related to the expiration dates of permits issued by the state to Nine Mile Point Nuclear Station (Accession No. ML060970089)
- April 18, 2006 E-mail sent by Carla Logan of Constellation to Leslie Fields of NRC providing information related to fish species at Nine Mile Point Nuclear Station (Accession No. ML061090052)

Appendix D

Organizations Contacted

Appendix D: Organizations Contacted

During the course of the staff's independent review of environmental impacts from operations during the renewal term, the following Federal, State, regional, local, and Native American tribal agencies were contacted:

Advisory Council on Historic Preservation, Washington, D.C.

Cayuga Nation of New York, Versailles, New York

City of Oswego, Oswego, New York

Greater Oswego County Chamber of Commerce, Oswego, New York

New York State Department of Environmental Conservation, Division of Environmental Permits, Albany, New York

New York State Department of State, Division of Coastal Management, Albany, New York

New York State Department of State, Division of Coastal Resources, Albany, New York

New York State Education Department, Albany New York

New York State Office of Parks, Recreation, and Historic Preservation

Northeast Regional Office, National Marine Fisheries Service, Gloucester, Maryland

Oneida Indian Nation of New York, Verona, New York

Onondaga Nation, Nedrow, New York

Oswego City School District, Oswego, New York

Oswego County Administrator's Office, Oswego, New York

Oswego County Department of Promotion and Tourism, Oswego, New York

Oswego County Department of Public Works, Oswego, New York

Oswego County Development and Planning Committee, Oswego, New York

Oswego County Health Department, Oswego, New York

Oswego County Planning and Community Development Department, Oswego, New York

Appendix D

Seneca Nation of Indians, Salamanca, New York

St. Regis Band of Mohawk Indians, Akwesasne, New York

State Historic Preservation Office, New York State Office of Parks, Recreation and Historic Preservation, Albany, New York

Syracuse-Onondaga Planning Agency, Syracuse, New York

Tonawanda Band of Senecas, Basom, New York

Town of Scriba, Oswego, New York

Tuscarora Nation, Lewiston, New York

U.S. Fish and Wildlife Service, Cortland, New York

Appendix E

Nine Mile Point Nuclear Station, LLC, Compliance Status and Consultation Correspondence

Appendix E: Nine Mile Point Nuclear Station, LLC, Compliance Status and Consultation Correspondence

Correspondence received during the process of evaluation of the application for renewal of the license for Nine Mile Point Nuclear Station is identified in Table E-1. Copies of the correspondence are included at the end of this appendix.

The licenses, permits, consultations, and other approvals obtained from Federal, State, regional, and local authorities for Nine Mile Point Units 1 and 2, are listed in Table E-2.

Table E-1. Consultation Correspondence

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission	Advisory Council on Historic Preservation (D. Klima)	July 29, 2004
U.S. Nuclear Regulatory Commission	New York State Office of Parks, Recreation and Historic Preservation (B. Castro)	August 11, 2004
U.S. Nuclear Regulatory Commission	U.S. Fish and Wildlife Service (M. Moriarty)	August 24, 2004
U.S. Nuclear Regulatory Commission	Oswego County Health Department (N. Roy)	September 16, 2004
U.S. Fish and Wildlife Service (D. Stilwell)	U.S. Nuclear Regulatory Commission	November 3, 2004
U.S. Nuclear Regulatory Commission	U.S. Fish and Wildlife Service (M. Stoll)	November 7, 2004

Table E-2. Federal, State, Local, and Regional Licenses, Permits, Consultations, and Other Approvals for Nine Mile Point Units 1 and 2

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
NRC	10 CFR Part 50	Operating license, Nine Mile Point Unit 1	DPR-63		08/22/09	Authorizes operation of Unit 1.
NRC	10 CFR Part 50	Operating license, Nine Mile Point Unit 2	NPF-69		10/31/26	Authorizes operation of Unit 2.
FWS	Migratory Bird Treaty Act (16 USC 703-712)	Permit				Authorizes carcass salvage and injured bird transport.
DOT	49 CFR Part 107, Subpart G	Certificate of Registration for Transportation of Hazardous Materials	062104700026M0		06/30/07	Authorization to transport hazardous materials.
New York State Department of State	Section 307 of the Coastal Zone Management Act [16 USC 1456(c)(3)(A)]	Consistency determination with the New York Department of State Coastal Management Program				New York State Department of State determined that renewal of the Nine Mile Point Units 1 and 2 operating licenses would be consistent with the New York State Coastal Management Program.
NYSDEC	6 NYCRR Part 175	New York State fish and wildlife license	523		07/31/06	License for the collection and possession of fish and wildlife

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
NYSDEC	6 NYCRR Part 325	Pesticide application business registration	79634	08/02/05	07/31/08	Authorization to apply pesticide.
NYSDEC	6 NYCRR Part 373-3	Hazardous waste interim status authorization	NYD00073042		N/A	Allows for accumulation and temporary on-site storage of mixed waste greater than 90 days.
NYSDEC	6 NYCRR Part 596	Hazardous waste substance bulk storage registration certificate	7-000058	09/29/05	11/07/07	Authorization for on-site bulk storage of hazardous substances.
NYSDEC	6 NYCRR Part 613	Petroleum bulk storage registration certificate	7-429880		11/07/06	Authorization for on-site bulk storage of petroleum products.
NYSDEC	6 NYCRR Part 675	Water withdrawal registration	NYGLWWR-3811	11/07/05	11/07/07	Authorization to withdraw water from Lake Ontario
NYSDEC	6 NYCRR Part 750	State pollutant discharge elimination system permit	NY 000 1015	12/01/09	12/01/09	Permit for discharge of wastewaters and once-through cooling water to the closed-cycle recirculating cooling canal system. Section 1.E.15 of the permit states that the permit constitutes certification of compliance with §401 of the Clean Water Act.

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
State of Tennessee Department of Environment and Conservation	Tennessee Code Annotated 68-202-206	Radioactive Shipment License	T-NY002-L06	01/01/06	12/31/06	Authorization to ship radioactive material to a licensed disposal/processing facility within Tennessee.
South Carolina Department of Health and Environmental Control	SC ADC 61-83	South Carolina radioactive waste transport permit, Unit 1	0004-31-06-X	11/16/05	12/31/06	Registration to transport radioactive materials in South Carolina.
South Carolina Department of Health and Environmental Control	SC ADC 61-83	South Carolina radioactive waste transport permit, Unit 2	0408-31-06-X	11/16/05	12/31/06	Registration to transport radioactive materials in South Carolina.
Virginia Department of Emergency Management	9 VAC 20-110-121	Registration for transport of radioactive material	CE-043006	04/15/04	04/30/06	Authorization to transport radioactive materials in Virginia .

CFR = Code of Federal Regulations
DOT = U.S. Department of Transportation
FWS = U.S. Fish and Wildlife Service
NRC = Nuclear Regulatory Commission
NYCRR = New York Code of Rules and Regulations
NYSDEC = New York State Department of Environmental Conservation
USC = United States Code



P.O. Box 63
Lycoming, New York 13093

August 6, 2004
NMPE 0419

Mr. Vance A. Barr
Coastal Resources Specialist
Consistency Review and Analysis
New York State Department of State
Division of Coastal Resources
41 State Street
Albany, New York 12231-0001

Subject: Nine Mile Point Nuclear Station, LLC
Application for Renewal of Operating Licenses
Coastal Management Program Consistency Determination

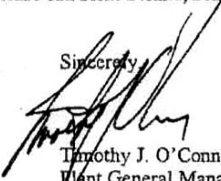
Dear Mr. Barr:

Nine Mile Point Nuclear Station, LLC (NMPNS) is in receipt of your letter dated June 28, 2004. Your letter requested NMPNS to complete and submit a Federal Consistency Assessment Form and to provide copies of the Nuclear Regulatory Commission License Renewal Application in accordance with 15 CFR Part 930 Subpart D. Enclosed please find a completed Federal Consistency Assessment Form, a document entitled *Coastal Management Program Consistency Determination* that provides supporting information and documentation, an electronic copy of NMPNS' application to the U.S. Nuclear Regulatory Commission (NRC) for the license renewal of the Nine Mile Point Nuclear Station (NMP), and a printed copy of the *Environmental Report-Operating License Renewal Stage, Nine Mile Point Nuclear Station*.

NMPNS is requesting review and concurrence with the enclosed Coastal Management Program Consistency Certification. The Consistency Certification presents NMPNS' position that continued operation of NMP would be in compliance with the current New York State Coastal Management Program.

If you have any questions or comments, please call Kent Stoffle, Principal Engineer, Environmental, at (315) 349-1364.

Sincerely,



Timothy J. O'Connor
Plant General Manager

TJO/KES/jm

Enclosures:

- 1- Federal Consistency Assessment Form
- 2- Coastal Management Program Consistency Determination
- 3- Nine Mile Point Nuclear Station License Renewal Application (cd)
- 4- Environmental Report-Operating License Renewal Stage, Nine Mile Point Nuclear Station



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

August 11, 2004

Ms. Bernadette Castro, Commissioner
New York State Office of Parks, Recreation,
and Historic Preservation
P.O. Box 189
Peebles Island
Waterford, NY 12138-0189

SUBJECT: NINE MILE POINT UNITS 1 AND 2 LICENSE RENEWAL REVIEW (PROJECT
REVIEW OPRHP NO. 03PR0532)

Dear Commissioner Castro:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing applications to renew the operating licenses for Nine Mile Point, Units 1 and 2 (NMP), which is located on the southeastern shore of Lake Ontario in the Town of Scriba, Oswego County, New York. NMP is owned by Constellation Energy Group (Constellation). The applications for renewal was submitted by Constellation on May 27, 2004, pursuant to NRC requirements at Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). The NRC has established that, as part of the staff review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC rules that implement the National Environmental Policy Act of 1969 (NEPA). In accordance with 36 CFR 800.8, the SEIS will include analyses of potential impacts to historic and archaeological resources.

In accordance with the National Historic Preservation Act of 1966, as amended, the NRC staff has determined that the area of potential effect (APE) for a license renewal action is the area at the power plant site and its immediate environs that may be impacted by post-license renewal land-disturbing operations or projected refurbishment activities associated with the proposed action. The APE may extend beyond the immediate environs in those instances where post-license renewal land-disturbing operations or projected refurbishment activities, specifically related to license renewal, may potentially have an effect on known or proposed historic sites. This determination is made irrespective of ownership or control of the lands of interest.

While preparing its applications, Constellation contacted your office by letters dated December 13, 2002, and February 28, 2004, requesting comments on any new and significant information regarding historic and archaeological resources. Constellation states in its environmental review (ER) that no known sites were found on site grounds or along the transmission line rights-of-way during historic and archaeological surveys conducted in the 1970s, 1980s, and early 1990s. Your office responded in a letter dated August 1, 2003, concurring that there are no known archaeological sites within the project area. However, due to the environmental setting of the project area, the SHPO considers the area to be sensitive for cultural resources.

Commissioner Castro

-2-

On September 21, 2004, the NRC will conduct two public NEPA scoping meetings at the Town of Scriba Conference Room, 42 Creamery Road, Oswego, New York. You and your staff are invited to attend. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is April 2005. If you have any questions or require additional information, please contact Ms. Leslie C. Fields, Environmental Project Manager at 301-415-1186 or via email at LCF@nrc.gov.

Sincerely,



Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-220, 50-410

Enclosure: As stated

cc w/o encl.: See next page



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 24, 2004

Marvin Moriarty, Regional Director
Northeast Regional Office
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035-9589

SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES WITHIN THE AREA UNDER
EVALUATION FOR THE NINE MILE POINT NUCLEAR STATION, UNITS 1
AND 2 LICENSE RENEWAL

Dear Mr. Moriarty:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing an application to renew the operating licenses for Nine Mile Point, Units 1 and 2 (NMP), which is located on the southeastern shore of Lake Ontario in the Town of Scriba, Oswego County, New York. NMP is owned by Constellation Energy Group (Constellation). The application for renewal was submitted by Constellation on May 27, 2004, pursuant to NRC requirements at Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). As part of the review of the license renewal application, the NRC is preparing a Supplemental Environmental Impact Statement (SEIS) under the provisions of the National Environmental Policy Act (NEPA) of 1969, as amended, which includes an analysis of pertinent environmental issues, including endangered or threatened species and impacts to fish and wildlife. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended.

The proposed action would include the use and continued maintenance of existing plant facilities and transmission lines. The NMP site covers approximately 900 acres, with over a mile of shoreline on Lake Ontario. Approximately 188 acres are used for power generation and support facilities. The remaining acreage is generally undeveloped. The local terrain consists of undulating hills that are predominantly covered with forest and brushlands. Federal and State designated wetlands occur on site.

Each NMP unit has a separate intake and discharge structure located offshore in Lake Ontario. Unit one uses a once-through open-cycle cooling system, while unit two is a closed-cycle system that uses a cooling tower.

For the specific purpose of connecting NMP to the regional transmission system, there is a total of approximately 26 miles of transmission line corridor. This transmission line corridor is being evaluated as part of the SEIS process. The transmission line corridor traverses Oswego and Onondaga Counties. The corridor passes through land that is primarily open farmland, wetlands, wooded areas, and pastureland. The enclosed transmission line map shows the transmission system that is being evaluated in the SEIS. Three 345-kilovolt (kV) lines connect NMP to the electric grid. Two of the transmission lines for Unit 1 run southward from the plant in a common corridor (500 feet wide) for 26 miles to the Clay substation. For Unit 2, the single

M. Moriarty

- 2 -

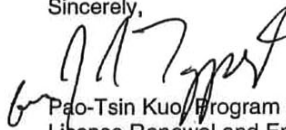
transmission line runs 2000 feet and ends at the Scriba substation. The construction of Unit 2 shortened one of the lines for Unit 1, where it now terminates at the Scriba substation.

To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests a list of species and information on protected, proposed, and candidate species and critical habitat that may be in the vicinity of NMP and its associated transmission lines. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

We plan to hold two public NEPA scoping meetings at 1:30 p.m. and 7:00 p.m. on September 21, 2004, at the Town of Scriba Conference Room, 42 Creamery Road, Oswego, New York, 13126. On September 22, 2004, we plan to conduct a site audit at the NMP facility. You and your staff are invited to attend both public meetings and the site audit. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is April 2005.

If you have any questions concerning the NRC staff review of this license renewal application, please contact Ms. Leslie C. Fields, Environmental Project Manager at 301-415-1186 or email LCF@nrc.gov.

Sincerely,



Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-220 and 50-410

Enclosures: 1. NMP Transmission Line Map
2. NMP Site Boundary

cc w/encls.: See next page

**FIGURE 3.1-2
TRANSMISSION**

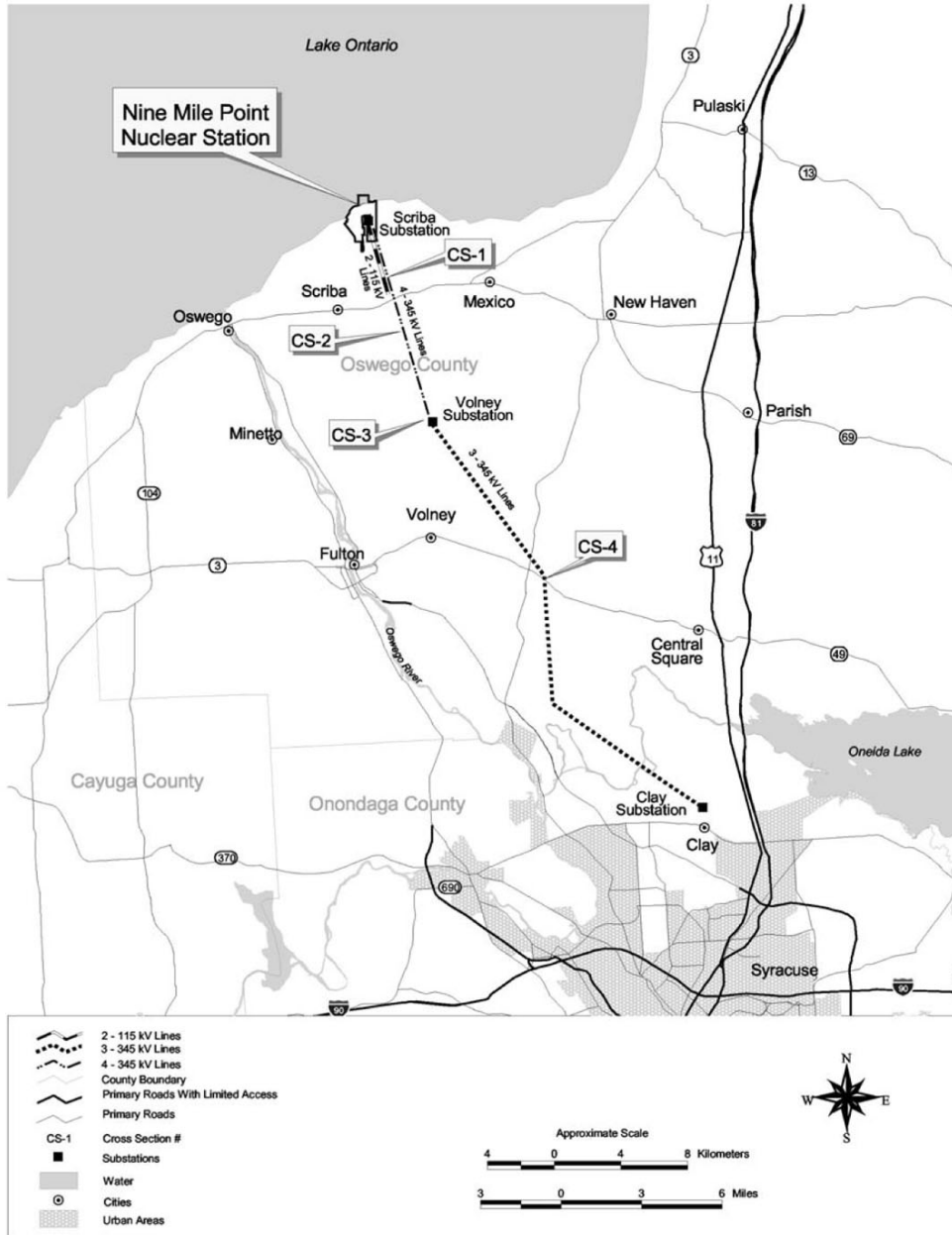
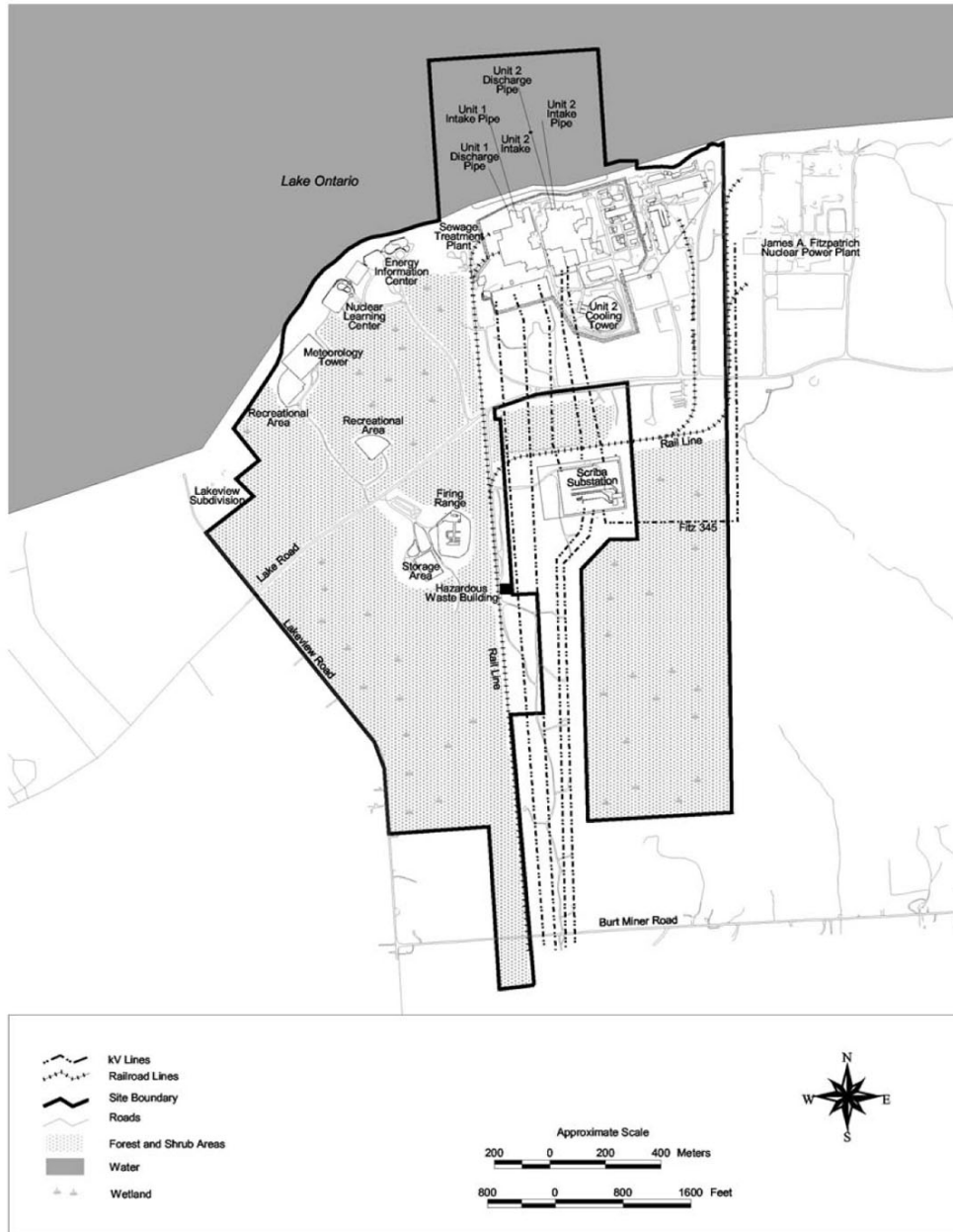


FIGURE 2.1-3
SITE BOUNDARY





UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 16, 2004

Ms. Natalie Roy
Oswego County Health Department
70 Bunner Street
Oswego, NY 13126

SUBJECT: NINE MILE POINT UNITS 1 AND 2 LICENSE RENEWAL REVIEW

Dear Ms. Roy:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing an application to renew the operating licenses for Nine Mile Point, Units 1 and 2 (NMP), which is located on the southeastern shore of Lake Ontario in the Town of Scriba, Oswego County, New York. NMP is owned by Constellation Energy Group, Inc. (Constellation). The application for renewal was submitted by Constellation on May 27, 2004, pursuant to NRC requirements at Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). The NRC has established that, as part of the staff's review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC rules that implement the National Environmental Policy Act of 1969 (NEPA).

Oswego County is most impacted by the NMP license renewal because the majority of its employees reside in Oswego County. During the week of September 20, 2004, Mr. Warren Rued, an NRC contractor from Lawrence Livermore National Laboratory, would like to visit your office and obtain the following information on the public water systems in order to analyze the environmental impacts of license renewal of NMP:

1. The number of public water systems serving Oswego County.
2. The number of residences using private wells.
3. The number of users for each public water system.
4. Design capacity of each public water system (maximum volume which can be used per day).
5. Current usage of each public water system.
6. Breakdown of water systems by type (community systems, private residential systems, and industrial systems, if present).
7. Amount of water purchased or obtained from outside sources (e.g., Onondaga County Water Authority, Metropolitan Water Board).

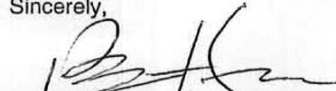
N. Roy

-2-

8. Amount of water available for future growth (qualitative statement indicating whether there are sufficient water reserves to provide water to the anticipated population in the future, and for how many years, using the current growth rates and current projections for Oswego county).

On September 21, 2004, the NRC will conduct two public NEPA scoping meetings at the Town of Scriba Conference Room, 42 Creamery Road, Oswego, New York. You and your staff are invited to attend. The anticipated publication date for the draft SEIS is April 2005. If you have any questions or require additional information, please contact Ms. Leslie C. Fields, Environmental Project Manager, at 301-415-1186 or via email at LCF@nrc.gov.

Sincerely,



Pap-Tsin Kuo, Program Director
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-220 and 50-410

cc.: See next page



United States Department of the Interior

FISH AND WILDLIFE SERVICE

3817 Luker Road
Cortland, NY 13045



November 3, 2004

Mr. Pao-Tsin Kuo
Program Director
License Renewal and Environmental Impacts
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Mr. Kuo:

This responds to your transmittal of August 24, 2004, requesting information on the presence of Federally listed or proposed endangered or threatened species in the vicinity of the proposed license renewal for the Nine Mile Point Power Generation Units and primary transmission lines in the Towns of Clay, Schroepfel, Scriba, and Volney in Onondaga and Oswego Counties, New York.

The Indiana bat is known to occur at hibernacula in Onondaga County and Albany County. These hibernacula are 18.5 miles and 38 miles, respectively, from the nearest point of the Nine Mile Point Power Generation Units and primary transmission lines and 40 miles and 51.6 miles from the farthest point. Based on the proximity of the proposed project site to the Onondaga and Albany Counties hibernacula and the observed distances traveled by Indiana bats, the Indiana bat may be found at the proposed project site if suitable habitat is present. In addition to their presence in and immediately around over-wintering sites, Indiana bats may move up to 330 miles beyond hibernacula to summer habitat (Kurta and Murray 2002). Suitable potential summer roosting/maternity habitat is characterized by trees, (dead, dying or living) or snags, greater than or equal to 5 inches diameter breast height, that have characteristics typical of roost sites for Indiana bats. These include trees having exfoliating or defoliating bark, or cracks, crevices, or holes that could be used by Indiana bats as a roost. Furthermore, wetlands, streams, associated floodplain forests, ponds, and impoundments provide preferred foraging habitat for pregnant and lactating bats, some of which may fly up to 1.5 miles from upland roosts to feed. Indiana bats also forage within the canopy of upland forests, over clearings with early successional vegetation (old fields), along the borders of croplands, along wooded fencerows, and over farm ponds in pastures (U.S. Fish and Wildlife Service 1999).

In a telephone conversation October 25, 2004, it was established that potentially suitable habitat is not going to be disturbed by the proposed action. Based on this information, we believe that the proposed license renewal of the Nine Mile Point Power Generation Units and primary transmission lines is not likely to adversely affect the Indiana bat.

Except for the potential for the Indiana bat and occasional transient individuals, no other Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. In addition, no habitat in the project impact area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Therefore, no further Endangered Species Act coordination or consultation with the U.S. Fish and Wildlife Service (Service) is required. Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of Federally listed and proposed endangered and threatened species in New York* is available for your information. If your project is not completed within one year from the date of this determination, we recommend that you contact us to ensure that the listed species presence/absence information for your proposed project is current.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional U.S. Fish and Wildlife Service (Service) comments under other legislation.

The Indiana bat is listed as endangered by the State of New York. The information requested above should be coordinated with both this office and with the NYSDEC. The NYSDEC contact for this species is Mr. Peter Nye, Endangered Species Unit, 625 Broadway, Albany, NY 12233 (telephone: [518] 402-8859).

For additional information on fish and wildlife resources or State-listed species, we suggest you contact the appropriate New York State Department of Environmental Conservation regional office(s),* and:

New York State Department of Environmental Conservation
New York Natural Heritage Program Information Services
625 Broadway
Albany, NY 12233-4757
(518) 402-8935

Since wetlands may be present, you are advised that National Wetlands Inventory (NWI) maps may or may not be available for the project area. However, while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Copies of specific NWI maps can be obtained from:

Cornell Institute for Resource Information Systems
302 Rice Hall
Cornell University
Ithaca, NY 14853-5601
(607) 255-6520
web: <http://iris.css.cornell.edu>
email: cornell-iris@cornell.edu

Work in certain waters of the United States, including wetlands, may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without recommending additional permit conditions, or recommend denial of the permit depending upon

potential adverse impacts on fish and wildlife resources associated with project construction or implementation. The need for a Corps permit may be determined by contacting the appropriate Corps office(s).*

Thank you for your time. If you require additional information please contact Michael Stoll at (607) 753-9334.

Sincerely,



David A. Stilwell
Field Supervisor

*Additional information referred to above may be found on our website at:
<http://nyfo.fws.gov/es/esdesc.htm>

References:

Kurta, A., and S.W. Murray. 2002. Philopatry and migration of banded Indiana bats (*Myotis sodalis*) and effects of radio transmitters. *Journal of Mammalogy* 83(2):585-589.

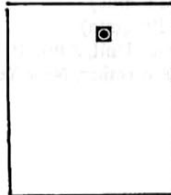
U.S. Fish and Wildlife Service. 1999. Agency Draft Indiana Bat (*Myotis sodalis*) Revised Recovery Plan. Fort Snelling, MN: U.S. Department of the Interior, Fish and Wildlife Service, Region 3. 53 p.

cc: NYSDEC, Syracuse, NY (Environmental Permits)
NYSDEC, Albany, NY (Natural Heritage Program)
NYSDEC, Albany, NY (Endangered Species Unit, Attn: P. Nye)
EPA, Div. of Environmental Planning & Protection, New York, NY
COE, Buffalo, NY

U.S. Fish and Wildlife Service
New York Field Office
3817 Luker Road
Cortland, NY 13045

To provide a timely response to future requests for endangered species comments in New York, please include the following in future inquiries:

1. A concise description of the project/action.
2. The size in acres of the project site, and an estimation of the total acres to be disturbed.
3. Name of the hamlet/village/city/town/county where the project/action occurs.
4. The latitude and longitude of the project/action, i.e.: 42° 13' 28" / 76° 56' 30". If the project/action is linear, you may provide coordinates for both ends or just one near center.
5. A map {preferably the map should be a U.S. Geological Survey quadrangle map (USGS Quad)} showing the project/action location. You need only provide a copy of that portion where the project/action occurs. Please provide the name(s) of the USGS Quad/s, and indicate where the project site is located on the full USGS Quad.



Providing the information above will assist us in responding to your needs.

If you require additional information please contact Michael Stoll at (607) 753-9334.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 7, 2004

Mr. Michael Stoll
Fish and Wildlife Biologist
New York Field Office
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045

SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES WITHIN THE AREA UNDER
EVALUATION FOR THE NINE MILE POINT NUCLEAR STATION, UNITS 1
AND 2 LICENSE RENEWAL (TAC NOS. MC3274 AND MC3275)

Dear Mr. Stoll:

This letter serves as follow up to a telephone conversation you held with Mr. James Wilson of the U.S. Nuclear Regulatory Commission (NRC) staff on October 25, 2004, regarding the license renewal review of Nine Mile Point Nuclear Station, Units 1 and 2 (NMP). We would like to confirm that the proposed action would include the use and continued maintenance of existing NMP facilities and transmission lines. Based on the applicant's environmental report, Constellation Energy Group Inc. has no plans for major refurbishment or construction activities at NMP for continued operations during the license renewal term. This was confirmed through discussions with the licensee during the NRC's site audit conducted on September 22, 2004.

Periodic maintenance of the transmission rights-of-way to control vegetation will be performed during the license renewal period. No additional clearing or land disturbance on-site is planned for the renewal period. Likewise, no in-lake activities related solely to the renewal are planned.

As stated in our letter of August 24, 2004, the NRC requests a list of species and information on protected, proposed, and candidate species and critical habitat that may be in the vicinity of NMP and its associated transmission lines. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act of 1934.

Your office will receive a copy of the draft EIS along with a request for comments. The anticipated publication date for the draft NMP EIS is April 2005.

M. Stoll

- 2 -

If you have any further questions concerning the NRC staff's review of this license renewal application, please contact Ms. Leslie C. Fields, Environmental Project Manager at 301-415-1186 or email LCF@nrc.gov.

Sincerely,



Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-220 and 50-410

cc: See next page

Appendix F

GEIS Environmental Issues Not Applicable to Nine Mile Point Units 1 and 2

Appendix F: GEIS Environmental Issues Not Applicable to Nine Mile Point Units 1 and 2

Table F-1 lists those environmental issues listed in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996, 1999)^(a) and 10 CFR Part 51, Subpart A, Appendix B, Table B-1, that are not applicable to Nine Mile Point Nuclear Station (Nine Mile Point) Units 1 and 2, because of plant or site characteristics.

Table F-1. GEIS Environmental Issues Not Applicable to Nine Mile Point Units 1 and 2

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	Category	GEIS Sections	Comment
SURFACE WATER QUALITY, HYDROLOGY, AND USE (FOR ALL PLANTS)			
Altered salinity gradients	1	4.2.1.2.2; 4.4.2.2	Nine Mile Point Units 1 and 2 cooling systems do not discharge to an estuary.
Water-use conflicts (plants with cooling ponds or cooling towers using makeup water from a small river with low flow)	2	4.3.2.1; 4.4.2.1	Nine Mile Point Units 1 and 2 cooling systems do not use makeup water from a small river with low flow.
GROUNDWATER USE AND QUALITY			
Groundwater use conflicts (potable and service water, and dewatering; plants that use <100 gpm)	1	4.8.1.1; 4.8.1.2	Nine Mile Point Units 1 and 2 do not use less than 100 gpm groundwater.
Groundwater-use conflicts (plants using cooling towers withdrawing makeup water from a small river)	2	4.8.1.3; 4.4.2.1	This issue is related to heat-dissipation systems that are not installed at Nine Mile Point Units 1 and 2.
Groundwater-use conflicts (Ranney wells)	2	4.8.1.4	Nine Mile Point Units 1 and 2 do not have or use Ranney wells.
Groundwater quality degradation (Ranney wells)	1	4.8.2.2	Nine Mile Point Units 1 and 2 do not have or use Ranney wells.
Groundwater quality degradation (cooling ponds in salt marshes)	2	4.8.3	Nine Mile Point Units 1 and 2 do not have or use cooling ponds.

(a) The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the GEIS include the GEIS and its Addendum 1.

Appendix F

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	Category	GEIS Sections	Comment
Groundwater quality degradation (cooling ponds at inland sites)	1	4.4.4	Nine Mile Point Units 1 and 2 do not have or use cooling ponds.
TERRESTRIAL RESOURCES			
Cooling pond impacts on terrestrial resources	1	4.4.4	This issue is related to a heat-dissipation system that is not installed at Nine Mile Point.
HUMAN HEALTH			
Microbial organisms (public health) (plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	2	4.3.6	Nine Mile Point Units 1 and 2 cooling systems do not discharge to a small river.

References

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. NUREG-1437, Volumes 1 and 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Main Report*, Section 6.3, Transportation, Table 9.1, Summary of findings on NEPA issues for license renewal of nuclear power plants, Final Report. NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

Appendix G

NRC Staff Evaluation of Severe Accident Mitigation Alternatives (SAMAs) for Nine Mile Point Units 1 and 2

Appendix G: NRC Staff Evaluation of Severe Accident Mitigation Alternatives (SAMAs) for Nine Mile Point Units 1 and 2

G.1 Introduction

Nine Mile Point Nuclear Station, LLC (NMPNS) submitted an assessment of SAMAs for Nine Mile Point Units 1 and 2 as part of the Environmental Report (ER) (NMPNS 2004a). Unit-specific analyses were performed for both of the units since the designs, as well as the risk profiles, for the two units are much different (Unit 1 is a boiling water reactor (BWR)/2 with a Mark I containment; Unit 2 is a BWR/5 with a Mark II containment.) The SAMA assessments were based on the most recent Nine Mile Point Probabilistic Risk Assessment (PRA) for each unit available at that time, a plant-specific offsite consequence analysis performed using the MELCOR Accident Consequence Code System 2 (MACCS2), and insights from the Nine Mile Point Individual Plant Examination (IPE) (NMPC 1992, 1993) and Individual Plant Examination of External Events (IPEEE) for each unit (NMPC 1995, 1996). In identifying and evaluating candidate SAMAs, NMPNS considered SAMA analyses performed for other operating plants that have submitted license renewal applications, as well as industry and NRC documents that discuss potential plant improvements. NMPNS identified 220 potential SAMA candidates. This list was reduced to 13 (Unit 1) and 20 (Unit 2) unique SAMA candidates by eliminating SAMAs that were not applicable to Nine Mile Point due to design differences, had already been implemented, or had high implementation costs. NMPNS assessed the costs and benefits associated with each of the remaining SAMAs and concluded in the ER that four of the candidate SAMAs evaluated for Unit 1 and 11 of the SAMAs evaluated for Unit 2 would be potentially cost-beneficial.

Based on a review of the SAMA assessment, the NRC issued a request for additional information (RAI) to NMPNS by letter dated October 20, 2004 (NRC 2004a) and email dated December 29, 2004 (NRC 2004b). Key questions concerned: peer reviews of the PRA and the potential impact of unresolved comments; release characteristics and classification criteria; dominant risk contributors at Nine Mile Point and the SAMAs that address these contributors; the potential impact of uncertainties on the assessment results; the status of potential improvements identified in the IPE and IPEEE; detailed information on some specific candidate SAMAs; and, consideration of additional SAMAs. NMPNS submitted additional information by letters dated December 6, 2004 (NMPNS 2004b) and January 31, 2005 (NMPNS 2005). In the responses, NMPNS provided: summaries of peer review comments; tables containing information on release categories and characteristics; listings of important basic events along with corresponding SAMA candidates addressing those events; an assessment of the impact of uncertainties; information related to the potential plant improvements identified in the IPE and IPEEE; and additional information regarding specific SAMAs. NMPNS's responses addressed the staff's concerns, and did not result in the identification of any additional potentially cost-beneficial SAMAs.

An assessment of SAMAs for Nine Mile Point is presented below.

G.2 Estimate of Risk for Nine Mile Point

NMPNS's estimates of offsite risk at Nine Mile Point are summarized in Section G.2.1. The summary is followed by the staff's review of NMPNS's risk estimates in Section G.2.2.

G.2.1 NMPNS's Risk Estimates

Two distinct analyses are combined to form the basis for the risk estimates used in the SAMA analysis: (1) the Nine Mile Point Level 1 and 2 PRA model, which includes both internal and external events models based on updated versions of the IPE (NMPC 1992, 1993) and IPEEE (NMPC 1995, 1996), and (2) a supplemental analysis of offsite consequences and economic impacts (essentially a Level 3 PRA model) developed specifically for the SAMA analysis. The SAMA analysis is based on the most recent Level 1 and 2 PRA model available at the time of the ER, referred to as the PRA01B model for each unit.

The baseline core damage frequency (CDF) values for the purpose of the SAMA evaluation are approximately 2.7×10^{-5} per year for Unit 1, and 6.2×10^{-5} per year for Unit 2. The CDF values are based on the risk assessment for both internally and externally initiated events.

The breakdown of CDF by functional contribution is provided in Table G-1. This information is compiled from that provided in the ER and in the responses to RAIs (NMPNS 2004a and 2004b). A more detailed breakdown of the major contributors is provided in the RAI response (NMPNS 2004b). According to the response, loss of injection due to fires and station blackout (SBO) are dominant contributors to the CDF for Unit 1. At Unit 2, SBO, loss of injection due to internal events, and loss of heat removal are dominant contributors to CDF. For Unit 1, fires contribute 49 percent and seismic events contribute five percent to the total CDF. Internal flooding events were screened from further consideration. For Unit 2, fires contribute six percent, internal floods contribute two percent and seismic events contribute one percent to the total CDF.

The Level 2 PRA models are based on the original Level 2 models from the IPE; however, the source terms were updated based on more recent analyses. The conditional probabilities, fission product release fractions, and release characteristics for each release category were provided in response to RAIs (NMPNS 2004b, 2005).

Table G-1. Nine Mile Point Core Damage Frequency

Initiator or Accident Class	Unit 1		Unit 2	
	CDF (Per Year)	Percent Contribution to CDF	CDF (Per Year)	Percent Contribution to CDF
Loss of support systems	7.8×10^{-6}	29	4.7×10^{-5}	75
Transients	4.1×10^{-6}	15	8.1×10^{-6}	13
Loss of coolant accidents (LOCAs)	5.4×10^{-7}	2	1.2×10^{-6}	2
Internal floods	NR ^(a)	NR ^(a)	1.2×10^{-6}	2
Internal Events CDF	1.3×10^{-5}	46	5.8×10^{-5}	93
Fires	1.3×10^{-5}	49	3.7×10^{-6}	6
Seismic activity	1.3×10^{-6}	5	6.2×10^{-7}	1
External Events CDF	1.4×10^{-5}	54	4.3×10^{-6}	7
Total CDF	2.7×10^{-5}	100	6.2×10^{-5}	100

(a) NR not reported; was screened from analysis

The offsite consequences and economic impact analyses use the MACCS2 code to determine the offsite risk impacts on the surrounding environment and public. Inputs for these analyses include plant-specific and site-specific input values for core radionuclide inventory, source term and release characteristics, site meteorological data, projected population distribution (within a 80 km [50-mi] radius) for the year 2030, emergency response evacuation modeling, and economic data. The core radionuclide inventory is based on the generic BWR inventory provided in the MACCS2 manual, adjusted to represent the Nine Mile Point power levels of 1850 MW(t) for Unit 1 and 3467 MW(t) for Unit 2. The magnitude of the onsite impacts (in terms of clean-up and decontamination costs and occupational dose) is based on information provided in NUREG/BR-0184 (NRC 1997c).

In the ER, NMPNS estimated the dose to the population within 80 km (50 mi) of the Nine Mile Point site to be approximately 0.225 person-Sv (22.5 person-rem) per year for Unit 1, and 0.509 person-Sv (50.9 person-rem) per year for Unit 2. The breakdown of the total population dose by containment release mode is summarized in Table G-2. Containment failures within the intermediate timeframe (6 to 24 hours following event initiation) and late timeframe (greater than 24 hours following event initiation) dominate the population dose risk at Nine Mile Point.

Table G-2. Breakdown of Population Dose by Containment Release Mode

Containment Release Mode	Unit 1		Unit 2	
	Population Dose (Person-Rem ^(a) Per Year)	Percent Contribution	Population Dose (Person-Rem ^(a) Per Year)	Percent Contribution
Early containment failure	5.0	22	5.9	12
Intermediate containment failure	10.0	44	12.2	24
Late containment failure	7.5	34	32.71	64
No containment failure (leakage)	0.01	<1	0.1	<1
Total Population Dose	22.5	100	50.9	100

(a) 1 person-Rem = 0.01 person-Sv

G.2.2 Review of NMPNS's Risk Estimates

NMPNS's determination of offsite risk at Nine Mile Point is based on the following three major elements of analysis:

- the Level 1 and 2 risk models that form the bases for the Unit 1 and Unit 2 IPE submittals (NMPC 1992, 1993) and the IPEEE submittals (NMPC 1995, 1996),
- the major modifications to the IPE model that have been incorporated in the Nine Mile Point PRAs, and
- the MACCS2 analyses performed to translate fission product source terms and release frequencies from the Level 2 PRA model into offsite consequence measures.

Each of these analyses was reviewed to determine the acceptability of NMPNS's risk estimates for the SAMA analysis, as summarized below.

The staff's review of the Nine Mile Point IPEs is described in NRC reports dated April 2, 1996 for Unit 1 (NRC 1996), and August 18, 1994 for Unit 2 (NRC 1994). Based on a review of the original IPE submittals and responses to RAIs, the staff concluded that the IPE submittals met the intent of Generic Letter 88-20; that is, the IPEs were of adequate quality to be used to look for design or operational vulnerabilities.

A comparison of internal events CDF from the IPE and the PRA used in the SAMA analysis indicates an increase of approximately 7.5×10^{-6} per year in the CDF for Unit 1 (from 5.5×10^{-6} per year to 1.3×10^{-5} per year). For Unit 2, the increase in CDF was about 2.7×10^{-5} per year (from 3.1×10^{-5} per year to 5.8×10^{-5} per year). The increase is mainly attributed to modeling changes that have been implemented since the IPEs were submitted. A summary listing of those changes that resulted in the greatest impact on the internal events CDF was provided in the ER, and include:

Unit 1

- added several initiating events for support system failures,
- updated and improved reactor pressure vessel overfill modeling to be consistent with unit modifications to reduce the probability of the event,
- improved modeling of loss of instrumentation scenarios, and
- improved modeling of containment heat removal recovery.

Unit 2

- revised and improved the SBO model based on updated human reliability evaluations and plant-specific events,
- improved modeling of the safety relief valves to allow recovery of dominant failure modes,
- improved modeling of containment heat removal recovery,
- added more detailed modeling of electrical switchgear to improve the modeling of dependencies, and
- added more detailed modeling of service water and improved the success criteria.

The Nine Mile Point Unit 1 IPE CDF value is at the low end of the range of the CDF values reported in the IPEs for boiling BWR 1/2/3 plants, while the IPE CDF value for Unit 2 is in the middle of the range of the CDF values reported in the IPEs for BWR 5/6 plants. Figure 11.2 of NUREG-1560 shows that the IPE-based CDF for BWR 1/2/3 plants ranges from 3×10^{-6} to 5×10^{-5} per year, and for BWR 5/6 plants, the CDF ranges from 1×10^{-5} to 6×10^{-5} per year (NRC 1997a). It is recognized that other plants have generally reduced the values for CDF subsequent to the IPE submittals due to modeling and hardware changes. The current internal events CDF results for Nine Mile Point remain comparable to other plants of similar vintage and characteristics.

Appendix G

The staff considered the peer reviews performed for the Nine Mile Point PRAs, and the potential impact of the review findings on the SAMA evaluation. In response to an RAI, NMPNS described the previous peer reviews, the most significant of which was the Boiling Water Reactor Owners Group (BWROG) Peer Reviews (NMPNS 2004b). These reviews were conducted in 1998 (Unit 1) and 1997 (Unit 2), and were reviews of slightly modified versions of the IPEs. In response to an RAI, NMPNS stated that all Level A facts and observations were incorporated in the PRA models used for the SAMA analyses, and that none of the Level B facts and observations that have not yet been incorporated would significantly impact the CDF or the SAMA results (NMPNS 2005). These Level B facts and observations were provided in the RAI response. The staff agrees that none of the facts and observations would adversely affect the PRAs to a degree that would invalidate their use for the SAMA evaluations.

Given that the Nine Mile Point PRAs have been peer reviewed and the peer review findings were either addressed or judged to have no impact on the SAMA evaluation, that NMPNS satisfactorily addressed staff questions regarding the PRA (NMPNS 2004b, 2005), and that the CDF falls within the range of contemporary CDFs for BWR plants with Mark I and Mark II containments, the staff concludes that the Level 1 PRA model is of sufficient quality to support the SAMA evaluation.

Niagara Mohawk Power Company (NMPC) submitted IPEEEs in August 1996 (Unit 1) and June 1995 (Unit 2), in response to Supplement 4 of Generic Letter 88-20 (NMPC 1996, 1995). NMPC did not identify any fundamental weaknesses or vulnerabilities to severe accident risk in regard to the external events related to seismic, fire, or other external events. However, a number of areas were identified for improvement in both the seismic and fire areas and were subsequently addressed as discussed below. In letters dated July 18, 2000 and August 12, 1998, the staff concluded that the submittals met the intent of Supplement 4 to Generic Letter 88-20, and that the licensee's IPEEE process was capable of identifying the most likely severe accidents and severe accident vulnerabilities (NRC 2000, 1998).

Unit 1 Seismic Analysis

The Unit 1 IPEEE uses a focused scope EPRI seismic margins analysis (SMA). This method is semi-quantitative and does not directly provide the means to determine the numerical estimates of the CDF contributions from seismic initiators. All equipment in the seismic IPEEE scope was reviewed in accordance with Unresolved Safety Issue (USI) A-46 program procedures. Based on the EPRI assessment methodology, NMPC found that, after IPEEE identified improvements were made, all components in the assessment success path had high confidence low probability of failure (HCLPF) values less than the 0.3g review level earthquake except for two items:

- battery boards 11 and 12 0.27g
- containment spray raw water pumps 0.29g

The HCLPF values for these two items are considered to be sufficiently close to the screening value as to essentially meet the review level earthquake requirements. In response to a SAMA-related RAI regarding the IPEEE, NMPNS stated that the improvements needed to meet the 0.3g HCLPF screening criteria (excluding the two items above) were tracked and completed under the USI A-46 program (NMPNS 2004b).

NMPNS addressed the potential for cost-beneficial SAMAs to address the above two items that have HCLPF values less than the screening values (NMPNS 2005). NMPNS stated that based on previous SAMA evaluations, a reduction in CDF of 1×10^{-7} per year would yield a benefit of about \$10K, and a reduction of 1×10^{-6} per year would yield a benefit of about \$100K. To accurately establish a change in CDF would require a more detailed seismic fragility and risk evaluation, which would easily exceed \$100K in cost. With regard to the battery boards, NMPNS stated that the difference in risk between the 0.27g HCLPF and 0.3 g HCLPF screening value is closer to 1×10^{-6} per year because DC power is important to the automatic operation of equipment, particularly since the seismic event is likely to have also caused a loss of offsite power. The modifications needed to achieve a 0.3 g HCLPF value were estimated to cost in excess of \$100K. In addition to the expense of the seismic evaluation (\$100K), this modification would not be cost-beneficial. With regard to the containment spray raw water pumps, NMPNS stated that the difference in risk is not distinguishable between the 0.29 g HCLPF and the 0.3 g HCLPF screening value. Therefore, the change in risk is likely to be closer to 1×10^{-7} per year (i.e., \$10K benefit) since the failure of these pumps primarily impacts the containment heat removal function. In order to achieve the 0.3 g HCLPF, it is likely that the four pumps would be required to be replaced (because the pump casing length would exceed the 20-ft limit allowed under USI A-46). This cost alone would exceed any achievable benefit. NMPNS concluded that the cost of increasing the seismic capacity of these items would exceed any potential benefit. The staff agrees with this conclusion.

The IPEEE extended the seismic margins methodology to include determination of a seismic CDF. The seismic CDF after making the identified improvements was estimated in the IPEEE to be 1×10^{-6} per year. The NRC's Safety Evaluation Report (SER) on the IPEEE concluded that this CDF, based solely on the seismic margins assessment, potentially underestimates the true seismic CDF (NRC 2000). Subsequent to the IPEEE, the Nine Mile Point Unit 1 PRA was updated to incorporate external events. The seismically induced CDF is given as five percent of the total CDF (or approximately 1.3×10^{-6} per year). A description of the updated seismic risk assessment was provided in response to a SAMA-related RAI and appears very similar to that utilized in the IPEEE (NMPNS 2004b). The staff notes that even if the seismic CDF is several times greater than the PRA assessed value it would still be a relatively small contributor to overall risk for Nine Mile Point Unit 1. The staff's conclusion is that the analysis, while somewhat simplified and utilizing a number of significant assumptions, incorporates the important factors that affect seismic risk and provides an estimate of seismic CDF and risk suitable for the present application.

Unit 2 Seismic Analysis

The Unit 2 IPEEE initially used a focused scope EPRI seismic margins analysis using a 0.5 g review level earthquake rather than the required 0.3 g. NMPC found that for a 24-hour mission time all of the plant's high confidence low probability of failure (HCLPF) values were more than the 0.5 g review level earthquake except for HFA Model 154 relay chatter, which had a HCLPF value of 0.45 g. For the long term (a 72-hour mission time) it was determined that makeup was dependent on non-seismic nitrogen bottles, which had a HCLPF value of 0.23 g. Additionally, three concerns were cited in the IPEEE: (1) potential for an overhead rack to impact a motor-operated valve (MOV); (2) potential interaction of hoist assemblies mounted on electric cabinets; and (3) fire water piping in the control building with less than 0.5 g HCLPF. NMPC stated in the IPEEE that the first two concerns had been resolved. A detailed evaluation subsequent to the walkdown concluded that a HCLPF of 0.5 g could be justified for the fire piping.

NMPC also performed a Level 2 seismic PRA to put the SMA results into perspective. The seismic CDF after making the identified improvements is given as 2.5×10^{-7} per year. It is noted that even though the two evaluations appear very similar, the NRC's SER on the IPEEE for Nine Mile Point Unit 2 did not express the same concerns about the seismic risk results as were expressed for the Nine Mile Point Unit 1 evaluation. Subsequent to the IPEEE, the NMP2 PRA was updated to incorporate external events. The seismically-induced CDF is given as one percent of the total CDF (or approximately 6×10^{-7} per year). A description of the updated seismic risk assessment was provided in response to an RAI and is very similar to that utilized in the IPEEE (NMPNS 2004b). The staff notes that even if the seismic CDF is several times greater than the PRA assessed value it would still be a relatively small contributor to overall Nine Mile Point risk for Unit 2. The assessment specifically included the contribution due to failure of the nitrogen bottles that had a HCLPF of 0.23 g. The staff notes that the failure frequency of these bottles combined with the failure of other systems necessary to lead to core damage result in a CDF contribution so low that a SAMA addressing this issue is unlikely to be cost-beneficial. The staff concludes that while somewhat simplified and utilizing a number of significant assumptions, the analysis incorporates the important factors that affect seismic risk and provides an estimate of seismic CDF and risk suitable for the present application.

Based on the licensee's efforts to identify and address seismic outliers, the staff concludes that the opportunity for seismic-related SAMAs has been adequately explored for Nine Mile Point Units 1 and 2 and that there are no cost-beneficial, seismic-related SAMA candidates.

The IPEEE fire analysis for both Nine Mile Point Unit 1 and Unit 2 consisted of a fire PRA that utilized portions of the Fire Induced Vulnerability Evaluation (FIVE) methodology. A single quantitative screening was initially performed, followed by a detailed analysis of the unscreened fire areas. The screening consisted of making an initial CDF estimate from a fire frequency estimate based on the amount of fixed and transient combustibles in each area and a conditional core damage frequency determined from the IPE. A CDF screening criterion of

1×10^{-6} per year was applied to each zone or area. The detailed analysis considered the location of ignition sources, combustibles and critical components in each area, along with fire detection and suppression capabilities to determine the fire CDF in each unscreened area.

Unit 1 Fire Analysis

The IPEEE Nine Mile Point Unit 1 fire CDF, after making IPEEE-identified improvements, is given as 2×10^{-5} per year. The principal contributors are given below.

Fire Zone	Location	Core Damage Frequency (per year)
T3B	Turbine Bldg. EI 261' South	1.3×10^{-5}
C1	Cable Spreading Room	2.0×10^{-6}
C3	Auxiliary Control Room	1.4×10^{-6}
C2	Main Control Room	1.1×10^{-6}
T2B	Turbine Bldg. EI 250' South & West	1.0×10^{-6}

Subsequent to the IPEEE, the Nine Mile Point Unit 1 PRA was updated to incorporate external events. As part of the update, the external events modeling from the IPEEE was improved, resulting in a reduction in external event risk. The updated fire-induced CDF is given as 1.3×10^{-5} per year, or approximately 49 percent of the total CDF. In response to an RAI, NMPNS provided a listing of the contribution to loss of injection events by initiating event, and a listing of basic event importance for CDF (NMPNS 2004b). These lists include numerous indications of the importance of fire events in the current PRA and are reasonably consistent with the above IPEEE results. Also, SAMA U1-210 addresses fires related to the dominant fire source from the IPEEE, and indicates a CDF reduction reasonably consistent with the above results. Based on this and the results of the NRC IPEEE review, the staff concludes that the current fire PRA results provide an adequate basis for considering these events in the SAMA evaluations.

Unit 2 Fire Analysis

The IPEEE Nine Mile Point Unit 2 fire CDF is given as 1.4×10^{-6} per year, which is approximately one decade lower than the fire CDF for Nine Mile Point Unit 1. The principal contributors to this are fires in various main control room cabinets. Subsequent to the IPEEE, the Nine Mile Point Unit 2 PRA was updated to incorporate external events. As part of the update, the external events modeling from the IPEEE was improved, resulting in an increase in external event risk. The updated fire-induced CDF is given as 3.7×10^{-6} per year, or approximately six percent of the total CDF. In response to an RAI, NMPNS provided a listing of

Appendix G

the contribution to loss of injection events by initiating event, and a listing of basic event importance for CDF (NMPNS 2004b). These lists include numerous indications of the importance of fire events in the current PRA and are reasonably consistent with the IPEEE results. Based on this and the results of the NRC IPEEE review, the staff concludes that the current fire PRA results provide an adequate basis for considering these events in the SAMA evaluations.

The Nine Mile Point Unit 1 IPEEE SER estimated that high wind loads contribute a CDF of 1.6×10^{-6} per year, tornado missiles contribute 3.5×10^{-7} per year and probable maximum participation contributes 6×10^{-7} per year. The Nine Mile Point Unit 1 IPEEE demonstrated that transportation and nearby facility accidents were not considered to be significant vulnerabilities at the plant without quantitative estimates. The staff concluded in the SER that these results did not indicate vulnerabilities to these other external hazards.

Using a progressive screening approach, the Nine Mile Point Unit 2 IPEEE concluded that contributions to CDF from other external events (high winds, tornado, transportation and nearby facility accidents, etc.) are insignificant (less than 1×10^{-6} per year). The SER on the NMP2 IPEEE concurred in this assessment.

Because NMPNS included contributions to risk from seismic and fire in its base case evaluation, and due to the efforts made during the IPEEE process to address seismic issues, the staff finds NMPNS's consideration of external events to be acceptable for purposes of the SAMA evaluation.

NMPNS stated that the Level 2 models used to determine the frequency of the various release categories include no major changes from the IPE models (NMPNS 2004a). The Level 2 analysis processes each core damage sequence individually through the Level 2 model. NMPNS characterized the releases for the spectrum of possible radionuclide release scenarios using a set of ten release categories, defined based on the timing and magnitude of the release. Each end state of the Level 2 analysis corresponds to one of the release categories. The release categories and their frequencies are presented in Tables F.2-5 and F.2-6 of the ER for Units 1 and 2, respectively (NMPNS 2004a). In response to an RAI, NMPNS provided the source terms for each release category and the basis for these values (NMPNS 2004b, 2005). The source terms were based on a combination of new plant specific MAAP 4.0 analysis and comparisons with source term results from NUREG/CR-4551 for Peach Bottom (NRC 1990a). All releases were modeled as occurring at 30 m above ground level. This is based on the expectation that regardless of containment failure location, the building panels will be blown out and most releases will pass through the building and exit near the refueling level. The staff concludes that the process used for determining the release category frequencies and source terms is reasonable and appropriate for the purposes of the SAMA analysis.

As discussed previously, the fission product inventories used in the consequence analyses are based on a fission product inventory scaled from generic information for each unit. In response to an RAI concerning the impact of current and future fuel management practices, NMPNS described a conservative analysis of core fission product inventory based on a bounding case of 1400 effective full power days (EFPD) versus the expected average core exposure at end-of-cycle of approximately 1277 EFPD (NMPNS 2005). The staff estimates that using this increased inventory would result in about a 20 percent increase in the total costs associated with a severe accident. Using realistic mid-life or average conditions would result in a smaller increase. Based on this limited impact, the staff concludes that the scaling based on the plant-specific power level yields sufficiently accurate and reasonable results for the dose assessment.

The staff reviewed the process used by NMPNS to extend the containment performance (Level 2) portion of the PRA to an assessment of offsite consequences (essentially a Level 3 PRA). This included consideration of the major input assumptions used in the offsite consequence analyses. The MACCS2 code was utilized to estimate offsite consequences. Plant-specific input to the code includes the source terms for each release category and the reactor core radionuclide inventory (both discussed above), site-specific meteorological data, projected population distribution within a 80-km (50-mi) radius for the year 2030, emergency evacuation modeling, and economic data. This information is provided in Appendix F of the ER (NMPNS 2004a).

NMPNS used site-specific meteorological data processed from hourly measurements for the 1994 calendar year as input to the MACCS2 code. Data from 1985 through 2001 were also considered, but data from 1994 was selected because it was considered to be "average" for items of interest, with no extremes in the annual averages or joint frequency distributions. Data voids were filled using various techniques, including substitution of alternate data from a backup tower or from alternate measurement levels, and interpolation between data points. The staff notes that previous SAMA analyses results have shown little sensitivity to year-to-year differences in meteorological data and considers use of the 1994 data in the base case to be reasonable.

The population distribution the applicant used as input to the MACCS2 analysis was estimated for the year 2030, based on SECPOP90 (NRC 1997b). The 1990 rosette populations generated by SECPOP90 were extrapolated to the year 2030 by using the ratio of 1990/2030 county populations multiplied by the estimated fraction of each county comprising the rosette section. The county-specific population projections were obtained from Cornell University. A sensitivity analysis was performed in which the projected population in all sectors was increased by ten percent. The increase in projected population results in approximately a seven percent increase (applicable to both units) in population dose risk, but less than a five percent increase in total costs associated with a severe accident. The staff considers the methods and assumptions for estimating population reasonable and acceptable for purposes of the SAMA evaluation.

Appendix G

The emergency evacuation model was modeled as a single evacuation zone extending out 16 km (10 mi) from the plant. It was assumed that 95 percent of the population would move at an average speed of approximately 1.8 meters per second with a delayed start time of 7200 seconds (NMPNS 2004a). This assumption is conservative relative to the NUREG-1150 study (NRC 1990b), which assumed evacuation of 99.5 percent of the population within the emergency planning zone. A sensitivity study performed on the evacuation speed demonstrated that the total dose and economic cost results are insensitive to this parameter. The evacuation assumptions and analysis are deemed reasonable and acceptable for the purposes of the SAMA evaluation.

Much of the site-specific economic data were provided from SECPOP90 (NRC 1997c) by specifying the data for each of the ten counties surrounding the plant, to a distance of 80 km (50 mi). The SECPOP90 input file was manually updated to 2000 using cost of living and other data from the Bureau of the Census and the Department of Agriculture. The agricultural economic data were updated using available data from the 1997 Census of Agriculture (USDA 1998) supplemented by data available through other Federal agencies.

The staff concludes that the methodology used by NMPNS to estimate the offsite consequences for Nine Mile Point provides an acceptable basis from which to proceed with an assessment of risk reduction potential for candidate SAMAs. Accordingly, the staff based its assessment of offsite risk on the CDF and offsite doses reported by NMPNS.

G.3 Potential Plant Improvements

The process for identifying potential plant improvements, an evaluation of that process, and the improvements evaluated in detail by NMPNS are discussed in this section.

G.3.1 Process for Identifying Potential Plant Improvements

NMPNS's process for identifying potential plant improvements (SAMAs) consisted of the following elements:

- review of plant-specific improvements identified in the Nine Mile Point IPE and IPEEE and subsequent PRA revisions
- review of SAMA analyses submitted in support of original licensing and license renewal activities for other operating nuclear power plants
- review of other NRC and industry documentation discussing potential plant improvements.

Based on this process, an initial set of 220 candidate SAMAs was identified, representing a compilation of 204 SAMAs identified from previous plant analyses, and 16 SAMAs identified

from the NMP-specific PRAs. In Phase 1 of the evaluation, NMPNS performed a qualitative screening of the initial list of SAMAs and eliminated SAMAs from further consideration using the following criteria:

- the SAMA is not applicable to the plant design,
- the SAMA has already been implemented,
- the SAMA is similar to another SAMA under consideration, or
- the SAMA is not feasible, has associated costs that exceed the maximum attainable benefit, or does not provide a significant benefit.

Based on this screening, 207 SAMAs were eliminated for Unit 1 and 200 SAMAs were eliminated for Unit 2, leaving 13 and 20 for further evaluation for Units 1 and 2, respectively. Of the SAMAs eliminated at Unit 1, 45 were eliminated because they were not applicable, 25 were similar to other SAMAs being considered, 65 had been implemented, 63 either had no significant safety benefit or had implementation costs greater than any risk benefit, and nine were related to the mitigation of ISLOCA, which is considered to be a low risk contributor, and the SAMA was not developed further. Of the SAMAs eliminated at Unit 2, 37 were eliminated because they were not applicable, 30 were similar to other SAMAs being considered, 66 had been implemented, 53 either had no significant safety benefit or had implementation costs greater than any risk benefit, nine were related to the mitigation of ISLOCA (as explained above), and seven were related to reactor coolant pump seal leakage (only considered for Unit 2). The remaining SAMAs are listed in Tables 4.16-3 (Unit 1) and 4.16-4 (Unit 2) of the ER (NMPNS 2004a), and were subjected to further evaluation.

For the final evaluation, NMPNS estimated the cost of implementing the SAMA, as described in Section G.5 below, and the associated potential risk reduction and dollar-equivalent benefit, as described in Sections G.4 and G.6 below. Of the 13 SAMAs surviving the initial screening for Unit 1, four were identified as potentially cost-beneficial. Of the 20 SAMAs surviving the initial screening for Unit 2, 11 SAMAs were identified as potentially cost-beneficial.

G.3.2 Review of NMPNS's Process

NMPNS's efforts to identify potential SAMAs focused on unit-specific risk and design characteristics. The initial list of SAMAs generally addressed the accident sequences considered to be important to CDF from functional, initiating event, and risk reduction worth perspectives. NMPNS also considered SAMAs to address improvements in containment performance but concluded that such modifications are expensive, and, therefore, screened them out with the exception of one SAMA related to containment venting (SAMA 212).

Appendix G

The preliminary review of NMPNS's SAMA identification process raised some concerns regarding the completeness of the set of SAMAs identified and the inclusion of plant-specific risk contributors. The staff requested clarification regarding the portion of risk represented by the dominant risk contributors (NRC 2004a). In response to the RAI, NMPNS provided a listing of basic events ranked using the Fussell-Vesely (FV) importance measure for both CDF and large early release frequency (LERF) (NMPNS 2004b). NMPNS considered basic events with a FV greater than 0.01. NMPNS correlated the top risk contributors to CDF and LERF with the SAMAs evaluated in the ER (NMPNS 2004b). Based on these assessments, NMPNS concluded that the set of 220 SAMAs evaluated addressed the major contributors to CDF and large release frequency, and that the review of the top risk contributors did not reveal any new SAMAs.

The staff noted that for several important basic events, the associated SAMAs identified as addressing the basic event were not included within the set of 13 and 20 SAMAs that survived the initial screening for Unit 1 and Unit 2, respectively, and were not described elsewhere in the ER. In response to a staff request, NMPNS provided supplemental information describing each of these SAMAs (eight additional SAMAs for Unit 1 and five additional SAMAs for Unit 2), and the cost and benefit considerations on which NMPNS screened these SAMAs from further consideration in Phase 1 (NMPNS 2005). The staff reviewed the description of the potential enhancement and the screening criterion assigned (e.g., not applicable, already installed, etc.) and agrees that these SAMAs do warrant further consideration for the reasons provided in the response.

NMPNS considered potential improvements to further reduce external events risk. The Nine Mile Point PRA models include external initiating events (fires, seismic, and floods). The risk profile for Unit 1 indicates that fires contribute almost half of the CDF. As a result, SAMA U1-210, protect critical fire targets, was identified and retained for evaluation. Although seismic events are important contributors to LERF, NMPNS concluded that no further evaluation was necessary since any modification to improve the fragility of the plant would be costly. At Unit 2, flooding in the control building was identified as an important contributor to LERF. Therefore, SAMA U2-223, improve control building flood scenarios, was identified and retained for evaluation.

While neither IPE identified vulnerabilities, both did identify a number of potential improvements, some of which were implemented and credited in the IPEs and others which were identified for future consideration. The staff questioned the applicant about the current status of these potential improvements (NRC 2004a). In response to the RAI, NMPNS provided the current status of the IPE identified improvements/enhancements. All have either been implemented, previously evaluated and determined not needed to be considered further, or are addressed by SAMAs in the present analysis (NMPNS 2004b).

The staff also questioned NMPNS about the consideration of SAMAs previously identified by other BWR plants as potentially cost-beneficial (NRC 2004a). In response to the RAI, NMPNS

provided an assessment of the applicability/feasibility of each of the specific enhancements identified by the staff, and concluded that these SAMAs either would not provide a significant benefit or were not feasible/applicable at Nine Mile Point (NMPNS 2004b).

The staff notes that the set of SAMAs submitted is not all-inclusive, since additional, possibly even less expensive, design alternatives can always be postulated. However, the staff concludes that the benefits of any additional modifications are unlikely to exceed the benefits of the modifications evaluated and that the alternative improvements would not likely cost less than the least expensive alternatives evaluated, when the subsidiary costs associated with maintenance, procedures, and training are considered.

The staff concludes that NMPNS used a systematic and comprehensive process for identifying potential plant improvements for Nine Mile Point, and that the set of potential plant improvements identified by NMPNS is reasonably comprehensive and therefore acceptable. This search included reviewing insights from the IPE and IPEEE and other plant-specific studies, reviewing plant improvements considered in previous SAMA analyses, and using the knowledge and experience of its PRA personnel.

G.4 Risk Reduction Potential of Plant Improvements

NMPNS evaluated the risk-reduction potential of the 13 (Unit 1) and 20 (Unit 2) remaining SAMAs that were applicable to Nine Mile Point. Many of the SAMA evaluations were performed in a bounding fashion in that the SAMA was assumed to completely eliminate the risk associated with the proposed enhancement. Such bounding calculations overestimate the benefit and are conservative.

NMPNS used model re-quantification to determine the potential benefits. The CDF and population dose reductions were estimated using the PRA01B version of the Nine Mile Point PRAs. The changes made to the model to quantify the impact of SAMAs are detailed in Section F.3 of Appendix F to the ER (NMPNS 2004a), and in the response to the RAI (NMPNS 2004b). Tables G-3 and G-4 list the assumptions considered to estimate the risk reduction for each of the evaluated SAMAs, the estimated risk reduction in terms of percent reduction in CDF and population dose, and the estimated total benefit (present values) of the averted risk based on a seven-percent and three-percent discount rate. The determination of the benefits for the various SAMAs is further discussed in Section G.6.

Several of the SAMAs were judged by NMPNS to have a negligible benefit based on a determination that both CDF and population dose would not be significantly impacted by their implementation (e.g., SAMAs U1-24, U1-112, and U2-21). In these instances, the SAMA affects sequences that are not risk-significant at Nine Mile Point, or the SAMA is ineffective, i.e., the SAMA does not provide a significant benefit because the failure would still occur due to another means.

The staff has reviewed NMPNS's bases for calculating the risk reduction for the various plant improvements and concludes that the rationale and assumptions for estimating risk reduction are reasonable and generally conservative (i.e., the estimated risk reduction is higher than what would actually be realized). Accordingly, the staff based its estimates of averted risk for the various SAMAs on NMPNS's risk reduction estimates.

G.5 Cost Impacts of Candidate Plant Improvements

NMPNS estimated the costs of implementing the 13 (Unit 1) and 20 (Unit 2) candidate SAMAs. The cost estimates conservatively did not include the cost of replacement power during extended outages required to implement the modifications, nor did they include contingency costs associated with unforeseen implementation obstacles. Estimates were presented in terms of dollar values at the time of implementation or estimation, and were not adjusted to present-day dollars. For some of the SAMAs considered, the cost estimates were sufficiently greater than the benefits calculated that it was not necessary to perform a detailed cost estimate.

The staff reviewed the bases for the applicant's cost estimates (presented in Section F.3 of Appendix F to the ER). For certain improvements, the staff also compared the cost estimates to estimates developed elsewhere for similar improvements, including estimates developed as part of other licensees' analyses of SAMAs for operating reactors and advanced light-water reactors. The staff reviewed the costs and found them to be consistent with estimates provided in support of other plants' analyses.

NMPNS did not provide a cost estimate for SAMA U2-218, which seeks to improve the high-pressure core spray cross-tie to Division I/II. NMPNS stated that upon further evaluation of the proposed modification, it was determined that the design concept was not feasible for implementation to achieve the modeled benefit. SAMAs U2-215 (use of a portable charger), U2-216 (hard pipe diesel fire pump to the reactor pressure vessel) and U2-221 (reduce unit cooler contribution to emergency diesel generator unavailability), all of which were identified as potentially cost-beneficial for Unit 2, were judged by NMPNS to provide a more reliable and cost-effective alternative to SAMA U2-218. Implementation of any or all of these potentially cost-beneficial SAMAs would reduce the estimated benefit of SAMA U2-218. Considering the above rationale, and that the benefit estimated by NMPNS for U2-218 has been conservatively determined, the staff agrees that further consideration of SAMA U2-218 is not warranted.

The staff concludes that the cost estimates provided by NMPNS are sufficient and appropriate for use in the SAMA evaluation.

Table G-3. SAMA Cost/Benefit Screening Analysis for Nine Mile Point Unit 1

SAMA	Assumptions	% Risk Reduction			Total Benefit (\$) 7% Discount Rate	Total Benefit (\$) 3% Discount Rate	Cost (\$)
		CDF	Population Dose	Population Dose			
U1-4 Procedure revision and training on loss of reactor building closed loop cooling	Operator action failure probability is improved from 0.1 to 1E-3	<1	<1	<1	8600	12,000	30,000
U1-21 Firewater supply to shutdown cooling heat exchanger	Failure of shutdown cooling modified to include success by using fire pump with no operator error	2.3	2	2	41,400	58,000	500,000
U1-24 Improved procedures for loss of control room HVAC	Screened out based on further consideration of existing procedures	~0	~0	~0	~0	~0	NA
U1-112 Modify reactor water cleanup (RWCU) for decay heat removal	RWCU provides adequate heat removal in all shutdown events in which its support systems are available	~0	~0	~0	~0	~0	>1 million
U1-113 Use of control rod drive (CRD) for alternate boron injection Failure of standby liquid control reduced by 2 orders of magnitude	Failure of standby liquid control reduced by 2 orders of magnitude	<1	<1	<1	5500	7700	>70,000
U1-208 Improve drywell head bolts	Bounding analysis by eliminating drywell failure modes in Level 2 analysis	0	<0.1	<0.1	1500	2000	>150,000
U1-209 Improve standard operating procedure SOP-14 and provide training	Human error probabilities in model for loss of vital AC power reduced by factor of 10	22	24	24	449,000	627,500	30,000
U1-210 Protect critical fire targets	Risk from dominant fire sources set to zero	23	24	24	459,000	641,500	40,000

SAMA	Assumptions	% Risk Reduction		CDF	Population Dose	Total Benefit (\$)		Total Benefit (\$) 3% Discount Rate	Cost (\$)
						7% Discount Rate	3% Discount Rate		
U1-211 Reduce offsite dependency on battery board DC11	Offsite Power Recovery within and after 1 hour revised to allow use of another battery board with operator error of 0.1	<1	2	<1	2	24,400	34,000	50,000	
U1-212 Capability to manually operate containment venting	Containment venting model revised to allow local manual operation of valve 201-16	<1	2	<1	2	37,500	52,400	>40,000	
U1-215 Add a portable battery charger	Human error probabilities in model for loss of vital AC power reduced by factor of 10	22	24	22	24	449,000	627,500	50,000	
U1-220 Installation of new transformers to improve AC power load management	Operator error to shed loads eliminated from model thus assuming perfect operator or transformers replaced	14	17	14	17	295,000	411,000	600,000	
U1-222 Improved response to loss of instrument air	U1-Model revised to reflect perfectly reliable operator on loss of instrument air or feedwater control system independent of instrument air	4	5	4	5	87,500	122,000	600,000	

Note: SAMAs in bold were judged to be potentially cost-beneficial.

Table G-4. SAMA Cost/Benefit Screening Analysis for Nine Mile Point Unit 2

SAMA	Assumptions	% Risk Reduction		Total Benefit (\$) 7% Discount Rate	Total Benefit (\$) 3% Discount Rate	Cost (\$)
		CDF	Population Dose			
U2-21 Firewater supply to shutdown cooling heat exchanger	Failure of shutdown cooling modified to include success by using fire pump with no operator error	~0	~0	~0	~0	>100,000
U2-23a Provide redundant ventilation for residual heat removal pump rooms	Room cooling is perfectly reliable	3	7	210,000	293,500	30,000
U2-23b Provide redundant ventilation for high pressure core spray (HPCS) pump room	Room cooling is perfectly reliable	4	8	264,000	369,000	30,000
U2-23c Provide redundant ventilation for reactor core isolation cooling pump room	Room cooling is perfectly reliable	1	2	77,500	108,300	30,000
U2-24 Improve procedures for loss of control room HVAC	Screened out based on further consideration of existing procedures and low contribution to CDF from ventilation failure	~0	~0	~0	~0	NA
U2-56 Additional diesel for onsite emergency AC power	New diesel generator with failure probability of 0.01 included. No credit if non-recoverable emergency bus failures or fire in emergency switchgear area occur	54	5	956,000	1,220,000	>10 million
U2-73 Firewater back up for emergency diesel generator cooling	Fire water required to fail in addition to service water in order to fail emergency diesel generators. Human error assumed to be zero	3	5	135,000	184,000	500,000

SAMA	Assumptions	% Risk Reduction			Total Benefit (\$) 7% Discount Rate	Total Benefit (\$) 3% Discount Rate	Cost (\$)
		CDF	Population Dose	Population Dose			
U2-112 Modify RWCU for decay heat removal	RWCU provides adequate heat removal in all shutdown events in which its support systems are available	~0	~0	~0	~0	>1 million	
U2-113 Use CRD for alternate boron injection	Failure of standby liquid control reduced by 2 orders of magnitude	<1	1	46,800	63,900	>150,000	
U2-208 Improve drywell head bolts	Bounding analysis by eliminating drywell failure modes in Level 2 analysis	0	2	30,700	43,000	>150,000	
U2-213 Enhance loss of service water procedure	Room cooling is perfectly reliable	4	8	264,000	369,000	30,000	
U2-214 Enhance SBO procedures	A detailed assessment was not performed	Note 2	Note 2	>100,000	>139,000	30,000	
U2-215 Use of portable battery charger	U2-Failure probability of portable battery charger reduced from 0.96 to 0.05	5	20	507,000	708,000	50,000	
U2-216 Hard pipe diesel fire pump to the reactor pressure vessel	Failure probability for fire pump to provide sufficient flow reduced from 0.8 to 1E-05 with same human error for operator to connect	42	8	800,000	1,112,000	200,000	
U2-218 Improve the HPCS crosstie to division I/II	Human error probabilities for failure of operator to implement crosstie reduced to 1E-03	41	4	706,000	986,000	NA	
U2-219 Improve containment venting	Human error probability for operator to vent containment reduced by a factor of 10	4	11	313,000	437,000	700,000	

SAMA	Assumptions	% Risk Reduction		Population Dose	Total Benefit (\$) 7% Discount Rate	Total Benefit (\$) 3% Discount Rate	Cost (\$)
		CDF	Dose				
U2-221a	Reduce unit cooler contribution to emergency diesel generator (EDG) unavailability— increase testing frequency	14	6	6	342,000	478,000	55,000
U2-221b	Reduce unit cooler contribution to EDG unavailability— provide redundant means of cooling	31	18	18	872,000	1,218,000	55,000
U2-222	Improve procedures for loss of instrument air	7	7	7	273,000	382,000	30,000
U2-223	Improve control building flooding scenarios	1	3	3	86,700	121,000	>100,000

Note 1: SAMAs in bold were judged to be potentially cost-beneficial.

Note 2: Compensatory measures are currently used during the applicable alignments during certain electrical configurations. These compensatory measures will be permanently added to appropriate procedures. Therefore, a detailed assessment was not performed.

G.6 Cost-Benefit Comparison

NMPNS's cost-benefit analysis and the staff's review are described in the following sections.

G.6.1 NMPNS Evaluation

The methodology used by NMPNS was based primarily on NRC's guidance for performing cost-benefit analysis, i.e., NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (NRC 1997c). The guidance involves determining the net value for each SAMA according to the following formula:

$$\text{Net Value} = (\text{APE} + \text{AOC} + \text{AOE} + \text{AOSC}) - \text{COE}$$

where,

- APE = present value of averted public exposure (\$)
- AOC = present value of averted offsite property damage costs (\$)
- AOE = present value of averted occupational exposure costs (\$)
- AOSC = present value of averted onsite costs (\$)
- COE = cost of enhancement (\$).

If the net value of a SAMA is negative, the cost of implementing the SAMA is larger than the benefit associated with the SAMA and it is not considered cost-beneficial. NMPNS's derivation of each of the associated costs is summarized below.

NUREG/BR-0058 has recently been revised to reflect the agency's revised policy on discount rates. Revision 4 of NUREG/BR-0058 states that two sets of base case estimates should be developed—one at three percent and one at seven percent (NRC 2004c). NMPNS provided both sets of estimates and stated that it would consider for further evaluation any SAMA that was cost-beneficial using a three percent discount rate.

Averted Public Exposure (APE) Costs

The APE costs were calculated using the following formula:

$$\begin{aligned} \text{APE} = & \text{Annual reduction in public exposure (person-rem/year)} \\ & \times \text{monetary equivalent of unit dose (\$2000 per person-rem)} \\ & \times \text{present value conversion factor (10.76 based on a 20-year period with a} \\ & \text{seven percent discount rate)}. \end{aligned}$$

As stated in NUREG/BR-0184 (NRC 1997c), it is important to note that the monetary value of the public health risk after discounting does not represent the expected reduction in public

health risk due to a single accident. Rather, it is the present value of a stream of potential losses extending over the remaining lifetime (in this case, the renewal period) of the facility. Thus, it reflects the expected annual loss due to a single accident, the possibility that such an accident could occur at any time over the renewal period, and the effect of discounting these potential future losses to present value. For the purposes of initial screening, NMPNS calculated an APE of approximately \$484,000 (Unit 1) and \$1,100,000 (Unit 2) for the 20-year license renewal period, which assumes elimination of all severe accidents.

Averted Offsite Property Damage Costs (AOC)

The AOCs were calculated using the following formula:

$$\begin{aligned} \text{AOC} = & \text{Annual CDF reduction} \\ & \times \text{offsite economic costs associated with a severe accident (on a} \\ & \text{per-event basis)} \\ & \times \text{present value conversion factor.} \end{aligned}$$

For the purposes of initial screening, which assumes all severe accidents are eliminated, NMPNS calculated an annual offsite economic risk of about \$86,100 (Unit 1) and \$125,000 (Unit 2) based on the Level 3 risk analysis. This results in a discounted value of approximately \$927,000 (Unit 1) and \$1,350,000 (Unit 2) for the 20-year license renewal period.

Averted Occupational Exposure (AOE) Costs

The AOE costs were calculated using the following formula:

$$\begin{aligned} \text{AOE} = & \text{Annual CDF reduction} \\ & \times \text{occupational exposure per core damage event} \\ & \times \text{monetary equivalent of unit dose} \\ & \times \text{present value conversion factor.} \end{aligned}$$

NMPNS derived the values for averted occupational exposure from information provided in Section 5.7.3 of the regulatory analysis handbook (NRC 1997c). Best estimate values provided for immediate occupational dose (3300 person-rem) and long-term occupational dose (20,000 person-rem over a 10-year cleanup period) were used. The present value of these doses was calculated using the equations provided in the handbook in conjunction with a monetary equivalent of unit dose of \$2000 per person-rem, a real discount rate of seven percent, and a time period of 20 years to represent the license renewal period. For the purposes of initial screening, which assumes all severe accidents are eliminated, NMPNS calculated an AOE of approximately \$10,200 (Unit 1) and \$23,500 (Unit 2) for the 20-year license renewal period.

Averted Onsite Costs (AOSC)

Averted onsite costs (AOSC) include averted cleanup and decontamination costs and averted power replacement costs. Repair and refurbishment costs are considered for recoverable accidents only and not for severe accidents. NMPNS derived the values for AOSC based on information provided in Section 5.7.6 of the regulatory analysis handbook (NRC 1997c).

NMPNS divided this cost element into two parts—the Onsite Cleanup and Decontamination Cost, also commonly referred to as averted cleanup and decontamination costs, and the replacement power cost.

Averted cleanup and decontamination costs (ACC) were calculated using the following formula:

$$\text{ACC} = \begin{array}{l} \text{Annual CDF reduction} \\ \times \text{present value of cleanup costs per core damage event} \\ \times \text{present value conversion factor.} \end{array}$$

The total cost of cleanup and decontamination subsequent to a severe accident is estimated in the regulatory analysis handbook to be $\$1.5 \times 10^9$ (undiscounted). This value was converted to present costs over a 10-year cleanup period and integrated over the term of the proposed license extension.

Long-term replacement power costs (RPC) were calculated using the following formula:

$$\text{RPC} = \begin{array}{l} \text{Annual CDF reduction} \\ \times \text{present value of replacement power for a single event} \\ \times \text{factor to account for remaining service years for which replacement power} \\ \text{is required} \\ \times \text{reactor power scaling factor} \end{array}$$

NMPNS based its calculations on the value of 615 MWe (Unit 1) and 1144 MWe (Unit 2). Therefore, NMPNS applied power scaling factors of 615 MWe/910 MWe for Unit 1 and 1144 MWe/910 MWe for Unit 2 to determine the replacement power costs. For the purposes of initial screening, which assumes all severe accidents are eliminated, NMPNS calculated the AOSC to be approximately \$456,000 for Unit 1 and \$1,330,000 for Unit 2.

Using the above equations, NMPNS estimated the total present dollar value equivalent associated with completely eliminating severe accidents at Nine Mile Point Unit 1 to be about \$1,900,000, and at Nine Mile Point Unit 2 to be about \$3,800,000.

NMPNS's Results

If the implementation costs were greater than \$2,000,000 (Unit 1), or \$5,000,000 (Unit 2), then the SAMA was screened from further consideration. A more refined look at the costs and benefits was performed for the remaining SAMAs. If the expected cost for those SAMAs exceeded the calculated benefit, the SAMA was considered not to be cost-beneficial. The cost-benefit results for the individual analysis of the 13 SAMA candidates (Unit 1) and the 20 SAMA candidates (Unit 2) are presented in Tables G-3 and G-4, respectively. In the baseline analysis, using a seven percent discount rate, three SAMAs were considered to be potentially cost-beneficial for Unit 1, and ten were considered to be potentially cost-beneficial for Unit 2. NMPNS performed sensitivity analyses to evaluate the impact of parameter choices on the analysis results (NMPNS 2004a). Based on the sensitivity analysis using a three percent discount rate, two additional SAMA candidates were determined to be potentially cost-beneficial, i.e., SAMA U1-212 and SAMA U2-223. The potentially cost-beneficial SAMAs are:

Unit 1

- SAMA U1-209—Improve Procedure SOP-14 and provide training: This SAMA involves a procedure revision to prevent the loss of power assuming operators are able to maintain control of the plant.
- SAMA U1-210—Protect critical fire targets: This SAMA would protect critical fire targets from dominant fire sources by moving some of the targets or sources to improve separation and/or providing cable tray protection (e.g., barrier board).
- SAMA U1-212—Add capability to manually operate containment venting: This SAMA involves adding the capability to manually operate the valve that vents primary containment by adding a hand wheel or local air tank (cost-beneficial at three percent discount rate).
- SAMA U1-215—Add a portable charger: This SAMA involves the use of a portable charger for charging the batteries to extend the coping time when AC power has been lost.

Unit 2

- SAMA U2-23a—Provide redundant ventilation for residual heat removal (RHR) pump rooms: This SAMA involves a revision of the operating procedure to provide additional space cooling via the use of portable equipment or blocking doors open.
- SAMA U2-23b—Provide redundant ventilation for high pressure core spray (HPCS) pump room: This SAMA is similar to SAMA U2-23a.

Appendix G

- SAMA U2-23c—Provide redundant ventilation for reactor core isolation cooling (RCIC) pump room: This SAMA is similar to SAMA U2-23a.
- SAMA U2-213—Enhance loss of service water procedure: This SAMA involves a procedure enhancement of the Unit 2 loss of service water procedure (SOP-11) to provide more specific guidance for events involving loss of service water.
- SAMA U2-214—Enhance SBO procedures: This SAMA involves a procedure enhancement of the SBO procedure to provide entry conditions into SOP-3 and SOP-1 for some of the important failure modes during certain electrical configurations.
- SAMA U2-215—Use of a portable charger for the batteries: This SAMA would provide an additional capability for maintaining the 125V DC battery charged given loss of emergency AC power combined with the capability to align the ADS and containment venting related solenoid-operated valves to DC power (via the uninterruptable power supply).
- SAMA U2-216—Hard pipe diesel fire pump to the reactor pressure vessel: This SAMA involves a hardware modification to allow the diesel fire pump to provide injection to the reactor pressure vessel (RPV).
- SAMA U2-221a—Reduce unit cooler contribution to emergency diesel generator (EDG) unavailability increase testing frequency: This SAMA would provide a more reliable means of cooling the EDG control panel rooms by testing the unit coolers during every cycle.
- SAMA U2-221b—Reduce unit cooler contribution to EDG unavailability provide redundant means of cooling: This SAMA would also provide a more reliable means of cooling the EDG control panel rooms by providing guidance for operators to open the EDG control panel room doors.
- SAMA U2-222—Improve procedure for loss of instrument air: This SAMA involves an enhancement to loss of instrument air procedure N2-SOP-19 to provide a better means of responding to loss of instrument air.
- SAMA U2-223—Improve control building flooding scenarios: This SAMA may involve structural modifications such as a water-tight door or piping modifications (to move firewater header) in order to eliminate the flood source (cost-beneficial at three percent discount rate).

It is noted that several of the SAMAs are not independent; that is, implementation of one SAMA could achieve a portion of the benefit of the others. For example, implementing SAMA U1-215 would significantly reduce the benefit of SAMA U1-209. Similarly, implementation of SAMAs U2-23a, -23b, -23c, and -213 can be considered as a combination since loss of service water (SAMA U2-213) is an important contributor and cause of room cooling failure (SAMA U2-23). NMPNS indicated that relationships between the SAMAs have not yet been modeled.

G.6.2 Review of NMPNS's Cost-Benefit Evaluation

The cost-benefit analysis performed by NMPNS was based primarily on NUREG/BR-0184 (NRC 1997c) and was executed consistent with this guidance.

In response to an RAI, NMPNS considered the uncertainties associated with the internal events CDF by evaluating those candidate SAMAs that are within a factor of three of being cost-beneficial (based on a seven percent discount rate) (NMPNS 2004b). For Unit 1, three such SAMAs were identified:

- U1-211—Reduce offsite dependency on battery board DC11
- U1-212—Capability to manually operate containment venting
- U1-220—Installation of new transformers to improve AC power load management

NMPNS noted that SAMA U1-215 (add a portable battery charger) provides a more reliable alternative for addressing the vulnerability associated with reducing the dependency on offsite power than SAMA U1-211, and its implementation will reduce the benefit of U1-211. (SAMA U1-215 is among the potentially cost-beneficial SAMAs identified by NMPNS for further evaluation). Therefore, further evaluation of U1-211 is not warranted. The staff agrees with this assessment.

As noted above, SAMA U1-212 is already among the set of potentially cost-beneficial SAMAs identified by NMPNS, having been identified as potentially cost-beneficial using a three percent discount rate. As such, this SAMA will be further evaluated.

NMPNS also stated that SAMA U1-220 is not warranted at this time due to the conservatism that exists in the model and in the cost estimation. In a follow-up question, the staff asked NMPNS to elaborate on and justify the conservatism in the model (NRC 2005). In response, NMPNS stated that in the model, the probability of operator error is set to zero, and that although it may be reasonable to remove the operator action in question due to the addition of new transformers, the baseline risk would be overstated for this operator action because a single human failure basic event is used in the model for both redundant power boards. This assumes complete dependency between human failures that could lead to overloading both redundant power boards. In reality, operator load management activities as well as timing could be different for each emergency power division, thereby reducing the dependency assumption. NMPNS also indicated that further review of the modification revealed that the transformers are attached to their corresponding power boards, thereby complicating the modification and increasing the engineering and installation costs. Therefore, NMPNS concluded that this SAMA would not be within a factor of three of being potentially cost-beneficial (NMPNS 2005). The staff agrees with this assessment.

Appendix G

For NMP Unit 2, the following SAMAs were identified as being within a factor of three of being cost-beneficial (based on a seven percent discount rate) (NMPNS 2004b):

- U2-219—Improve containment venting
- U2-223—Improve control building flooding scenarios

NMPNS stated that for U2-219, it conservatively modeled the benefit of full automation by not considering competing risks, and also underestimated the implementation costs. Additional costs in the amount of \$250,000 would be needed to install multiple valves and operators, hard piping, and valve actuation circuitry and logic. Therefore, this SAMA would no longer be within a factor of three of being cost-beneficial. The staff agrees with this assessment.

As noted above, SAMA U2-223 is already among the set of potentially cost-beneficial SAMAs identified by NMPNS, having been identified as potentially cost-beneficial using a three percent discount rate. As such, this SAMA will be further evaluated.

NMPNS performed sensitivity analyses that addressed assumptions made in other parts of the cost-benefit analysis, including population, fission product release, and evacuation assumptions. The evacuation sensitivity demonstrated that results are insensitive to this parameter. The other sensitivity cases (e.g., population and fission product release) resulted in less than a ten percent change in both offsite dose and offsite economic risks.

The staff concludes that, with the exception of the four potentially cost-beneficial SAMAs for Unit 1 and the 11 potentially cost-beneficial SAMAs for Unit 2, the costs of the SAMAs would be higher than the associated benefits.

G.7 Conclusions

NMPNS compiled a list of 220 SAMA candidates using the SAMA analyses submitted in support of licensing activities for other nuclear power plants, NRC and industry documents discussing potential plant improvements, plant-specific insights from the NMP IPE and IPEEE, and the current PRA models for Unit 1 and 2. An initial screening removed SAMA candidates that: (1) are not applicable at Nine Mile Point due to design differences, (2) have already been implemented at Nine Mile Point, (3) are sufficiently similar to another SAMA under consideration, or (4) are not feasible, have associated costs that exceed \$2M (Unit 1) or \$5M (Unit 2), or do not provide a significant benefit. A total of 207 SAMAs were eliminated for Unit 1 and 200 SAMAs were eliminated for Unit 2, leaving 13 and 20 for further evaluation, respectively.

For the remaining SAMA candidates, a more detailed design and cost estimate was developed as shown in Tables G-3 and G-4. The cost-benefit analyses using a seven percent discount

rate showed that three of the 13 SAMA candidates are potentially cost-beneficial for Unit 1 and ten of the 20 SAMA candidates are potentially cost-beneficial for Unit 2. Upon completion of a three percent discount rate sensitivity study, an additional SAMA candidate was determined to be potentially cost-beneficial at each unit. NMPNS considered those SAMAs that were within a factor of three of being cost-beneficial, and concluded that no additional SAMAs would become cost-beneficial.

The staff reviewed the NMPNS analysis and concluded that the methods used and the implementation of those methods were sound. The treatment of SAMA benefits and costs supports the general conclusion that the SAMA evaluations performed by NMPNS are reasonable and sufficient for the license renewal submittal. The inclusion of external events afforded the quantitative evaluation of SAMAs specifically aimed at reducing risk from external events.

The staff agrees with NMPNS's identification of areas in which risk can be further reduced in a cost-beneficial manner through the implementation of all or a subset of the identified, potentially cost-beneficial SAMAs. Given the potential for cost-beneficial risk reduction, the staff agrees that further evaluation of these SAMAs by NMPNS is warranted. However, none of the potentially cost-beneficial SAMAs relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of the license renewal pursuant to 10 CFR Part 54.

G.8 References

Electric Power Research Institute (EPRI). 1991. *A Methodology for Assessment of Nuclear Power Plant Seismic Margins*, Revision 1, EPRI Report NP-6041-SL.

Electric Power Research Institute (EPRI). 1995. *Fire PRA Implementation Guide*. Science Applications International Corporation, EPRI Report TR-104031, December 1995.

Niagara Mohawk Power Corporation (NMPC). 1992. Letter from J. F. Firlit, NMPC, to U.S. Nuclear Regulatory Commission Document Control Desk. Subject: Nine Mile Point Unit 2, Docket No. 50-410, NPF-69, Individual Plant Examination (IPE) Final Report, July 30, 1992.

Niagara Mohawk Power Corporation (NMPC). 1993. Letter from C. D. Terry, NMPC, to U.S. Nuclear Regulatory Commission Document Control Desk. Subject: Nine Mile Point Unit 1, Docket No. 50-220, DPR-63, Individual Plant Examination, Generic Letter 88-20, July 27, 1993.

Niagara Mohawk Power Corporation (NMPC). 1995. Letter from C. D. Terry, NMPC, to U.S. Nuclear Regulatory Commission Document Control Desk. Subject: Nine Mile Point Unit 2, Docket No. 50-410, NPF-69, Individual Plant Examination of External Events (IPEEEs) Severe

Appendix G

Accident Vulnerabilities—10CFR50.54(f) (Generic Letter No. 88-20, Supplement 4), June 30, 1995.

Niagara Mohawk Power Corporation (NMPC). 1996. Letter from C. D. Terry, NMPC, to U.S. Nuclear Regulatory Commission Document Control Desk. Subject: Nine Mile Point Unit 1, Docket No. 50-220, DPR-63, Individual Plant Examination of External Events (IPEEEs) Severe Accident Vulnerabilities—10CFR50.54(f) (Generic Letter No. 88-20, Supplement 4), August 29, 1996.

Nine Mile Point Nuclear Station, LLC (NMPNS). 2004a. *Applicant's Environmental Report Operating License Renewal Stage, Nine Mile Point Units 1 and 2*. Nine Mile Point Nuclear Station, LLC, Annapolis, Maryland, May 2004.

Nine Mile Point Nuclear Station, LLC (NMPNS). 2004b. Letter from James A. Spina, NMPNS, to U.S. NRC Document Control Desk. Subject: Nine Mile Point Units 1 and 2, Docket Nos. 50-220 and 50-410, Facility Operating License Nos. DPR-63 and NPF-69, License Renewal Application Responses to NRC Requests for Additional Information Regarding the Analysis of Severe Accident Mitigation Alternatives (TAC Nos. MC3274 and MC3275), December 6, 2004.

Nine Mile Point Nuclear Station, LLC (NMPNS). 2005. Letter from James A. Spina, NMPNS, to the U.S. NRC Document Control Desk. Subject: Nine Mile Point Units 1 and 2, Docket Nos. 50-220 and 50-410, Facility Operating License Nos. DPR-63 and NPF-69, License Renewal Application Revised and/or Supplemental Responses to NRC Requests for Additional Information Regarding the Analysis of Severe Accident Mitigation Alternatives (TAC Nos. MC3274 and MC3275), January 31, 2005.

U.S. Nuclear Regulatory Commission (NRC). 1988. Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities," November 23, 1988.

U.S. Nuclear Regulatory Commission (NRC). 1990a. *Evaluation of Severe Accident Risks: Peach Bottom, Unit 2*. NUREG/CR-4551, Vol. 4, Rev. 1, Part 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1990b. *Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants*. NUREG-1150, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1991. *Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities*. NUREG-1407, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1994. Letter from Pao-Tsin Kuo, U.S. NRC, to B. Ralph Sylvia, Niagara Mohawk Power Corporation (NMPC). Subject: Individual Plant Examination for Nine Mile Point Nuclear Station, Unit 2 (TAC No. M74437), August 18, 1994.

U.S. Nuclear Regulatory Commission (NRC). 1996. Letter from Darl S. Hood, U.S. NRC, to B. Ralph Sylvia, Niagara Mohawk Power Corporation (NMPC). Subject: NRC Staff's Evaluation of the Nine Mile Point Nuclear Station Unit No. 1 Individual Plant Examination (TAC No. M74436), April 2, 1996.

U.S. Nuclear Regulatory Commission (NRC). 1997a. *Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance*. NUREG-1560, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1997b. *SECPOP90: Sector Population, Land Fraction, and Economic Estimation Program*. NUREG/CR-6525, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1997c. *Regulatory Analysis Technical Evaluation Handbook*. NUREG/BR-0184, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1998. Letter from Darl S. Hood, U.S. NRC, to John H. Mueller, Niagara Mohawk Power Corporation (NMPC). Subject: Review of Individual Plant Examination of External Events, Nine Mile Point Nuclear Station, Unit No. 2 (TAC No. M83646), August 12, 1998.

U.S. Nuclear Regulatory Commission (NRC). 2000. Letter from Peter S. Tam, U.S. NRC, to John H. Mueller, Niagara Mohawk Power Corporation (NMPC). Subject: Nine Mile Point Unit 1 Individual Plant Examination of External Events (TAC No. M83645), July 18, 2000.

U.S. Nuclear Regulatory Commission (NRC). 2002a. *Perspectives Gained From the IPEEE Program, Final Report, Vols. 1 and 2*, NUREG-1742, Washington, D.C., April 2002.

U.S. Nuclear Regulatory Commission (NRC). 2004a. Letter from Leslie C. Fields, U.S. NRC, to James A. Spina, NMPNS. Subject: Request for Additional Information (RAI) Regarding Severe Accident Mitigation Alternatives for the Nine Mile Point Nuclear Station, Units 1 and 2 (TAC Nos. MC3274 and MC3275), October 20, 2004.

U.S. Nuclear Regulatory Commission (NRC). 2004b. Email from Jennifer Davis, U.S. NRC, to Dennis Vandeputte, NMPNS. Subject: NMP RAI Response Follow Up Questions, December 29, 2004.

U.S. Nuclear Regulatory Commission (NRC). 2004c. *Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission*. NUREG/BR-0058, Rev. 4, Washington, D.C.

U.S. Department of Agriculture (USDA). 1998. *1997 Census of Agriculture, National Agriculture Statistics Service, 1998*. Available online at: <http://www.nass.usda.gov/census/census97/volume1/vol1pubs.htm>. (Accession No. ML060960401)

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

NUREG-1437, Supplement 24

2. TITLE AND SUBTITLE

Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)
Supplement 24
Regarding Nine Mile Point Nuclear Station, Units 1 and 2
Final Report

3. DATE REPORT PUBLISHED

MONTH

YEAR

May

2006

4. FIN OR GRANT NUMBER

5. AUTHOR(S)

See Appendix B of report

6. TYPE OF REPORT

Technical

7. PERIOD COVERED (Inclusive Dates)

8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)

Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above"; if contractor, provide NRC Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address.)

Same as 8 above

10. SUPPLEMENTARY NOTES

Docket Numbers 50-220, 50-410

11. ABSTRACT (200 words or less)

This final supplemental environmental impact statement (SEIS) has been prepared in response to an application submitted to the NRC by Nine Mile Point Nuclear Station, LLC to renew the operating licenses for Nine Mile Point Nuclear Station, Units 1 and 2 (Nine Mile Point) for an additional 20 years under 10 CFR Part 54. The final SEIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. It also includes the staff's recommendation regarding the proposed action.

The NRC staff's recommendation is that the Commission determine that the adverse environmental impacts of license renewal for Nine Mile Point are not so great that preserving the option of license renewal for energy-planning decision makers would be unreasonable. The recommendation is based on (1) the analysis and findings in the GEIS; (2) the Environmental Report submitted by Nine Mile Point Nuclear Station, LLC; (3) consultation with Federal, State, and local agencies; (4) the staff's own independent review; and (5) the staff's consideration of public comments.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

Nine Mile Point Nuclear Station, Units 1 and 2
NMP
Nine Mile Point
Final Supplement to the Generic Environmental Impact Statement
FSEIS
National Environmental Policy Act
NEPA
License Renewal
GEIS

13. AVAILABILITY STATEMENT

unlimited

14. SECURITY CLASSIFICATION

(This Page)

unclassified

(This Report)

unclassified

15. NUMBER OF PAGES

16. PRICE