U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION (NRR)

AUDIT REPORT
ON
IMPLEMENTATION OF GENERIC LETTER (GL) 98-01
"YEAR 2000 READINESS OF COMPUTER SYSTEMS AT NUCLEAR POWER PLANTS"

Docket No: 50-263

License No: DPR-22

Licensee: Northern States Power Company (NSP)

Facility: Monticello Nuclear Generating Plant (MNGP)

Location: 2807 West Highway 75
                                Monticello, MN 55362

Dates: September 15 - 17, 1998

Audit Team Members: Matthew Chiramal, NRR
                                Dave Butler, Region III
                                Deirdre Spaulding, NRR

Approved by: Jared Wermiel, Chief
                                Instrumentation and Controls Branch
                                Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

From September 15 through 17, 1998, the NRC staff conducted an audit of the Year 2000 (Y2K) program at the Monticello Nuclear Generating Plant in accordance with the audit plan (Attachment 1) for this activity. The purpose of the audit was to (1) assess the effectiveness of the Northern States Power Company (the licensee) programs for achieving Y2K readiness, including continued safe operation of the plant as well as compliance with applicable NRC regulations and license conditions with respect to the potential Y2K problems, (2) evaluate Y2K program implementation to assure that the licensee's schedule is in accordance with NRC Generic Letter (GL) 98-01 guidelines for achieving Y2K readiness by July 1999, and (3) assess the licensee's contingency plans for addressing risks associated with potential events resulting from Y2K problems. The audit team reviewed selected licensee documentation regarding Monticello's Y2K program and conducted interviews with the cognizant licensee personnel. The results of this audit and subsequent audits at other selected plants will be used by the staff to determine the need for additional action, if any, on Y2K readiness for nuclear power plants.

Based on the staff's assessment and evaluation of the Monticello Y2K readiness program, the following observations were made:

1. The Monticello Y2K readiness program is comprehensive and is based on the nuclear power industry Y2K problem guidance contained in Nuclear Energy Institute (NEI)/Nuclear Utilities Software Management Group (NUSMG) 97-07, "Nuclear Utility Year 2000 Readiness."

2. The Monticello Y2K readiness program is receiving appropriate management support and oversight.

3. The licensee began the formal Monticello Y2K program later than most licensees (June 1998) and as a result, the licensee is still in the initial assessment stage. The licensee is undertaking an ambitious schedule in order to meet the July 1999 Y2K readiness date established by the NRC staff in GL 98-01. Despite the late start, the Y2K readiness schedule appears to be achievable because of the limited number of software items at the site, the fact that the licensee has already begun remediation of major critical computer systems, and the licensee has received support via information sharing with the Boiling Water Reactor Owners Group and a utility alliance.

4. The licensee has not started the Monticello Y2K contingency planning. The licensee plans to utilize the nuclear industry guidance in NEI/NUSMG 98-07, "Nuclear Utility Year 2000 Readiness Contingency Planning," for this effort. With proper attention provided by management, the licensee should be able to complete this effort by July 1999.

5. The licensee's corporate and Monticello plant-specific Y2K program interfaces are effectively addressing grid reliability and availability issues.

6. The licensee will address the operating status of Monticello, which is currently planned to be in a refueling outage on December 31, 1999, in its corporate Y2K readiness plan and associated contingency planning. Both operating and shutdown conditions for Monticello will be considered.

REPORT DETAILS

1.0 INTRODUCTION

The objectives of the Monticello Nuclear Generating Plant (MNGP) Y2K Program audit were to:

1. assess the effectiveness of the Northern States Power Company (the licensee) programs for achieving Y2K readiness including continued safe operation of the plant as well as compliance with applicable NRC regulations and license conditions with respect to the potential Y2K problems,

2. evaluate Y2K program implementation to assure that the licensee's schedule is in accordance with NRC Generic Letter (GL) 98-01 guidelines for achieving Y2K readiness by July 1999, and

3. assess the licensee's contingency plans for addressing risks associated with potential events resulting from Y2K problems.

The audit was conducted in accordance with the established audit plan (Attachment 1) which was based in part on the guidance and requirements contained in the following documents:

- GL 98-01, "Year 2000 Readiness of Computer Systems at Nuclear Power Plants"

- Licensee Response(s) to GL 98-01

- Plant technical specifications and license terms and conditions

- Applicable NRC regulations

- NEI/NUSMG 97-07, "Nuclear Utility Year 2000 Readiness"

Prior to the audit at the plant site, the audit team had obtained and reviewed the MNGP Year 2000 Readiness Implementation Plan and associated work instructions (draft versions of document numbers 1, 2, and 3 listed in Attachment 2).

The audit process started with an entrance meeting attended by the MNGP Year 2000 Readiness Project Manager (PM) and other site personnel, the Year 2000 PM of Prairie Island Nuclear Plant, and members of the audit team. Attachment 3 is a list of the attendees. The PM and members of the project team described the project organization, the project plan and its implementation, and the project status and ongoing activities.

Following the meeting, the audit team spent the rest of the audit reviewing the project plan and its associated procedures, the plan implementation products (documents and data bases) and interacting with the project team members, particularly with the PM. The documents reviewed are listed in Attachment 2.

2.0 MNGP Y2K PROJECT DESCRIPTION

2.1 Project Organization

The MNGP Y2K project has 15 full-time persons (including the PM and two contractors) and 3 part-time persons). The PM has overall responsibility for the project and reports to the General Superintendent - Design and Engineering, MNGP, who reports to the Monticello Site Plant Manager. The Plant Manager reports to the President-Nuclear Generations who provides the information to the Project Sponsor.

MNGP participates with other organizations that are addressing the Y2K effort. The licensee has been involved with the Boiling Water Reactor (BWR) Owners Group. According to the licensee, the BWR Owners Group final report on its Y2K program is due October 1998. MNGP has been able to take advantage of the BWR Owners Group generic Y2K efforts for several noncompliant computer systems. MNGP will be upgrading its nonsafety-related process computer system (PCS), a General Electric Company (GE) 3D Monicore Baseline 94 system. The GE 3D Monicore Baseline 98 upgrade system which is Y2K compliant is scheduled to be installed at the site in November 1998 with testing and final acceptance of the PCS occurring over a period of approximately 2 months. Other Y2K compliant upgrades being coordinated through the BWR Owners Group are the GE NUMAC automated TIP [traversing in-core probe] control units and the rod worth minimizer (RWM), and GE Fanuc reactor recirculation control and motor-generator (MG) set scoop tube positioner and controller systems.

To further the exchange of Y2K information, MNGP is also part of a Y2K Alliance, which is composed of representatives from Point Beach, Kewaunee, Monticello, Duane Arnold, and Prairie Island nuclear power plants.

2.2 Project Plan

The MNGP Year 2000 Readiness Implementation Plan (Item 1 of documents reviewed in Attachment 2) is the plant-specific plan that was developed by the licensee and issued on July 17, 1998. It is based on the guidance provided in NEI/NUSMG 97-07, which was endorsed by the NRC in NRC GL 98-01 as guidance that when properly implemented presents one approach for achieving Y2K readiness. The audit team's review confirmed that the MNGP Year 2000 Implementation Plan is based on the guidance contained in NEI/NUSMG 97-07.

The MNGP Year 2000 Readiness Implementation Plan consists of the following phases. awareness, initial assessment, detailed assessment, remediation, contingency planning and risk management, and notification. It also includes requirements for quality assurance, regulatory considerations, and documentation.

2.2.1 Awareness

At MNGP, the formal Y2K awareness phase of the Y2K program was initiated in June 1998 to all site personnel via Site News Letters. Additionally, through various group meetings and e-mails, information on Y2K problems was disseminated to system engineers and staff during

the start of the project. On September 16, 1998, the plant Year 2000 Project was discussed at the Engineering/Technical Staff Training session.

At the corporate level, Y2K awareness began in 1996. The NSP board of directors approved the NSP Year 2000 Project and its budget in 1996.

The MNGP Y2K project implementation schedule is provided in Table 1.

2.2.2   Initial Assessment

The initial assessment stage of the MNGP Y2K Project started in July 1998. The completed initial assessment will result in the identification of all software applications and embedded system components at the MNGP. The NSP Software Master Configuration Index (SMCI) was used by MNGP to identify the software applications, and the Champs database was used to aid in the identification of embedded systems. The tasks of initial assessment include (1) inventory, (2) categorization, (3) classification, (4) prioritization, and (5) analysis of the initial assessment. The licensee indicated that the inventory of all software application items and approximately 80 percent of the embedded system components was complete.

In the identification of embedded systems, it is necessary to review the procedures and documentation for occurrences of phrases that would indicate the existence of an internal clock or processor, survey the vendors for information on their equipment, perform system walk-downs, and review schematics, program listings, and reference manuals.

Table 2 provides the results of inventory of software items. Of the 290 software items identified, 120 will require assessment testing, and 60 will require additional detailed and integrated testing. Table 3 provides a list of safety-related softwares at MNGP.

Table 4 provides the results of inventory for the embedded systems. A total of 453 embedded items had been identified to date. Out of the total of 453 identified embedded items, 175 still need to be assigned a classification.

Prioritization

The inventory phase includes the prioritization of the identified items. The priority is based on the criticality and risk of the functions performed. The criticality is based on the criteria as suggested by NEI/NUSMG 97-07: (1) critical (life-threatening implications, required by regulations; major impact on service to customers), (2) severe (mandated by regulatory agencies but can be lost for short periods of time; asset is used solely as a backup to an asset of critical importance; business continues but with great difficulty), (3) high (mandated by regulatory agencies but which have compensatory measures; business continues but with serious difficulty), (4) medium (minimal impact on company's core business; compensatory measures are more costly to use than the asset), (5) low (customer service is not affected; minimal impact on business operation), or (6) none (no lost productivity; asset is no longer being used or has no identified users). Risk assessment is based on the frequency of usage and type of usage and is classified as critical, high, medium, or low. Priority of high, medium, or low will be assigned commensurate with the level of importance relative to criticality and risk.

Analysis of Initial Assessment

The results of the MNGP initial assessment of the software applications and embedded items will be placed in the MNGP Y2K Application Checklist and Embedded Component Summary.

Analysis of the initial assessment is the final step in the initial assessment phase. During the analysis of the initial assessment, items are dispositioned as "not affected" or designated as needing further detailed assessment. Items that do not display a date or calculate a date require no further evaluation and are designated as "not affected." All other items will require detailed assessment and will be dispositioned as follows: use as is, remove, replace, or remediate and test.

NRC Audit Team Assessment

Several folders for embedded components were reviewed by the audit team. The components were selected from the database print-out titled "Embedded Components Sorted by Classification [sp]" dated Tuesday, September 15, 1998, consisting of 18 pages.

Out of a total of 453 embedded components identified, a total of 32 embedded component folders were reviewed by the audit team.

> 159 items had a classification that needed to be determined - 24 items were selected for review
> 23 items were classified under "Continuity of Business" - 1 item was selected for review
> 126 items were classified under "Important to Operation" - 2 items were selected for review
> 12 items were classified under "License Commitment" - 1 item was selected for review
> 55 items were classified under "Non-essential" - 0 items were selected for review
> 12 items were classified under "Personnel Safety" - 1 item was selected for review
> 20 items were classified under "Required by Regulations" - 1 item was selected for review
> 8 items were classified under "Safety Related" - 2 items were selected for review

While reviewing the embedded component information, the audit team found that for component with ID number 427 a "low" priority was assigned. The PM indicated that a Y2K issue does not exist here because there is no date function. From its initial look at the folder in detail, the audit team determined that there seemed to be a different method for determining the priority of these components from the method that is spelled out in the NEI/NUSMG 97-07 guidance. The PM indicated that the impact evaluation grid, risk evaluation grid, and corrective action grid proposed in NEI/NUSMG 97-07 were modified and combined in the risk assessment and prioritization guidance provided in the MNGP Year 2000 Embedded Component Work Instruction (item 3 of documents reviewed in Attachment 2). The intent was to make risk assessment and priority determination easier. The PM also indicated that the determination of risk and priority also involves the engineering judgements of the evaluator, system engineer, system superintendent, and PM. The audit team considered the explanation acceptable and for components in which no date functions exist a low priority is appropriate. Table 5 provides a list

of embedded components that were reviewed by the audit team. Table 6 provides information on the embedded components that MNGP classified as safety related.

2.2.3. Detailed Assessment

In the detailed assessment phase, MNGP will obtain information on each item to determine its expected performance when subjected to the NEI/NUSMG 97-07 identified problem dates. There are four different evaluations that may be carried out during the detailed assessment phase. Vendor evaluation, plant-owned or supported software evaluation, interface evaluation, and embedded components evaluation. Vendor evaluation encompasses validation testing based on the criticality of the item, prior experience with the vendor, extent of documentation, or plant knowledge of the item. Plant-owned or supported software evaluation encompasses knowledge-based decisions, scanning, and testing. When testing is proposed, test specifications and procedures are developed. Interface evaluation encompasses the review of the interface capability with software and applications that interface with other systems. Embedded components evaluation encompasses the use of knowledge-based decisions and testing. When sufficient vendor and plant information is available to support a knowledge-based decision, no additional testing is required. Upon completion of the detailed assessment, each component found to be susceptible to the Y2K problem will be used as is, retired, replaced, or modified.

2.2.4. Y2K Testing and Validation

MNGP will perform Y2K testing in support of the evaluation efforts to determine whether the Y2K problem is present. Testing is performed during detailed assessments and requires the development of test procedures. Y2K testing will also be performed subsequent to remediation to determine whether those efforts have eliminated the Y2K problem and no unintended functions are introduced.

MNGP will perform assessment testing per computer problem/change reports (PCRs) and associated verification and validation (V&V) plans and test procedures that they currently have or will establish. Assessment testing will be handled as follows: The test procedures will be written as the application or process software is received and evaluated. A generic test procedure has been prepared which is being used as the starting point. It consists of 16 various categories for Y2K evaluation and testing. Some test procedures, such as those for the security computer and equipment database, are currently being developed from the generic test procedure. This assessment testing process is expected to continue through January 1999.

MNGP will perform testing subsequent to remediation consisting of unit testing, integration testing, and system testing. Unit testing focuses on a single application, software module, or component. Integration testing examines the integration of related software modules, applications, and components. System testing examines the hardware and software components of the system as a whole.

MNGP will perform validation to confirm that the software is capable of performing its intended function. Validation is performed subsequent to remediation and Y2K testing. Upon

satisfactory validation, certification and documentation will indicate "Y2K Ready" or "Y2K Compliant" depending on the remediation that was implemented.

2.2.5. Remediation or Replacement

Remediation or replacement will be performed per PCRs and associated V&V plans. A review of the SMCI for final disposition will also be performed. The purpose of remediation is to properly disposition items identified in the detailed assessment. MNGP is revising its existing "Computer & Information Systems - Problem/Change Report" (item 6 of documents reviewed) for software applications, and "Condition Report Process," (item 5 of documents reviewed) for embedded systems. These two documents ensure that identified items are properly tracked and dispositioned.

2.2.6. Regulatory Considerations

The MNGP Year 2000 Readiness Implementation Plan and associated documents (items 1, 2, 3, and 4 of documents reviewed) include references to existing plant procedures that have guidance on regulatory considerations, such as 10 CFR 50.59 reviews, and reportability evaluations per 10 CFR 50.72, 10 CFR 50.73, and 10 CFR Part 21, and operability determinations as required by plant technical specifications.

2.2.7. Contingency Planning

MNGP has not begun contingency planning; however, in January 1999 MNGP will begin its contingency planning in accordance with NEI/NUSMG 98-07, "Nuclear Utility Year 2000 Readiness Contingency Planning."

2.2.8. Y2K Program Management

With regard to the MNGP schedule, there are activities that need to be completed by individuals at the NSP corporate level beyond the control of the MNGP Y2K team. Thus, when making the determination whether the MNGP Y2K project is on schedule, the audit team evaluated the interaction of the MNGP Y2K project management with the NSP Y2K corporate Y2K program.

2.2.9. Electric Grid Issues

MNGP is addressing the issue of substation equipment in the following manner. There appeared to be some questions as to where the boundaries of responsibility for review of substation equipment reside. The boundary between NSP generation and the new independent transmission company is not clearly defined with regard to the issue of Y2K readiness of the substation equipment. Some of the MNGP equipment resides in the substation, and because of this, the question of who should perform the Y2K assessment is not yet resolved. The equipment in question includes metering and relaying equipment. The corporate level bi-weekly project team meeting, which includes MNGP Y2K project management, is addressing this issue.

3.0 AUDIT TEAM FINDINGS

The following six observations were made by the audit team of the MNGP Y2K project:

1. The licensee's MNGP Year 2000 Readiness Implementation Plan is a comprehensive document and is based on the guidance contained in NEI/NUSMG 97-07 with additional plant-specific procedures for evaluation of computer software and embedded software. The plan and associated procedures make use of existing plant procedures for software configuration control, software quality assurance (QA), software V&V, and change reporting. The plan is implemented through a project team consisting of a PM and technical specialists. The assessment and evaluation process requires the interaction of a cross-section of the plant organization.

2. The MNGP Year 2000 Readiness Project has the support of a senior management sponsor. At present, communication of the progress of the project to senior management is through a project tracking report. Once the project's initial assessment is completed (scheduled for November 1998), bi-monthly project status meetings with NSP corporate senior management are planned.

3. The audit team was under the impression that all nuclear power plant licensees had started their facility-specific Y2K program by early 1998 because NEI/NUSMG 97-07 was provided to senior utility management in November 1997. The MNGP Year 2000 Readiness Project was formally started in June 1998 and incorporated into the NSP corporate Y2K program at that time. The licensee was aware of the Y2K problem in late 1996 and had initiated an ad-hoc evaluation of some MNGP computer systems (e.g., plant process computer, plant security computer, and the turbine electronic pressure regulator) in 1997. The MNGP project is at the initial assessment stage now which is expected to be completed by October/November 1998. The overall MNGP Y2K project is scheduled to be completed by July 1999 with readiness achieved at that time. The audit team considers the schedule to be an ambitious one. However, the licensee appears to be able to meet the project schedule since (1) the number of software items at the site that are to be assessed for Y2K vulnerabilities (290 software items and around 500 embedded components per initial inventory) is not large, and (2) the licensee appears to have already identified and begun upgrades to major critical computer systems and components for Y2K compliance/readiness, and (3) licensee participation in BWR Owners Group and utility alliance efforts is permitting a more rapid assessment and remediation of systems and equipment because of information sharing than if the licensee had to proceed on its own. The audit team notes that detailed assessment, including some testing and remediation, and subsequent associated testing of some remaining critical systems and components are major tasks yet to be done.

4. The audit team had planned to review the outline of the licensee's Y2K contingency plan for MNGP. However, the licensee has not as yet started on the plant Y2K contingency plan. The projected start date for MNGP Year 2000 Contingency Plan is January 1999. The Y2K PM stated that the contingency plan will be based on the guidance in NEI/NUSMG 98-07 and initiated in parallel with the detailed assessment efforts of the

overall MNGP Y2K project. The audit team pointed out that a single point-of-contact for contingency planning has not been identified in the existing project team. The audit team believes that completion of the detailed Y2K contingency plans at MNGP can be achieved by July 1999 with the necessary attention provided by the Y2K PM and senior management.

5. NSP corporate efforts and interfaces with its generation Y2K projects, including MNGP and Prairie Island Y2K projects, are good for addressing electrical grid reliability and availability issues . The audit team notes that the biweekly project team meeting is a good vehicle for identifying and assigning responsibilities for interface items that might affect plant operations and grid concerns such as the substation equipment issue noted above.

6. According to the licensee's present plan, MNGP is to be shut down for reactor refueling in December 1999. However, there is a possibility that the unit may continue to operate during the December 31, 1999 - January 1, 2000, roll-over period. The NSP corporate Y2K program and MNGP Year 2000 Readiness Implementation Plan and associated contingency plans will consider both MNGP operating conditions.

Date: October 1998

Table 1   MNGP Y2K Project Implementation Schedule
Table 2   Software Inventory
Table 3   Inventory of Safety-Related Software at MNGP
Table 4   Inventory of Embedded Systems
Table 5   Embedded Components Reviewed by the Audit Team
Table 6   Safety-Related Embedded Components Identified by MNGP

Attachment 1 Y2K Readiness Audit Plan
Attachment 2 Documents Reviewed
Attachment 3 Entrance Meeting - Attendees

Table 1 - MNGP Y2K Project Implementation Schedule

Activity	Starting date	Finishing date
Awareness	June 1998*	September 16, 1998**
Initial assessment	July 1998	December 1998
Detailed assessment	November 1998	March 1999
Testing/Validation	December 1998	June 1999
Remediation	December 1998	June 1999
Contingency planning	January 1999	

*   A limited awareness effort began with the receipt and review of NRC Information Notice 96-70 in December 1996.

**   The MNGP personnel will be kept informed of the Y2K readiness project status through the Site News Letters.

Table 2 - Software Inventory

	Total	High criticality*	Safety related**	Augmented	Standard
Software items	290	30	18	39	233

* High criticality software systems are those that perform mission critical functions including safety-related systems performing direct safety functions and those nonsafety-related systems required for plant operation.

** Table 3 lists the inventory of safety-related software at MNGP.

Table 3 - Inventory of Safety-Related Software at MNGP.

No.	Software ID	Function
1	ARCON 96	Calculates relative concentrations in plumes from control room air intakes
2	BLOCKAGE 2.5	Predicts whether accumulation of debris on torus suction strainer leads to loss of ECCS
3	CBATR	Compartment bulk air temperature transfer calculation model - used for temperature response for station blackout and equipment qualification
4	GOTHIC	Thermal hydraulic information for containment - HELB [high-energy line break] analysis for equipment qualification
5	MPM Voltage	Motor power monitor - collect and analyze 3-phase motor current
6	NPLATE	Base plate analysis program
7	PIPEPLUS	Calculates piping deflections, stresses, support loads
8	PPPS	EPRI prediction program for MOV [motor-operated valve] thrust
9	STARDYNE	Structural analysis program
10	A-FAULT	ANSI fault analysis program
11	AOVDB	Air-operated valve predictive maintenance
12	DAPPER/300	Performs analysis of 3-phase AC power load flow, voltage, fault current
13	MMOV	Support MOV program
14	PACKING NFORC	MOV diagnostic software
15	RISC	Shielding, isotopic/decay heat and nuclear criticality calculations
16	STAD III DETERMINE	Finite element structural analysis
17	THRUST PACK DATA	Provide detailed MOV spring pack data
18	VOTES	MOV diagnostic software

None of the safety-related software identified to date performs a direct safety function. The above systems provide support or auxiliary functions to safety-related systems. They do not have real-time functions.

Table 4 - Inventory of Embedded Systems

	Total	Safety related	Augmented	Standard	Important to Safety	Required by regulations
Embedded Items	453	8				20
		Required by license commitments	Important to operation	Personnel safety	Continuity of business	Non-essential
		12	127	12	35	53

Table 5 - Embedded Components Reviewed by the Audit Team

Classification	Instrument name (V-Vendor)	System	Mission critical	Date function	Y2K status and note if to be tested
To be determined (TBD)*	EPR Pressure Control V - GE Fanuc	TRB (turbine)	TBD	No	Not applicable since no date function (N/A)
TBD	Digital Feedwater Level Control V - Autech Data Systems	RFC (recirc flow control)	TBD	Unknown	Unknown
TBD	Main Steam Radiation Channel A V - GE	PRM	TBD	Unknown	Unknown To be tested
TBD	RFC B Programmable Controller V - GE Fanuc	RFC	TBD	Unknown	Unknown
TBD	Rod Worth Minimizer V - GE NUMAC	RWM	TBD	No	N/A
TBD	FW A Flow to Level Control	RLC	TBD	Unknown	Unknown
TBD	FW B Flow to Level Control	RLC	TBD	Unknown	Unknown
TBD	RFC A Genius Digital I/O Module	RFC	TBD	Unknown	Unknown
TBD	RFC A Genius Relay Output Module	RFC	TBD	Unknown	Unknown
TBD	RFC A Genius Digital I/O Module	RFC	TBD	Unknown	Unknown
TBD	RFC B Genius Digital I/O Module	RFC	TBD	Unknown	Unknown
TBD	RFC B Genius Relay Output Module	RFC	TBD	Unknown	Unknown

Table 5--continued

Classification	Instrument name (V-Vendor)	System	Mission critical	Date function	Y2K status and note if to be tested
TBD	RFC B Genius Digital I/O Module	RFC	TBD	Unknown	Unknown
TBD	Transmation		TBD	None	Unknown
TBD	Transmation		TBD	Unknown	Unknown
TBD	RFC A Genius Analog Module	RFC	TBD	Yes	Unknown
TBD	RFC A Genius Analog Module	RFC	TBD	Yes	Unknown
TBD	RFC B Genius Analog Module	RFC	TBD	Yes	Unknown
TBD	RFC B Genius Analog Module	RFC	TBD	Yes	Unknown
TBD	Recirc MG A Scoop Tube Position	RFC	TBD	Unknown	Unknown
TBD	Recirc MG B Scoop Tube Position	RFC	TBD	Unknown	Unknown
TBD	Recirc MG B Scoop Tube Position	RFC	TBD	Unknown	Unknown
TBD	Recirc MG A Scoop Tube Position	RFC	TBD	Unknown	Unknown
TBD	RFC A Adjustable Speed Drive	RFC	TBD	Unknown	Unknown
TBD	RFC B Adjustable Speed Drive	RFC	TBD	Unknown	Unknown
Continuity of business	#11 Recirc Flow Control	RFC	Critical	No	Ready
Important to operation	#12 RFP Recirc Flow Control	CFW	Critical	None	Not affected

Table 5--continued

Classification	Instrument name (V-Vendor)	System	Mission critical	Date function	Y2K status and note if to be tested
Important to operation	Vessel Level (Feedwater) Master Controller	RLC	Severe	None	Not affected
License commitment	SRS Controller	Chemistry	High	None	Not affected
Personnel safety	Personnel Contamination Monitor	Rad Protection	Medium	Yes	Unknown
Required by regulations	Automated TIP Control Unit 3	TIP	Critical	Yes	
Safety related	EFT Temperature Control	EFT	Critical	None	Not affected
Safety related	Div I 120 VAC Class 1E Inverter	UPS	Critical	None	Not affected

*   Items that have not been classified have not been assessed and the data in the folders is preliminary.

Table 6 - Safety-Related Embedded Components Identified by MNGP

Instrument Name	System	Mission Critical	Date Function	Y2K Status
EFT Temperature Control	EFT	Critical	None	N/A
EFT Temperature Control	EFT	Critical	None	N/A
Reactor Vessel Skin Temperature	RPV	Critical	None	N/A
SRV Tailpipe Temperature	MST	Critical	None	N/A
CGCS 'A" Pressure Temperature Indicator	CGCS	Critical	None	N/A
CGCS "B" Pressures Temperature Indicator	CGCS	Critical	None	N/A
Div I 120 VAC Class 1E Inverter	UPS	Critical	None	N/A
Div II 120 VAC Class 1E Inverter	UPS	Critical	None	N/A

MNGP has not identified to date any safety-related embedded system susceptible to the Y2K problem.

Y2K READINESS AUDIT PLAN

Preamble

The objectives of this audit are:

(1) To assess the effectiveness of licensee programs for achieving Y2K readiness and in addressing compliance with the terms and conditions of their license and NRC regulations and continued safe operation.

(2) To evaluate program implementation activities to assure that licensees are on schedule to achieve Y2K readiness in accordance with GL 98-01 guidelines.

(3) To assess the licensee contingency planning for addressing risks associated with events resulting from Y2K problems.

This audit should include review of relevant documentation, and interviews with selected utility personnel. Examples of relevant documentation are: facility specific Y2K program plan, assessment plan, inventory listing/database (including possibly separate inventories of embedded systems), project tracking, reviews and evaluations of regulatory considerations including 10 CFR 50.59 changes, QA procedures related to Y2K program, etc. If possible, include direct observation of testing and validation methodology.

Document Review - Thorough familiarization with the following is required prior to the audit.

    a. Generic Letter 98-01
    b. Licensee Response(s) to GL 98-01
    c. License terms and conditions
    d. NEI/NUSMG 97-07, "Nuclear Utility Year 2000 Readiness"

Additionally, the review should include the following:

    a. Technical Specifications
    b. 10CFR50.36, "Technical Specifications," paragraph (c)(3), "Surveillance requirements," paragraph (c)(5), "Administrative controls."
    c. 10CFR50.47, "Emergency Plans," paragraph (b)(8)
    d. 10CFR50.59, "Changes, tests and experiments"
    e. 10CFR50 Appendix B Criterion III, "Design Control"
    f. 10CFR50 Appendix B Criterion XVII, "Quality Assurance Records"
    g. 10CFR50 Appendix E, "Emergency Response Data System"
    h. 10CFR50 Appendix A General Design Criterion (GDC) 13, "Instrumentation and Control"
    i. 10CFR50 Appendix A GDC 17, "Electric power systems"
    j. 10CFR50 Appendix A GDC 19, "Control room"

k. *10CFR50 Appendix A GDC 23, "Protection system failure modes"*

l. *Standard Review Plan Chapter 7, especially Branch Technical Position 14*

m. *NRC Inspection Manual Chapter 0330: Guidance for Review of Licensee Draft Documents*

n. *NRC Inspection Manual Chapter 0620: Inspection Documents and Records*

o. *NRC Inspection Manual Chapter 0610: Inspection Reports*

p. *Response to Questionnaire Relating to Draft TI on Y2K Readiness of Computer Systems at Nuclear Power Plants*

q. *NEI/NUSMG 98-07, "Nuclear Utility Year 2000 Readiness Contingency Planning"*

r. *Year 2000 Computing Crisis: An Assessment Guide, GAO/AIMD-10.1.14, September 1997*

s. *Year 2000 Computing Crisis: Business Continuity and Contingency Planning, Exposure Draft, GAO/AIMD-10.1.19, March 1998*

t. *Year 2000 Computing Crisis: A Testing Guide, Exposure Draft, GAO/AIMD-10.1.21, June 1998*

A. Pre-Visit Activities

1. Through the Project Manager in coordination with the resident inspector, let the licensee know of the site audit visit 3 to 4 weeks in advance of the visit.

2. Obtain a copy of the licensee's Y2K Readiness Plan and an organization chart showing the Y2K Project alignment. Obtain the name of the Y2K project manager.

3. Based on the Resident Inspector's response to the Y2K questionnaire, identify the stage of the implementation of the plan. Make a list of documents, per the licensee's plan, which have been completed. (For example, if initial assessment has been completed, the inventory list showing the item, its classification and prioritization, should also have been completed.) Select the documents that would be reviewed during the audit at the site.

4. Review the plan, and form an outline of the areas that you would focus on during the site audit.

5. Inform the licensee of the documents that you plan to review, and the project staff you would like to meet. Convey to the licensee that you would like to have a presentation of the plant's Y2K program on the first day of the visit as part of the entrance meeting.

B. Site Visit Activities

DAY 1

1. At the entrance meeting, convey to the licensee that the intent of the visit is to see how well the plant-specific Y2K readiness program is being implemented and whether it will meet its main objective of making the plant Y2K ready on schedule. The audit will focus on those areas affecting safety (safety-related computer systems) first. Subsequently, the remainder of the Y2K readiness program will be assessed for those areas important to plant operation but not directly affecting safety. Systems to consider include the security computer, emergency

response (data collection and communication) systems, radiation monitoring systems, surveillance tracking systems, and process controls (feedwater, turbine, power).

2. Use information obtained from licensee's presentation, along with your understanding of the plant-specific plan, as a means of gaining a good understanding of the licensee's program. Conduct discussions with the licensee's program staff on specific aspects requiring additional detail. The idea is to get a good understanding of the licensee's Y2K program and its implementation. Discuss management, QA, resources, and schedules. *Remember, it is based on this that you would flesh out the detailed audit that you had outlined during your pre-visit activities.*

(These activities, plus access to site, would probably take all of the first day.)

DAYS 2, 3 & 4

The licensee's facility specific Y2K program was developed based on the guidance in NEI/NUSMG 97-07. NEI/NUSMG 97-07 suggests a five phase approach to ensure that a licensees plant continues to operate safely and within the requirements of their license and NRC regulations. The status of the implementation of these phases and schedules for remaining activities, including planning and coordination of Y2K-related work during currently planned outages, should be examined against the July 1, 1999 Y2K readiness date in GL 98-01. The allocation of funds and resources for completion of the phases should also be reviewed.

The scope of systems described in the licensee's Y2K program should include an inventory and assessment of software-based systems and equipment necessary for plant safety and operation, and to satisfy license conditions, technical specifications, and NRC regulations. It should be confirmed that the inventory and assessment has included a review of embedded software systems. Inventory/assessment should also include testing and calibration equipment, spares and interfaces. The program plan should provide appropriate emphasis and priority on safety-related systems/components and systems required for safe operation at the initial and detailed assessment stages.

Methods for assessing Y2K susceptibility should be examined. Verify that appropriate bases (e.g., testing, knowledge-based decisions, testing of the same system by others, use of a tool to evaluate code, vendor certified information, code inspections, and engineering analysis) are provided for Y2K readiness and Y2K compliance as identified by the facility specific program objectives. *{NOTE: Where the licensee relies on data and information provided by others for the bases, including vendors, care should be taken to check that the licensee's program has steps as appropriate for assessing and validating the information.}* Further, when compensatory measures or "work arounds" are identified for achieving Y2K readiness, they should be evaluated for their appropriateness. *{NOTE: When compensatory measures are used, they should be addressed in related contingency plans. They should also be identified, as part of the program, in longer-term maintenance or corrective actions to maintain the system, device, or application Y2K ready.}*

Testing and validation is performed as part of the implementation process. There are several critical dates that should be considered in the determination of Y2K readiness or compliance as follows:

September 9,1999,	09/09/99
December 31,1999,	12/31/99
January 1, 2000,	01/01/00
February 28, 2000,	02/28/00
February 29, 2000,	02/29/00
March 1, 2000,	03/01/00

In addition to the information provided in NEI/NUSMG 97-07, contingency planning should be addressed in detail. Contingency actions to be taken in the event that unanticipated occurrences or malfunctions occur should be reviewed against the potential concerns identified in the Y2K program. In addition, it should be confirmed that certain, high-priority contingency plans, identified by the facility-specific contingency planning, have been established, for example, for ensuring adequate emergency diesel fuel oil to cope with a possible extended loss of offsite power, augmentation of staffing, alternative means of emergency communication and post-accident data collection are available, alternative means of controlling access to vital areas is provided, and provisions to minimize the probability of losing electric power from the grid are available in the event of a nuclear power plant shutdown. It can be anticipated that many licensees will not have completed contingency planning at this stage of their program. However, contingency planning should clearly be incorporated in the facility-specific Y2K program plan. Licensee programs may reference NEI/NUSMG 98-07 or GAO/AIMD-10.1.19 as a basis for contingency planning.

The licensee's review of their regulatory compliance should include a determination of the need for changes to the licensing basis, technical specifications, licensing commitments, and plant safety analysis report.

C. Conclusion of Site Activities

Plan to have an exit meeting with the Y2K project manager. Discuss, in general terms, the review you had done of the facility specific Y2K program, and in particular, any open items that were identified to conclude your audit. Mutually agree upon an avenue to resolve these open items so that you can close out the audit.

Documents Reviewed

1. MNGP Year 2000 Readiness Implementation Plan, Revision 0, July 17, 1998

2. MNGP Year 2000 Assessment - Computer Work Instruction, CWI-05.01, Revision 0, July 21, 1998

3. MNGP Year 2000 Embedded Component Project Work Instruction, PWI-Y2K-2.01, Revision 0, July 30, 1998

4. MNGP Software Quality assurance Requirements, 4AWI-08.03.03, Revision 3, January 29,1998

5. MNGP Condition Report Process, 4AWI-10.01.03, Revision 7, December 16, 1997

6. MNGP Computer Problem/Change Report (PCR), CWI-02.03, Revision 3, September 10, 1998

7. MNGP Software Verification and Validation - Computer Work Instruction, CWI-04.05, Revision 1, January 30, 1992

8. MNGP QA Records Control, 4AWI-02.10.01, Revision 3, July 12, 1996

Entrance Meeting - Attendees

September 15, 1998

Dave Butler	NRC RIII
John Grubb	Gen. Supt. NGS
Deirdre Spaulding	Elec. Engr. NRC/NRR/HICB
Matthew Chiramal	NRR/NRC
Gene Heupel	Process Leader - Eng.
Ronald Siepel	Y2K Project Manager - Monticello
Roger Oelschlager	Y2K Project Manager - Prairie Island
Peggy Anderson	Y2K
Jack Thorson	Y2K Embedded
Sam Shirey	Licensing
Russ Van Dell	NSP - Computer & Info System
Mike Hippe	Production Engineer

Attachment 3