GE Nuclear Energy

Edward W. Secko
Regulatory Compliance Manager

Morris Operation
General Electric Company
7555 East Collins Road
Morris, IL 60450
815/942-5590 Ext. 55

January 27, 2004

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

REFERENCE: SNM-2500
Docket 72-1
TAC No. L23091

SUBJECT: Response to USNRC Request for Additional Information dated May 16, 2003

Enclosed are the following documents:

1) 1 copy of the GE Morris Operation response to the request for additional information questions 1-1, 1-2, and 1-3.

2) 1 copy of revision to the Consolidated Safety Analysis Report (CSAR), Appendix A.8, Aging Management for GE Morris Operation, NEDO-21326D11

Please acknowledge receipt of this transmittal by signing and returning a copy of this letter to E. W. Secko at the above address.

If there are any questions regarding this transmittal, please contact E. W. Secko at the above phone number.

Sincerely,

E. W. Secko
Regulatory Compliance Manager
GE, Morris Operation

Enclosures

I acknowledge receipt of:
1) GE-MO response to USNRC RAI dated January 27, 2004
2) CSAR Revisions Appendix A.8, Aging Management

Signed	Title	Date

NMSS01

Structure, Systems and Components Evaluation for Aging Management Review

SECTION 1 - IDENTIFICATION OF SSCS SUBJECT TO AGING MANAGEMENT

1-1 Provide a list of SSCs that are subject to an AMR and a list of SSCs that are not subject to an AMR. Describe the process used to determine the SSCs that are subject to an AMR.

Response 1 – SSCs subject to an AMR are specified in Section 11.3 of the CSAR and are part of the original licensing basis for Morris Operation.

SSCs subject to an AMR

- Fuel Storage Basin concrete walls, floors and expansion gate
- Fuel Storage Basin stainless steel liner
- Fuel Storage System including baskets and supporting grid
- Unloading Pit doorway guard
- Filter Cell Structure

SSCs not subject to an AMR are due to there being no emergency condition generated by the failure of any of these systems. This will be detailed in subsequent questions.

SSCs not subject to an AMR

- Air compressors
- Basin leak detection system
- Basin water chillers
- Basin water level monitor
- Basin filter system
- Demineralized water system
- Fuel handling cranes and associated fuel handling equipment
- Off-site power
- Standby diesel generator
- Ventilation system
- Water supply well
- Water tower

NRC Memorandum Christopher M. Regan / John D. Monninger October 24, 2003

1-1 The RAI asked for a description of the process used to identify those plant systems, structures, and components (SSCs) that should be subject to an aging management review (AMR). The GEMO response listed the important to safety - SSCs identified in the Consolidated Safety Analyses Report (CSAR).

The NRC felt that the RAI was not fully answered because GEMO did not describe the process used to identify SSCs that require an AMR and those that do not require an AMR. The NRC provided examples of the process used to screen SSCs and what might be used to identify what is within the scope for renewal of the GEMO operating license.

Additional guidance on the scoping process is available in the draft license renewal guidelines for the Independent Spent Fuel Storage Installation (ISFSI) at the Surry Nuclear Power Station as well as the spent fuel pool section of the St. Lucie Nuclear Power Plant license renewal application and the NRC safety evaluation report (SER). The NRC would like to see a similar discussion of the scoping process from GEMO.

Structure, Systems and Components Evaluation for Aging Management Review

GEMO agreed to reconsider its response to this RAI.

Response 2 – SSCs subject to an AMR specified in Section 11.3 of the CSAR and part of the original licensing basis for Morris Operation and SSCs identified through process described below.

SSCs subject to an AMR

- Fuel Storage Basin concrete walls, floors and expansion gate
- Fuel Storage Basin stainless steel liner
- Fuel Storage System including baskets and supporting grid
- Unloading Pit doorway guard
- Filter Cell Structure
- Spent fuel cladding
- Basin building (above grade)

SSCs not subject to an AMR as determined through the evaluation process below.

SSCs not subject to an AMR

- Air compressors
- Basin leak detection system
- Basin water chillers
- Basin water level monitor
- Basin filter system
- Demineralized water system
- Fuel handling cranes and associated fuel handling equipment
- Ground water monitoring well network
- Off-site power
- Standby diesel generator
- Ventilation system
- Water supply well
- Water tower

The process used to determine the SSCs that are subject to an AMR is the following:

The proposed Part 72 license renewal process is summarized in the two principles of license renewal from the Part 54 Final Rule Statements of Consideration published in Federal Register Vol. 60, No. 88, May 8, 1995, pages 22464. *"The first principle of license renewal was that, with the exception of age-related degradation unique to license renewal and possible a few other issues related to safety only during the period of extended operation of nuclear power plants, the regulatory process is adequate to ensure that the licensing basis of all currently operating plants provides and maintains an acceptable level of safety so that operation will not be inimical to public health and safety or common defense and security. Moreover, consideration of the range of issues relevant only to extended operation led the Commission to conclude that the detrimental effects of aging is probably the only issue generally applicable to all plants. As a result, continuing this regulatory process in the future will ensure that this principle remains valid during any period of extended operation if the regulatory process is modified to address age-related degradation that is of unique relevance to license renewal.*

The second and equally important principle of license renewal holds that the plant-specific licensing basis must be maintained during the renewal term in the same manner and to the same extent as

during the original licensing term. This principle would be accomplished, in part, through a program of age-related degradation management for systems, structures, and components that are important to license renewal..."

All support SSCs at GE-MO as part of OLB are classified under the GE Design and Facility Classification System that established the requirements for final design, procurement, fabrication, installation, testing, and operation of equipment and facilities. This system, described in MOI-431, "Design and Facility Classification", and the GE-MO QA Plan, ranks SSCs by nuclear safety related Functional Classification and QA effort required.

Functional Classes are:

- FC-1 – Applicable to all Basic Components, 10CFR21 applies. Failure could create a substantial radiation safety hazard.
- FC-2 – Applicable to SSCs which, if not repaired or replaced promptly following malfunction or failure, could cause or substantially contribute to a significant reduction in the margin of safety. Failure could create potential for abnormal radiation conditions or reduced safety margins.
- FC-3 – Applicable to SSCs not directly nuclear safety-related, but because of design or fabrication complexity, accessibility for repair and maintenance, or other considerations, it is desired to impose specific quality requirements to reduce risks which could result in shutdown of a nuclear facility or a non-nuclear hazard to the public and/or operating personnel.
- FC-4 – Applicable to SSCs not meeting requirements of other functional classifications. Failure would have negligible effect on operating continuity or safety.

QA Effort Required:

Coding which indicates extent of QA activity required to verify achievement of the necessary quality level for a given component, system, or structure. QAER designation is independent of functional class and may be designated by any of five levels; A, B, C, D or E. QA actions are graduated into levels that provide guidance for incorporation of appropriate QA requirements in the design, procurement, fabrication/construction, inspection, testing, records and QA media. Guidance is followed by applying appropriate QA requirements to each element or activity consistent with its importance to safety.

For the Fuel Storage System, all major components fall within Functional Class 2, Safety Related with time to repair or replace in the event of failure or malfunction. QAER level B assigned in that critical attribute rather than all attributes would receive QA verification.

All support SSCs are classified as Function Class 3 or 4, and as such are not directly related to nuclear safety as described above.

This system establishes that there are no FC-1 systems at GE-MO, the only FC-2 SSCs are used for fuel storage, and the support systems, are FC-3 or 4, such as FC-3 for the basin water chillers. As such, aging management is then limited to FC-2 SSCs.

Per the NRC issued RAI, "*The GE-MO ISFSI request for license renewal is unique in that it is the first ISFSI to request a license renewal and it is the only operating commercial water basin ISFSI not co-located at a nuclear power plant site in the United States. Storage of spent nuclear fuel in a water basin are held to the same 10 CFR Part 72 regulations as a dry cask ISFSI. The NRC has provided preliminary guidance for 10 CFR Part 72 license renewal to Virginia Electric and Power Company's (VEPCO) dry cask ISFSI (Ref. 2, 3, & 7) but has not issued any written guidance for wet storage ISFSIs. Since the design and operation of the GE-MO ISFSI is similar to a spent fuel storage pool at a nuclear power plant, the NRC has used applicable portions of NUREG1800, Standard Review Plan for*

Structure, Systems and Components Evaluation for Aging Management Review

Review of License Renewal Applications for Nuclear Power Plants (Ref. 9) and NUREG-1801, Generic Aging Lessons Learned (GALL) Report (Ref. 10) during the review of the GE-MO ISFSI. While both of the NUREGs contain guidance that is not applicable to the GE-MO ISFSI; the NRC staff believes that the general processes covering the spent fuel pool, its support systems, and historic information on age related degradation of nuclear power plant SSCs are appropriate for renewing the GE-MO ISFSI license. For these reasons, the staff has decided to apply the guidance developed for dry cask ISFSI license renewal and for those applicable sections of NUREG-1800 and 1801 to the license renewal of the GE-MO ISFSI in addition to the appropriate regulations of 10 CFR Part 72."

In broad, generic terms, the design and operation of the GE-MO spent fuel pool is similar to a spent fuel storage pool at a nuclear power plant and some aspects of the reference NUREGs may be applicable, however, significant differences between GE-MO basins and support systems and a nuclear power plants fuel storage basins and the fuel stored in both must also be taken into account. The GE-MO basins are below ground, in native bedrock, water level is maintained at or below grade level. All stored fuel is held in GE-MO unique stainless steel baskets (CSAR Section 5.0, ¶ 5.4.4.2) that that are a "can" style container minus a lid, providing individual support and additional containment and shielding for each fuel bundle. Fuel is not routinely shuffled nor is new fuel added unlike the spent fuel pool in a nuclear power plant, (last fuel moved was January 1989) and there are no plans to do so. The static state of the GE-MO fuel assures there are no mechanical or dynamic stresses placed on the fuel. The large basin water volume and low decay heat input (RAI Question 2-7 and 5-3) from the stored fuel provide an extended period of time to take corrective action in case of a malfunction of any of the basin support systems. In the event of an earthquake or other extreme natural phenomena, sufficient makeup water is available through either on-site or off-site means to maintain safe storage conditions.

Fuel stored at GE-MO has reactor discharge dates that range from April, 1970 through October 1986. The last fuel was received at GE-MO in January 1989. Burn up rates range from a high of 36.71 GWD/MTU to a low of 0.18 GWD/MTU, and an average burn up of 17.74 GWD/MTU. Due to the robust design of the pool (CSAR Section 5.0, ¶ 5.5) and the time interval from reactor discharge, there are no postulated events that would result in exposure to a member of the public in excess of the limits of 10CFR72.104, as stated in the CSAR, Section 8.0, ¶ 8.1.1. The condition of the fuel is monitored as part of routine activities conducted at GE-MO through basin water analysis (RAI Question 3-7 and 3-8) and air quality monitoring (RAI Question 2-18). The design of the pool, and operational requirements for the basin area assure a depth of water over the stored fuel, which provides for extended passive heat dissipation capability. This heat dissipation capability has been verified through testing (RAI Question 5-3, J. D. Kesman Report of November 27, 2001) which demonstrated that a minimum of 54 days is available following a loss of basin cooling and make-up capability before the water level will approach the Technical Specification limit, 9 feet above the fuel, or a drop of 3.5 feet from normal pool level.

In general, safe storage of the spent fuel is achieved by maintaining the integrity of the fuel cladding through maintaining a high quality of basin water (CSAR Section 10.0, ¶ 10.4.5). Fuel cladding is designed to withstand a far more severe environment in a reactor than in static storage at GE-MO. The low temperature conditions, removal of both particulate and ionized impurities from the basin water, and absence of chemical materials provides high water clarity, limits corrosion and maintains radiation exposure rates in the vicinity of the basin as low as reasonably achievable. The cladding provides an effective primary barrier to the escape of fission or activation products from stored fuel. The basin water is an effective secondary barrier for the confinement of the small amounts of radioactive materials that may be released from the spent fuel.

The GE-MO radiation protection program is previously established in the current approved revision of the GE-MO Consolidated Safety Analysis Report (CSAR) Section 7.0, Radiation Protection. Subsection 7.7, Estimated Man-Rem Off Site Dose Assessment, specifies the current approved

environmental monitoring program. Under normal operating conditions, Kr-85 provides essentially all the exposure from the GE-MO ventilation exhaust stack. The sum of the values for annual whole body exposure due to inhalation and skin dose out to a radius of 50 miles gives a total of less than 2×10^{-6} man-Rem/yr whole body and less than 0.12 man-Rem skin dose. Routine air samples continue to show that exhaust emissions are below detectable limit, as followings:

	Vent Supply	Stack Inlet
Alpha (µCi/ml)	4.79x10-13	MDA (~1x10-15)
Beta (µCi/ml)	1.07x10-12	MDA (~1x10-15)

The vent supply is air intake to the facility and stack inlet is air being released to the exhaust stack.

There are no planned or unplanned releases of liquid wastes from the site boundaries.

Analysis of postulated accidents including the causes of such events, consequences, and the ability of GE-MO to cope with each are previously established in the CSAR, Section 8.0, Accident Safety Analysis. The Structures, Systems, and Components (SSCs) Important to Safety are described in Section 11.0, Quality Assurance. Both have been in the CSAR since the original Part 50 license, SNM-1265 was issued for GE-MO and were included during the 1979 license renewal application and subsequent issue of the current Part 72 license SNM-2500 in 1982. As such, both are considered part of the original licensing basis for Morris Operation. Given the robust design of the Morris pool and the passive nature of the SSCs Important to Safety, no scenario involving a support system would result in an exposure to the public in excess of the criteria established in 10CRF72.104.

The current approved safety basis for the Morris facility as defined in the CSAR, designated items important to safety (CSAR Section 11.0, sub-section 11.3) demonstrates that no accident postulated (CSAR Section 8.0) will result in exceeding the limits of 10 CFR 72.104 and 10 CFR 100.20 to demonstrate protection of the public.

As shown in CSAR Sections 7.0 and 8.0, the low value of credible doses that could be received from normal operating and credible accident releases are many orders of magnitude below regulatory limits.

Unlike similar support systems at a nuclear power plant, the combination of the GE-MO radiation safety program, accident analysis and functional classification of equipment demonstrates that failure of a SSC supporting fuel storage basin operation will not cause an immediately reportable event. Ample time has been demonstrated for repair, temporary substitution, or permanent replacement of any SSC to prevent any Technical Specification violation and no exceedance of regulatory limits for radiation exposure is postulated.

The first step in the license renewal process involved the identification of the in-scope SSCs. This was done by evaluating the SSCs against the following scoping criteria. Consistent with the current licensing basis, the following SSC types are considered important to safety and consistent with the guidance in NEI-95-10, R3, Section 3.1 are considered in scope for the purpose of license renewal:

3.1 Systems, Structures, and Components Within the Scope of License Renewal

Part 54 Reference

54.4
(a) Plant systems, structures and components within the scope of this part are --

Structure, Systems and Components Evaluation for Aging Management Review

(1) Safety-related systems, structures and components which are those relied upon to remain functional during and following design-basis events (as defined as in 10 CFR 50.49 (b)(l)) to ensure the following functions –

(i) The integrity of the reactor coolant pressure boundary;

(ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or

(iii) The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the guidelines in 4 50.34(a)(l), 50.67(b)(2), or 100.11 of this chapter, as applicable.

(2) All nonsafety-related systems, structures, and components whose failure prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section.

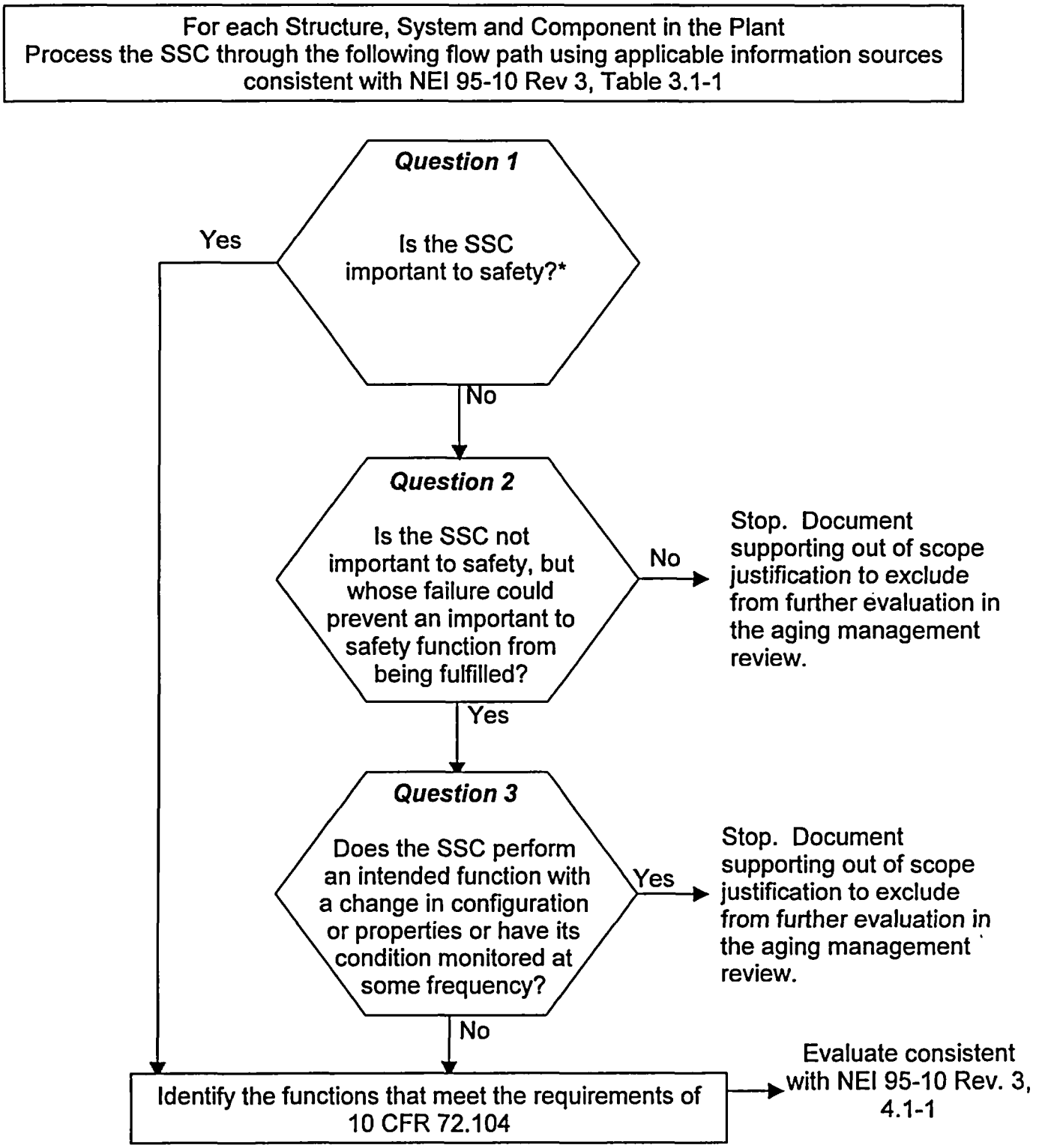
(3) All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49) pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

As Morris is licensed under 10 CFR 72 and functions as a stand alone ISFSI the requirements of 10CFR50 do not apply.

The basis for evaluating Structures, Systems and Components within the scope for license renewal under 10CFR72 was developed consistent with NEI 95-10 Rev 3, Figure 3.0-1. The process developed is similar to the process described in the GALL report (NUREG 1801) and is consistent, where practical, with the application provided in support of the Surrey application for a dry storage ISFSI. This figure was modified to remove references to 10 CFR 54.4(a)(3) and incorporate guidance from the Surrey application for ISFSI site-specific license renewal.

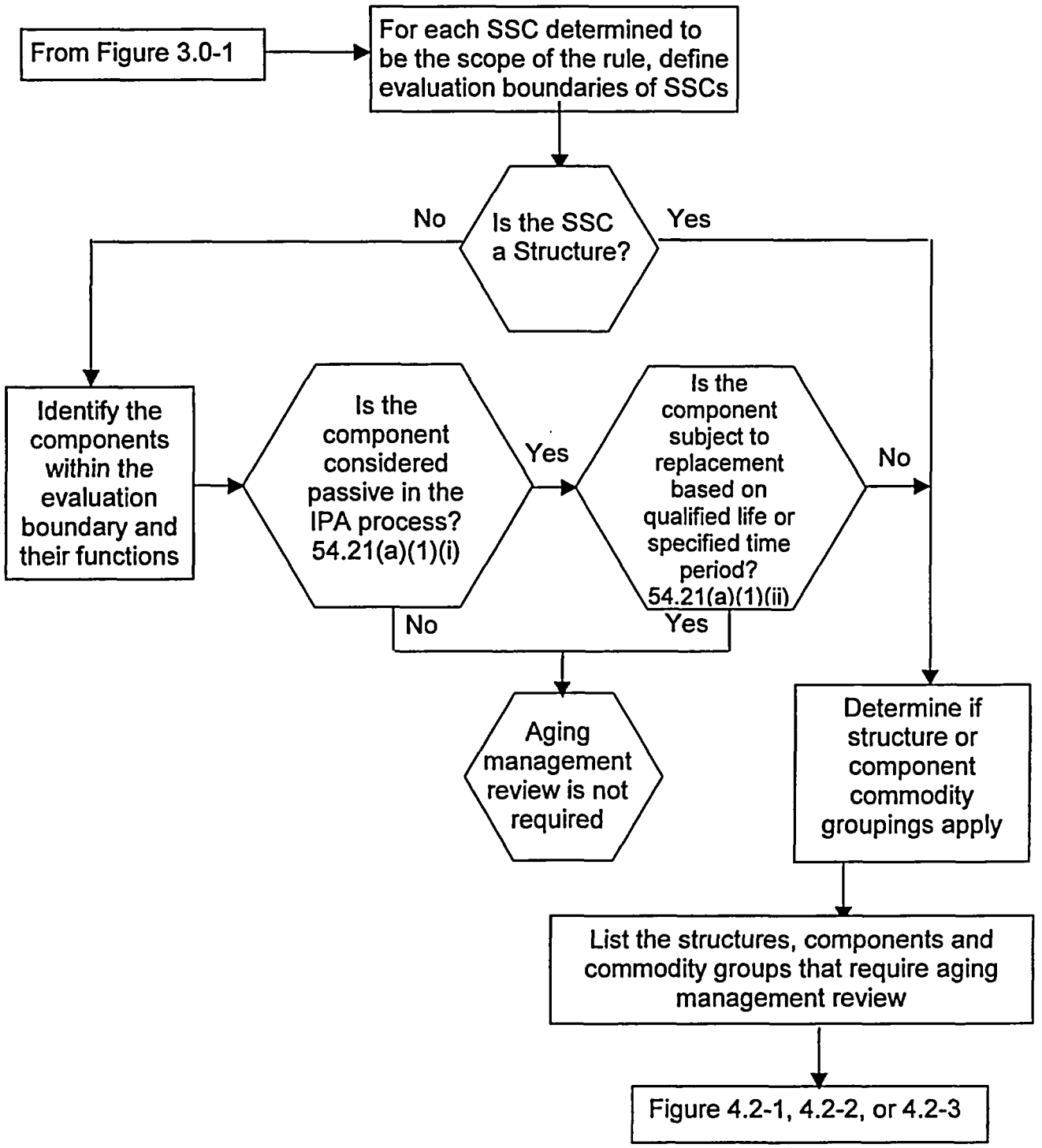
Structure, Systems and Components Evaluation for Aging Management Review

Basis for evaluating Structures, Systems and Components within the scope for license renewal. (Figure 3.0-1)

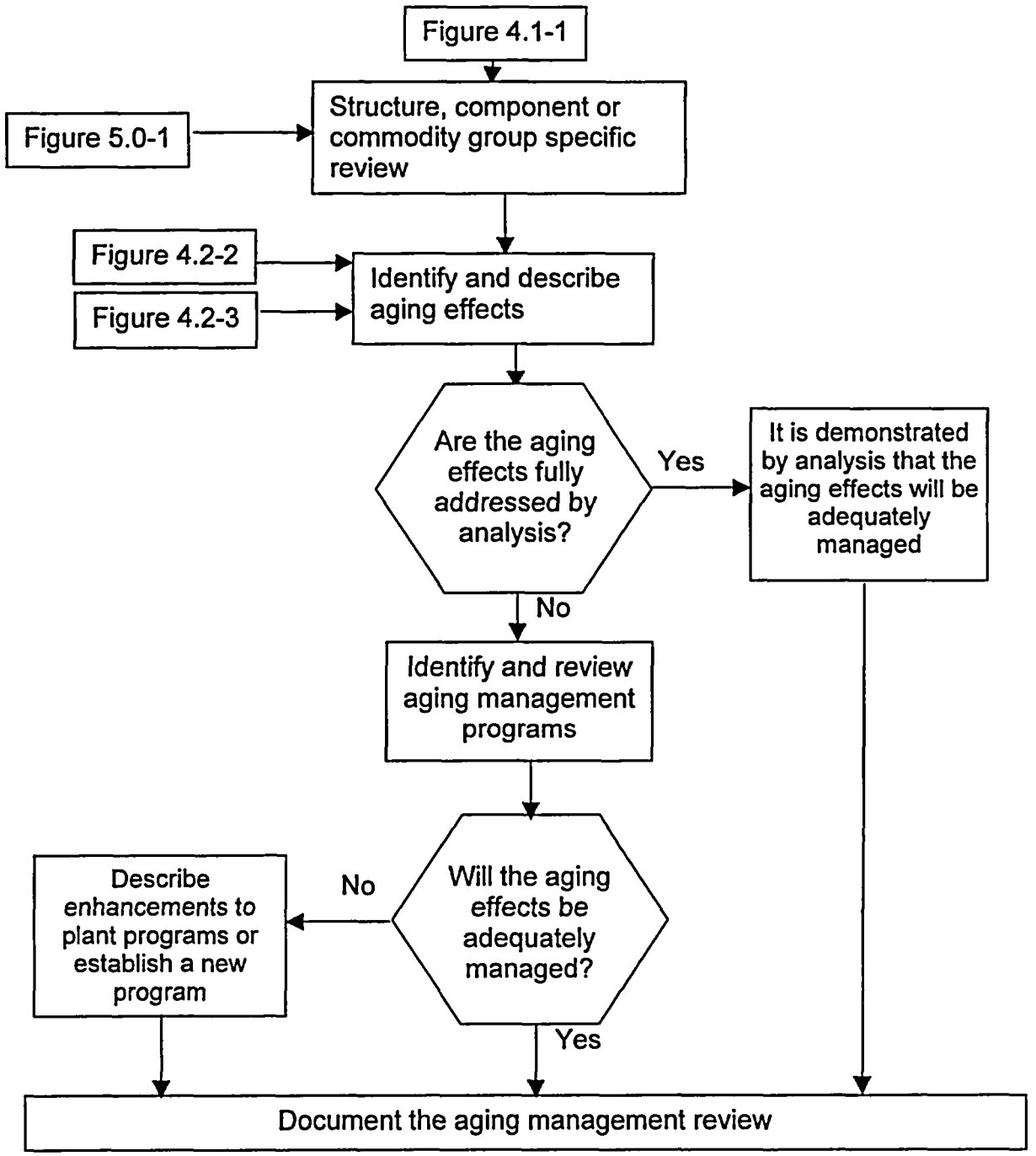


* Important to safety related SSCs are those which are relied upon to remain functional during and following design basis events to ensure the capability to prevent or mitigate the consequences of accidents that could result in off site exposure exceeding 10 CFR 72.104

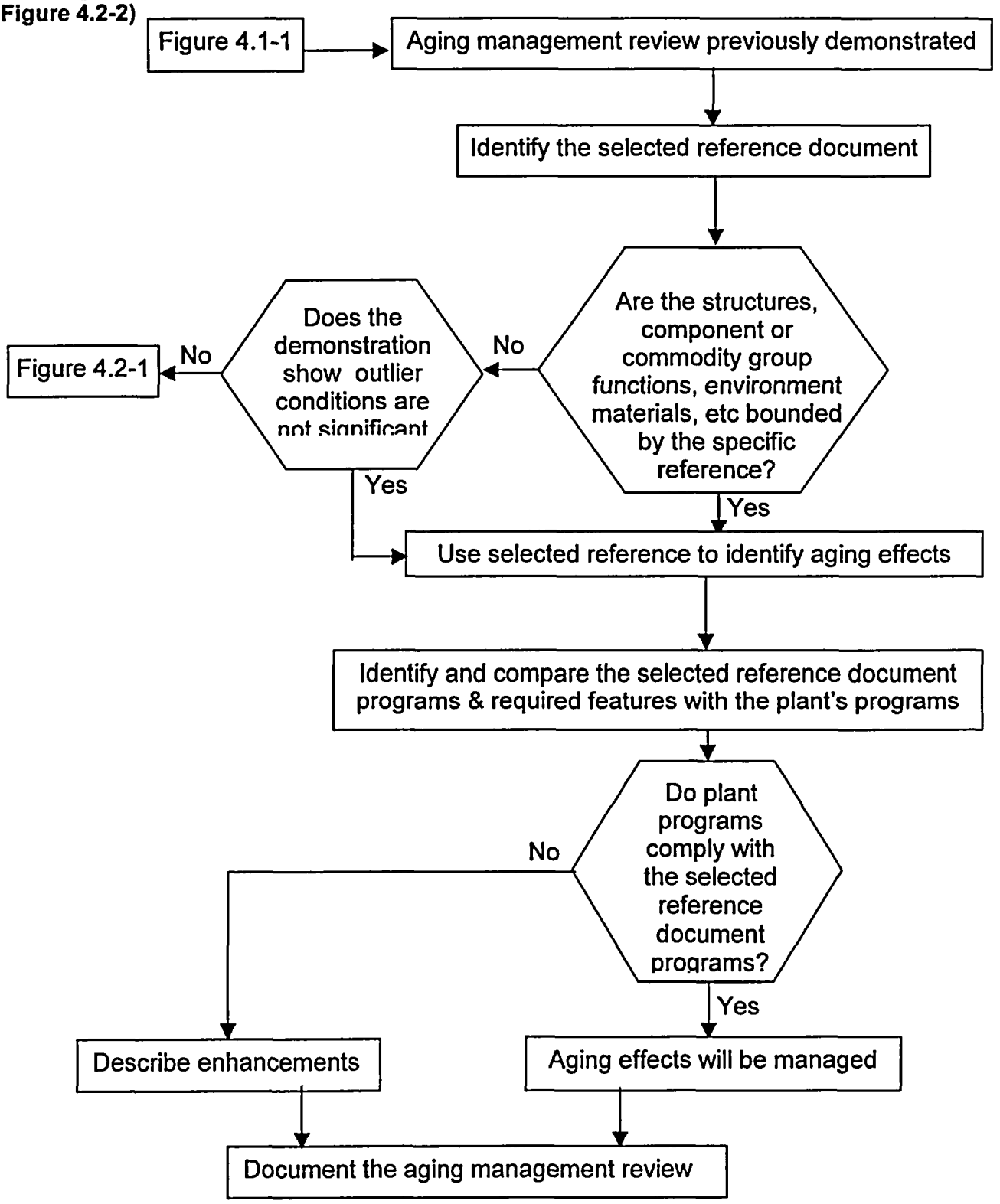
Identification of Structures and Components subject to aging management review [(54.21(a)(1)] (Figure 4.1-1)



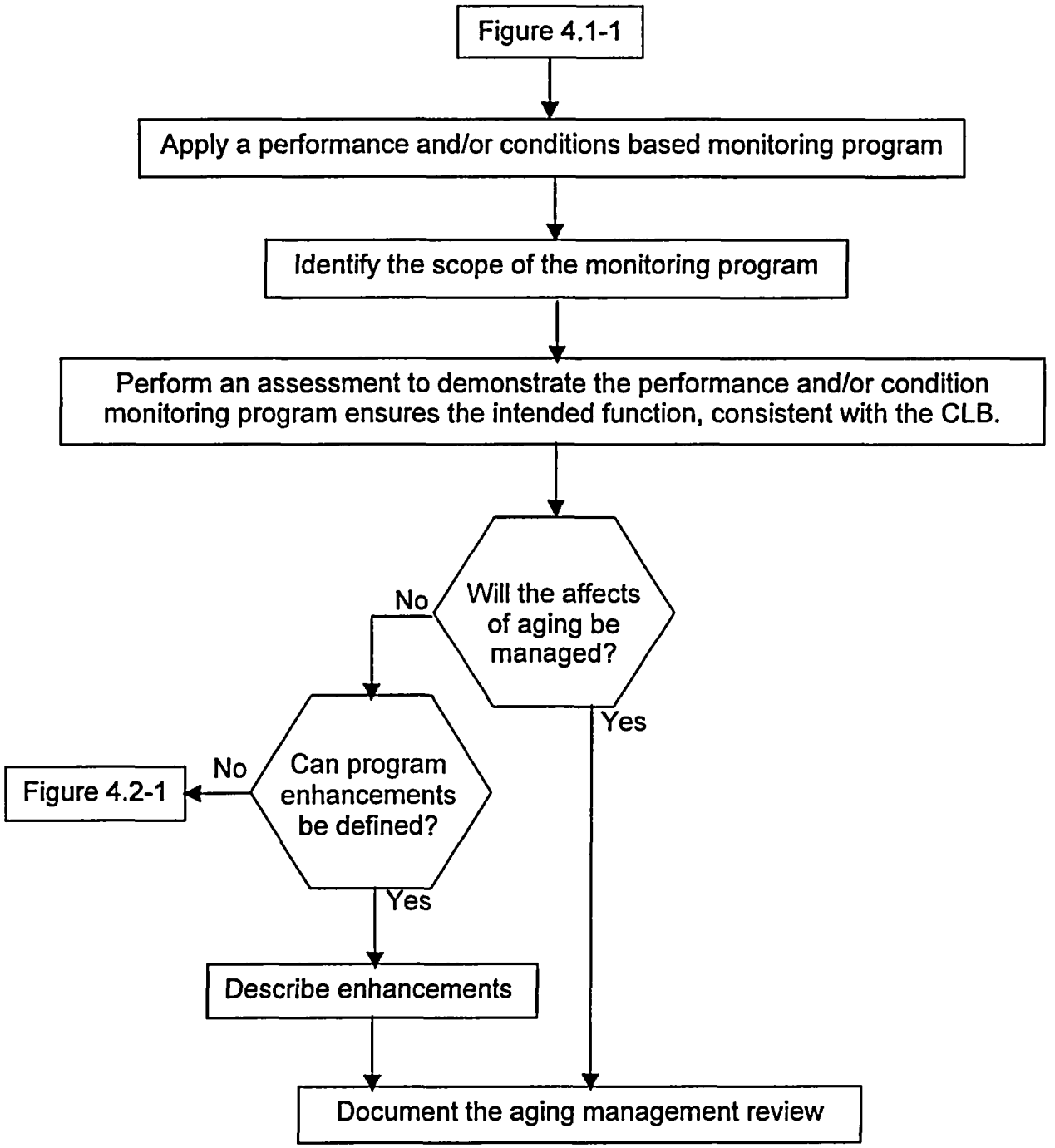
Assuring that the Effects of Aging Will be Managed (Figure 4.2-1)



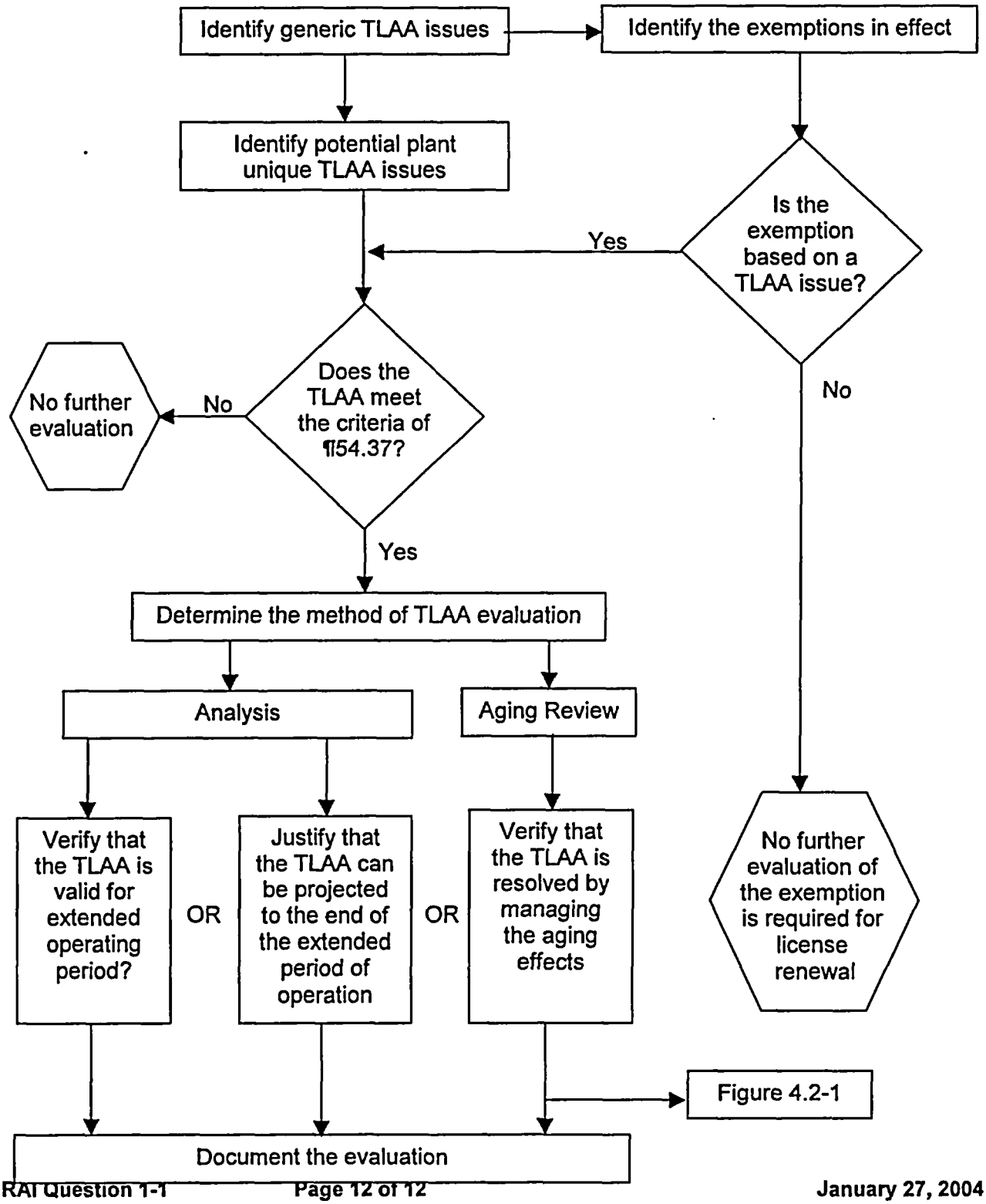
Assuring that the Effects of Aging will be Managed [54.21(a)(3)] using a Previous Review (Figure 4.2-2)



Assuring the Effects of Aging will be Managed using a Monitoring Program [54.21(a)(3)]
Figure 4.2-3



Evaluation of TLAAs and Exemptions [¶54.21(c)] Figure 5.0-1



SECTION 1 -IDENTIFICATION OF SSCS SUBJECT TO AGING MANAGEMENT

1-2 The SER and the EA for the license renewal will require an assessment of the AMR for each SSC relied on in the applicant's Consolidated Safety Analysis Report (CSAR) (Ref. 4). This RAI is necessary for the staff to determine if all appropriate SSCs have been included within the scope of license renewal review and which will support the staff development of the SER and the EA.

Identify those SSCs, other than the SSCs important to safety listed in Section 11.3 of the Consolidated Safety Analysis Report (CSAR), that are relied upon to:

a. Maintain the conditions required to store spent fuel safely;

b. Prevent damage to the spent fuel or the high-level radioactive waste container during handling and storage; or

c. Provide reasonable assurance that spent fuel can be possessed, stored, and transferred without undue risk to the health and safety of the public.

Response 1 – See answer to Question 1-1, "SSCs not subject to an AMR".

NRC Memorandum Christopher M. Regan / John D. Moninger, October 24, 2003

1-2 The RAI asked for a list of SSCs identified by the scoping criteria of RAI 1-1. GEMO felt this RAI was similar to 1-1 and referred to the response to 1-1.

The NRC stressed that the AMR consisted of a four step process:

1. Establish a logical process to evaluate site SSCs to identify items important to safety;

2. Using the process, evaluate site SSCs and identify those components that are important to safety or whose failure could damage an important to safety SSC;

3. Evaluate the identified SSCs to identify the potential effects of aging on the SSC; and

4. Describe the existing (or proposed) process needed to manage the aging effect or justify why the potential aging effect need not be managed at their facility.

The NRC offered the fuel rod as an example. The fuel cladding is the first barrier against release of the nuclear fuel. Cladding could be subject to potential aging effects if it is not maintained in a basin with the proper water chemistry. Thus the fuel cladding may be considered an SSC important to safety and which may be subject to a potential aging effect. Thus the equipment used to maintain the basin water chemistry may be considered an SSC whose failure will have an adverse effect on the SSC important to safety (fuel cladding/assembly). Under this scenario, the water basin treatment equipment may also require an AMR.

GEMO could use existing preventive maintenance (PM) programs as the aging management program for basin water quality SSCs. GEMO would need to identify the effects of aging on the

water basin treatment equipment (pump/motor failure, resin consumption, pipe thinning, etc.) and describe how the existing PM program will mitigate each potential aging effect.

Another SSC to be considered might be the steel building that encloses the basin. Questions that might be addressed include: Can the steel structure, building columns, foundation, and roofing fail or degrade to a point where they would endanger the safe storage of the spent fuel? If so, what would be the physical indications of the aging or degradation? What actions would be required to identify, prevent or mitigate the identified aging effect?

GEMO agreed to reconsider its response to this RAI.

Response 2 – Those SSCs, other than the SSCs important to safety listed in Section 11.3 of the Consolidated Safety Analysis Report (CSAR), that are included within the scope of license renewal review

SSCs subject to an AMR

- Spent fuel cladding
- Basin building (above grade)

SSCs not subject to an AMR as determined through the evaluation process in 1-1.

- SSCs not subject to an AMR
- Air compressors
- Basin leak detection system
- Basin water chillers
- Basin water level monitor
- Basin filter system
- Demineralized water system
- Fuel handling cranes and associated fuel handling equipment
- Ground water monitoring well network
- Off-site power
- Standby diesel generator
- Ventilation system
- Water supply well
- Water tower

SECTION 1 – IDENTIFICATION OF SSCS SUBJECT TO AGING MANAGEMENT

1-3 The SER and the EA for the license renewal will require an assessment of the AMR for all SSCs relied on in the applicant's CSAR. This RAI is necessary for the staff to determine if all appropriate SSCs have been included within the scope of the license renewal review and which will support the staff development of the SER and the EA.

Provide a list of SSCs that are not important to safety but whose failure could prevent an important to safety function from being fulfilled or whose failure as a support SSC could prevent an important to safety function from being fulfilled. Also, describe the process used to determine this list of SSCs and the functions performed by these SSCs.

The SER and the EA for the license renewal will require an assessment of the AMR for all SSCs relied on in the applicant's CSAR. This RAI is necessary for the staff to determine if all appropriate SSCs have been included within the scope of license renewal review and which will support the staff development of the SER and the EA.

Response 1 – There are no not important to safety SSCs at Morris Operation whose failure could prevent an important to safety function from being fulfilled.

Discussion on impact of loss of SSCs not important to safety

Air Compressors – replaced in 1998. At the same time, uses for process and instrument were re-worked to eliminate unnecessary air use. The compressors are redundant, one compressor can supply all the air needs for the site, but both compressors can be operated at the same time if greater volume is required. Impact of loss of the compressor systems on basin related activities are as follows. The compressors provide air to the basin level indicator (see Basin Level below), basin LDS pumpout (see Basin Liner LDS system below), ventilation dampers (dampers fail open) and the basin filter flow control valve (fails as is). Failure of the compressors would not cause a failure in any important to safety system.

Basin Filter System - The basin filter system continuously draws water from the basin skimmers maintaining outstanding water clarity. This system's simple robust design maintains high reliability. During periods when the basin filter was shut down, sometimes in excess of 6 weeks for maintenance activities, no measurable degradation of basin water quality was observed. This included turbidity and contaminants.

Basin Liner Leak Detection System - Pump outs are continuously recorded on a strip-chart recorder and the information reviewed once a day. Failure of the pump does not pose a hazard, as a back-up pump is available. Additionally, increased surveillance of the pool level is sufficient to mitigate any loss of this system. The system also has localized instrumentation that is monitored shiftly by the operator on rounds.

Basin Water Chillers – as described in the CSAR, the chillers, along with all associated piping, pumps, valves, and heat exchangers were installed new in 2000. These units are redundant and only one set is necessary to maintain basin water temperature. The only scenario that could cause both chillers to be inoperable, would be loss of both off-site power feeds and the stand-by diesel generator. An event that has never happened in the history of GE-MO. However, as shown elsewhere in the report on basin heatup, if this event occurred, normal makeup water to reduce effects of evaporation and the slow evaporation rate allow more than ample time to repair/replace the chillers, including bringing in skid mounted units to temporarily cool the basin water while the permanent units are being replaced.

Basin Water Level Monitor - Computer monitored (SIMS System) and alarmed also operations during rounds manual records the basin water level 6 times a day. If this system failed, visual observation by the shift operator would detect any decrease in water level. In addition, due to the location of the suction lines for the basin water chillers, after a drop of less than 31 inches, that system would go into alarm.

Demineralized Water System – The demineralized water system is new in 1996. It is a skid mounted resin bed system with its own computer monitoring. Piping, etc. for this system was replaced at the same time. If output water quality is out of specification, it automatically notifies the supplier and sounds a local alarm. The supplier normally arrives within 24 hours to replace the system resin beds. Typically the basin makeup water is 236 gallons per day. The computer runs on 110 volts, so if all site power was lost, this unit could be connected to one of our many 110/220 volt generators. Water would continue to be gravity fed from the 50,000 gallon water tower.

Fuel Handling Equipment – The fuel handling cranes are maintained under the GE-MO preventative maintenance program, and inspected in accordance with the requirements specified in 10 CFR 1910.179 and ANSI B30-2. Yearly inspections are performed by an independent contractor whose crane inspection services are accredited by the U.S. Department of Labor under 29 CFR 1919 to inspect, test and certify cranes. All grapples and associated equipment used to handle fuel or fuel baskets are laid away, and if the need to use them arises, they will be inspected and evaluated at that time.

Off-site Power – Morris Operation is fed by 2 separate off site power sources with the primary feed coming from Dresden Station. Off-site power is extremely stable with no more than 2 or 3 failures of both feeds at the same time in over 30 years. Those were all during winter periods and were the result of heavy ice storms.

Standby Diesel Generator – The diesel generator can supply backup power to all site systems, including lighting. It is maintained by a diesel generator contractor. Additionally, it is tested bi-weekly as specified in Operability Test 16-90 and subjected to an emergency start/loading scenario yearly as specified in Operability Test 16-91. In approximately 30 years, total off-site power failed an estimated approximately 2 or 3 times, but the generator never failed to start.

Water Tower – Inspected by a nationally established contract company specializing in tanks and towers with the ability to inspect to API and AWWA standards. The tower is divided to provide 10,000 gallons for normal use and approximately 40,000 gallons for emergency use. If the the tower were inoperable, water can be pumped directly from the well to supply the site. In addition, without power, it would continue to feed its contents to the site, and with current water useage (~427.4 Gallons per day), could continue to supply site needs for over 100 days, longer with water conservation measures.

Site Water Well – The well had a new pump and discharge pipe installed in March, 2002. The pump has a 150 gpm capacity. If a complete loss of site power occurred, water can be trucked in and pumped to the tower using truck borne pumps, or pumped from the tanker directly to the water system.

Ventilation System – Air is taken in through the air inlet plenum is distributed through the process building, passed through the sand filter and exhausted out the 300 foot tall exhaust stack. The sand filter was sized to provide a negative pressure ventilation inside the original reprocessing facility. Air quality is monitored at the facility inlet, at the sand filter inlet and sand filter exhaust. Until 1983 the ventilation system was configured to operate as originally designed for a fuel reprocessing plant with a flow of 24,000 CFM through the filter. During 1983,

the ventilation system was re-configured to operate as it does today, at a flow of 14,000 CFM through the filter. The sand filter D/P has stayed effectively constant over the 20 years since the change in flow velocity. Routine air samples continue to show the following emissions :

	Vent Supply	Stack Inlet
Alpha (μCi/ml)	4.79x10-13	MDA (~1x10-15)
Beta (μCi/ml)	1.07x10-12	MDA (~1x10-15)

g. The stack gas monitoring system (equipment number SP-879) continuously samples the inlet to the sand filter and the takes two independent samples of the stack effluent. An alpha/beta counting unit analyzes these samples. The SIMS monitors flow through the sampling system. Stack flow is also continuously monitored by the SIMS and recorded on a regular basis.

NRC memorandum Christopher M. Regan / John D. Moninger, October 24,2003

1-3 The RAI asked for a list of SSCs not important to safety but whose failure could prevent an important safety function from being fulfilled. GEMO provided a list of components that have undergone major renovation to demonstrate the effectiveness of their maintenance

The NRC offered the fire hoses in the spent fuel pool at St. Lucie as an example of the type of equipment they consider not important to safety but whose failure could impact a safety function.

St. Lucie eliminated the spent fuel pool water makeup and piping system from their AMR because, if it failed, emergency water could be added using the fire hoses. This action however, made the fire hoses an SSC not important to safety but whose failure could endanger the fuel pool water level. Thus, the fire hoses needed to be considered in the AMR.

In a similar fashion, the GEMO water supply system may not be subject to AMR because, if it fails, the site would have several weeks to restore it to operation before the water level in the pool would evaporate to within 9 feet of the top of the fuel bundles. If GEMO decides to scope out the water treatment system from the AMR they must demonstrate that the safety of the fuel would not be compromised.

The NRC suggested that GEMO reconsider its response to RAIs 1-1 through 1-3 and develop a formal process to identify SSCs important to safety. They can then use the process to identify specific SSCs subject to an AMR. Each identified SSC can then be examined to identify the potential aging effects and a program can be developed or identified that monitors for, mitigates, or prevents the aging effect. It is key that GEMO include all systems that are necessary to keep the fuel stored safely. Some items (i.e., instrumentation, some monitoring equipment) may not need to be on the list because they have no direct effect on the safe storage of the fuel.

The key to the discussion is being able to demonstrate that GEMO can (1) prevent damage to the spent fuel, and (2) allow safe movement of the fuel for the next 20 years. In order to be fully responsive to the RAI a complete discussion for each SSC under consideration would be necessary.

GEMO agreed to reconsider its response to this RAI.

Response 2 – Those SSCs, other than the SSCs important to safety listed in Section 11.3 of the Consolidated Safety Analysis Report (CSAR), that are included within the scope of license renewal review

SSCs subject to an AMR

- Spent fuel cladding
- Basin building (above grade)

SSCs not subject to an AMR as determined through the evaluation process in 1-1.

- SSCs not subject to an AMR
- Air compressors
- Basin leak detection system
- Basin water chillers
- Basin water level monitor
- Basin filter system
- Demineralized water system
- Fuel handling cranes and associated fuel handling equipment
- Ground water monitoring well network
- Off-site power
- Standby diesel generator
- Ventilation system
- Water supply well
- Water tower

The process used to determine which SSCs would be subject to an AMR is described in the response to Question 1-1. The results are presented in tabular format below to justify the decsion to place a SSC either in scope or out of scope for Aging Management Review. The question numbers refer to specific question on the flow chart provided in the answer to 1-1.

SSC	Question 1	Question 2	Question 3	In Scope	AMR Required	Discussion
Spent fuel cladding	Yes	N/A	N/A	Yes	Yes	Spent fuel in the GE-MO basins are clad with both stainless steel and zircalloy. Per IAEA-TECDOC-1012, "Durability of Spent Nuclear Fuels and Facility Components in Wet Storage", the zirconium alloys represent a class of materials that is highly resistant to degradation in wet storage, including some experience in aggressive waters. The database for the zirconium alloys supports a judgment of satisfactory wet storage in the time frame of 50 to 100 years or more." (IAEA 5). Stainless steel components in wet storage facilities have an excellent history of performance, including service in aggressive waters. Specific examinations of LWR SS fuel claddings indicate no evidence of degradation after periods of wet storage. Satisfactory service of SS clad fuels and facility components can be expected for several decades if materials with favorable microstructures and low stress levels are involved (IAEA 5). Results of basin air and water sampling since the last fuel was received in January 1989 have been consistent, indicating the fuel cladding isn't deteriorating.
Basin building above grade	No	Yes	Yes	Yes	Yes	Section 4.2 of the CSAR discusses in detail wind and tornado loadings on the building, flood design and seismic design. Section 8.6 of the CSAR discusses in detail tornado generated missiles and their affects. There are no postulated releases, due to analyzed accident/event analysis that would allow a release in excess of 10CFR72.104. However, the building structure will be inspected on a regular basis as part of the AMP for any signs of deterioration.
Air compressors	No	No	N/A	No	No	These units were replaced in 1998. The compressors are redundant, one compressor can supply all the air needs for the site. The system has the capability to operate both compressor simultaneously should a greater volume be required. Impact of loss of the compressor systems on basin related activities are as follows: The compressors provide air to the basin level indicator (see Basin Level below), basin LDS pumpout (see Basin Leak Detection System below), ventilation dampers (dampers fail open) and the Basin Filter System flow control valve (fails as is). The impact of a failure of each of these

						systems is discussed individually below, demonstrating failure of the compressors would not cause a failure in any important to safety system. SOP 8-1, Air Compressor Operation provides guidance for the start-up and sequential operation of the air compressors along with operational checks and emergency operation instructions. Correct operation of the compressors is monitored by operators during normal shift rounds. Failure of the air compressors is produces both Site Information Management System (SIMS System) and Control Room alarms.
SSC	**Question 1**	**Question 2**	**Question 3**	**In Scope**	**AMR Required**	**Discussion**
Basin filter system	No	Yes	Yes	No	No	The basin filter system continuously draws water from the basin skimmers maintaining outstanding water clarity. This system's simple robust design (CSAR Section 1, 1.4.3) and operation (CSAR Section 5, 5.5.2) maintains high reliability of the filter system. During periods when the basin filter was shut down, sometimes in excess of 6 weeks for maintenance activities, no measurable degradation of basin water quality was observed. Basin water quality is routinely monitored through SOP 16-10, Basin Water Analysis Compliance Test and SOP 1-20, Basin Filter Operation. Operation of the system is verified by operations personnel twice each shift. Once during normal operator rounds and once by normal mid-shift instrumentation monitoring on the SIMS system. There is no failure alarm on the system, but loss of filter function would not exceed 4 hours without detection. The intake is located at the basin water surface, and the system return is located approximately 31 inches from the top of the basin ensuring a system leak will not approach a Basin water level technical specification limit.
Basin leak detection system	No	Yes	Yes	No	No	Pump outs are continuously recorded on a strip-chart recorder and the information reviewed by the duty operator on rounds. The system also has localized instrumentation that is monitored shiftly by the operator on rounds. Failure of the system causes both Control Room and SIMS alarms. Failure of the pump does not pose a hazard, as a back-up pump is available. Should both pumps fail, the water level in the leak detection system will equalize with the basin water level. In the event of a system outage, increased surveillance of the pool level is

						sufficient to mitigate any loss of this system. System failure would result in an alarm at the guard station?? The following SOPs are routinely performed, 16-11, "Basin Leak Detection Alarm Operability Test"; 16-12 Basin Leak Detection Calibration Compliance Test" in order to assure proper system operation.
SSC	**Question 1**	**Question 2**	**Question 3**	**In Scope**	**AMR Required**	**Discussion**
Basin water chillers	No	No	N/A	No	No	As described in the CSAR, the chillers, and associated piping, pumps, valves, and heat exchangers were installed new in 2000. These units are redundant; only one set is necessary to maintain basin water temperature. The only scenario that could cause both chillers to be inoperable would be loss of both off-site power feeds and the stand-by diesel generator, an event that has never happened in the history of GE-MO. However, as discussed in RAI question 2-7, in the report on basin heat-up, if this event occurred, normal makeup water to off-set effects of evaporation and the slow evaporation rate allow more than ample time to repair/replace the chillers, including bringing in skid mounted units to temporarily cool the basin water while the permanent units are being replaced. Maintenance of cooling with makeup water addition only, can be supported indefinitely. SOP 1-22, Basin Cooler System, describes operation of the basin cooling system. Abnormal system operation is indicated by alarms on the SIMS and in the Control Room. The duty operator checks each chiller shiftly. The new system employs heat pumps (versus external radiator assemblies in the original system) resulting in no basin liquid systems extending external of the pool building.
Basin water level monitor	No	No	N/A	No	No	Basin water level is continuously computer monitored through the SIMS System that will automatically monitor water level and provide an alarm at the guard station. Operations personnel also monitor basin water level during rounds and manual record the basin water level 6 times a day. If this system failed, visual observation by the shift operator would detect any decrease in water level. Pool level is also visible via remote cameras located in the basin area, providing monitoring of the basin from the Central Alarm Station. In addition, due to the location of the suction lines for the basin water chillers, after a drop of less than

						31 inches, which doesn't cause a technical specification violation, the basin chiller system would show a Control Room and SIMS alarm.
SSC	**Question 1**	**Question 2**	**Question 3**	**In Scope**	**AMR Required**	**Discussion**
Demineralized water system	No	No	N/A	No	No	The demineralized water system (including piping) was replaced in 1996. It is a skid mounted resin bed system with its own computer monitoring ties to a phone line. If output water quality is out of specification, the system automatically notifies the supplier and sounds a local alarm. The supplier normally arrives within 24 hours to replace the system resin beds. Typically the basin makeup water is 236 gallons per day. It takes a loss of approximately 1,983 gallons to drop the basin water level one (1) inch. The computer runs on 110 volts, so if all site power was lost, this unit could be connected to one of several on-site 110/220 volt generators. Demineralized water is also routinely sampled per SOP 16-10, Basin Water Analysis Compliance Test. The duty operator verifies system function shiftly once a day totalized and capacity flow and water quality is recorded.
Fuel handling cranes and associated fuel handling equipment	No	No	N/A	No	No	The fuel handling cranes are maintained under the GE-MO preventative maintenance program, and inspected in accordance with the requirements specified in 10 CFR 1910.179 and ANSI B30-2. Yearly inspections are performed by an independent contractor whose crane inspection services are accredited by the U.S. Department of Labor under 29 CFR 1919 to inspect, test and certify cranes. All grapples and associated equipment used to handle fuel or fuel baskets are laid away, and prior to use will be inspected. Repair and/or replacement will be accomplished as required based on the results of the inspections. All are described in Section 5.0 of the CSAR.
Ground water well monitoring network	No	No	N/A	No	No	The eight NRC reviewed and approved ground water sampling wells at MO are used to monitor for any potential leakage of basin water to the surrounding soil. The wells are sampled routinely per SOP 16-102, Sample Well Analysis Compliance Test. In addition, 3 of the wells positioned around the basin are used to monitor for ground water potential effects on below grade concrete.

Off-site power	No	No	N/A	No	No	Morris Operation is fed by 2 separate off site power sources with the primary feed coming from Dresden Station. Off-site power is extremely stable with no more than 2 or 3 failures of both feeds at the same time in over 30 years. Those were all during winter periods and were the result of heavy ice storms. In the event of a complete loss of off-site power, a stand-by diesel generator can provide power to operate all systems at GE-MO. Failure of the operating incoming power feed produces both Control Room and SIMS alarms. SOP 14-1, Loss of Incoming Power Line, SOP 14-2 Total Power Loss, and SOP 14-3 Cross-Tie of Incoming Power Busses describe operation of the off-site electrical supply system.
SSC	**Question 1**	**Question 2**	**Question 3**	**In Scope**	**AMR Required**	**Discussion**
Standby diesel generator	No	No	N/A	No	No	The diesel generator can supply backup power to all site systems, including lighting. It is inspected yearly by a diesel generator contractor. Additionally, it is tested bi-weekly as specified in Operability Test 16-90 and subjected to an emergency start/loading scenario yearly as specified in Operability Test 16-91. SOP 14-4 describes Diesel Generator Operation. Also the duty operator performas a visual inspection of the diesel and checks oil temperature and jacket water temperature each shift and diesel fuel storage tank is checked once a day. In approximately 30 years, total off-site power failed an estimated approximately 2 or 3 times, but the generator never failed to start. If off-site power were lost and the stand-by diesel failed to start, a portable 400kVA diesel driven generator could be brought in operate all systems at MO.
Ventilation system	No	No	N/A	No	No	Air is taken in through the air inlet plenum is distributed through the process building, passed through the sand filter and exhausted out the 300 foot tall exhaust stack. The sand filter was sized to provide filtering for the original reprocessing facility. Air quality is monitored at the facility inlet, at the sand filter inlet and sand filter exhaust. Until 1983 the ventilation system was configured to operate as originally designed for a fuel reprocessing plant with a flow of 24,000 CFM through the filter. During 1983, the ventilation system was re-configured to operate as it does today, at a flow of 14,000 CFM through the

						filter. The sand filter D/P has stayed effectively constant over the 20 years since the change in flow velocity. Routine air samples continue to show the following emissions: Vent Supply Stack Inlet Alpha (µCi/ml) 4.79x10-13 · MDA (~1x10-15) Beta (µCi/ml) 1.07x10-12 MDA (~1x10-15) The ventilation system is monitored through SOP 16-81, "Ventilation System Operability Test"; SOP 16-82, "Sand Filter Delta P Operability Test"; SOP 16-84, "Exhaust Sample Analysis Compliance Test". Ventilation system inlet and outlet blowers and air flow are checked on a shiftly basis by the duty operator. Failure of exhaust blowers produce Control Room and SIMS alarms. The concrete structure was designed and constructed in accordance with applicable national standards in effect at the time, specifically, as a minimum, ACI 318-63, and meets conditions consistent with longevity as described by the GALL report, section A1.1 for concrete containments. While it may not be possible to state the expected life of the concrete exactly, the existing conditions avoid the degradation mechanisms that would adversely affect the structural integrity of the concrete.
SSC	**Question 1**	**Question 2**	**Question 3**	**In Scope**	**AMR Required**	**Discussion**
Water supply well	No	No	N/A	No	No	The well had a new pump and discharge pipe installed in March, 2002. The pump has a 150 gpm capacity. If a complete loss of site power occurred the site would rely on gravity feed from the tower (see Water Tower). In the very unlikely event of an extended outage, water can be trucked in and pumped to the tower using truck borne pumps, or pumped from the truck directly to the water system. Flow of water from the well is verified by the duty operator each shift when the well is in operation.
Water tower	No	No	N/A	No	No	Inspected by a nationally established contract company specializing in tanks and towers with the ability to inspect to API and AWWA standards. The tower is divided to provide 10,000 gallons for normal use and approximately 40,000 gallons for emergency use. The tower provides gravity feed to the site. With current water usage (~427.4 total gallons per day), it could

						continue to supply site needs for over 90 days. Water conservation measures could be implemented to extend this capability. Additionally, water can be pumped from the well directly to the site water system bypassing the tower. The duty operator verifies water level at the begining of each shift and then once a day water pumped from the well is verified.
SSC	**Question 1**	**Question 2**	**Question 3**	**In Scope**	**AMR Required**	**Discussion**