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February 19, 2004

U. S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Corporation
McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
Response to NRC Generic Letter 2003-01: Control Room Habitability

On June 12, 2003, the NRC issued Generic Letter (GL) 2003-01 concerning Control Room habitability. The NRC issued the Generic Letter to alert addressees to findings at U.S. power reactor facilities suggesting that the Control Room licensing and design bases, and applicable regulatory requirements may not be met, and that Technical Specification surveillance requirements may not be adequate. Also, the Generic Letter emphasizes the importance of reliable, comprehensive surveillance testing to verify Control Room habitability.

The GL requests information to confirm that the facility's Control Room meets applicable habitability requirements with emphasis placed on inleakage testing, radiological analyses, hazardous chemical and smoke assessments, and the adequacy of Technical Specifications. The GL also requests the design criteria to which the facility is licensed, and whether any compensatory measures are currently in place that maintains the Control Room habitable.

On August 7, 2003, Duke Energy Corporation (Duke) provided the 60 day response required of addressees that could not provide the information requested in the GL within 180 days of issuance. In its August 7, 2003 letter, Duke stated that a response would be submitted by February 20, 2004.

Therefore, Duke's response to the GL 2003-01 Requested Information for McGuire Nuclear Station is provided in the Attachment to this letter.

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No commitments are contained in this letter. If questions arise or additional information is needed, contact Lee A. Hentz at 704-875-4187.

Sincerely,

Gary R. Peterson

Attachment

I affirm that I, Gary R. Peterson, am the person who subscribed my name to the foregoing, and that all the matters and facts herein are true and correct to the best of my knowledge.

Gary R. Peterson, Site Vice President

Subscribed and sworn to me: February 19, 2004
Date

Freda K. Crump
Notary Public

My commission expires: August 17, 2006
Date

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MCGUIRE NUCLEAR STATION'S RESPONSE TO NRC GL 2003-01

Per the above-referenced Generic Letter, licensees were requested to provide information on three issues relating to the importance of ensuring that the Control Room envelope is operated and maintained in accordance with the facility's design and licensing bases. The exact requests and the specific McGuire responses follow:

1. **Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases.**

McGuire Nuclear Station Units 1 and 2 were designed to the General Design Criteria (GDC) outlined in 10 CFR 50, Appendix A. A comparison of GDCs 1, 3, 4, 5, and 19 versus the facilities current design and licensing bases is shown in Table 1.

The McGuire Nuclear Station Control Room is shared by both units. The Control Room Area Ventilation (CRAVS) and Chilled Water (CRACWS) systems are designed to maintain the environment in the Control Room envelope within acceptable limits for the operation of unit controls, for maintenance and testing of the controls as required, and for uninterrupted safe occupancy of the Control Room during post-accident shutdown. Because of these criteria, the systems are designed as Engineered Safety Feature (ESF) Systems with absolute and carbon filtration in the outside air intakes and equipment redundancies for use as conditions require. Two 100 percent Safety Class 3 redundant air handling systems are provided for the Control Room and are supplied with chilled water by two 100 percent Safety Class 3 redundant chilled water systems, each with one 100 percent capacity chiller and one 100 percent chilled water pump. Filtered makeup air for pressurization of the Control Room envelope is provided by two 100 percent capacity outside air pressure filter train (OAPFT) fans. Essential electrical apparatus involved with the cooling, heating and pressurizing of the Control Room during accident conditions are connected to emergency standby power (Emergency Diesel Generators).

During normal operations, a single CRAVS and CRACWS operates to provide proper cooling of the Control Room. Upon receipt of an ESF signal, both CRAVS and CRACWS trains operate to facilitate cooling and both OAPFT units align to filter makeup air to pressurize the Control Room. The resetting of the system requires deliberate manual action by the operator. Instrumentation is provided for the systems to control and indicate the temperature, and to indicate radioactivity levels. Early warning ionization type smoke detectors are located near the return air inlets in the ductwork serving the Control Room Area Ventilation System.

The CRAVS and CRACWS are independent of other ventilation systems. This assures the integrity and availability of the Control Room in the event of any postulated fire or radioactive contamination generated in other areas of the plant. The design of the CRAVS is such that the maximum radiation dose received by the Control Room personnel under accident conditions is within the limits of GDC 19 contained in Appendix A to 10 CFR 50.

Operation of the CRAVS and CRACWS is governed by Technical Specifications 3.7.9, 3.7.10, and Selected Licensee Commitment (SLC) 16.7.6. The performance of the CRAVS and CRACWS are monitored in accordance with Maintenance Rule requirements per 10 CFR 50.65. Health Reports for each system are developed by McGuire System Engineering and periodically reviewed by senior management.

As demonstrated with attached Table 1 and the responses that follow, the CRAVS and CRACWS systems are designed, constructed, configured, operated, and maintained in accordance with McGuire's design and licensing basis, with the exception of the issue noted in the response to Question 2 regarding the Control Room habitability compensatory measure.

Emphasis should be placed on confirming:

(a) **That the most limiting unfiltered inleakage into your CRE (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for CRE habitability. Describe how and when you performed the analyses, tests, and measurements for this confirmation.**

McGuire Nuclear Station contracted Lagus Applied Technologies through NCS, Inc. to perform a tracer gas leak test and flow measurement for the McGuire Control Room. An overview of the tracer gas test method was presented to the NRC during a meeting on September 17, 2003 in Rockville, Maryland. The testing was performed and successfully completed from October 24 through October 27, 2003. NCS provided McGuire with a written test report detailing the methodology and results of the tracer gas test. A new dose analysis for McGuire established a maximum limit of 610 scfm unfiltered inleakage into the Control Room provided compensatory measures were implemented to use existing station procedures to distribute potassium iodine appropriately. [MCC-1227.00-00-0095, Calculation of Post LOCA Radiation Dose for Operability Evaluation of MNS Control Room Unfiltered Inleakage]. The method employed in this calculation uses a source term developed pursuant to Regulatory Guide 1.4.

The CRAVS and CRACWS provide the normal and emergency ventilation requirements to the Control Room. During emergency mode of operation, the Control Room is maintained at a positive pressure $\geq$ 0.125 inches water gage with respect to the outside. The Control Room is maintained habitable for personnel and equipment by filtering outside air for pressurization. The following is a description of the test method and results.

During operation in the emergency mode, makeup outside air is drawn through each of two outside air intakes. Both outside air intakes provide suction to either or both outside air pressure filter train (OAPFT) fans. Testing was based on the Constant Injection Test

Method described in ASTM E741 and ASTM E2099. The Constant Injection Test Method tested the following configurations: (a) A-train operating in emergency mode and B-train off, (b) B-train operating in emergency mode and A-train off, and (c) A-train and B-train operating in emergency mode at the same time.

In a Constant Injection Test, tracer gas (sulfur hexafluoride (SF_6)) is continuously injected into the makeup air stream of the CRAVS at a constant rate just upstream of the OAPFT. Through sampling, tracer gas dispersed throughout the Control Room envelope (CRE) is verified. After waiting a sufficient period of time for concentration equilibrium to occur, a number of measurements of the tracer concentration at the most downstream point (in a static pressure sense) of the CRAVS were obtained. By understanding the concentration of the tracer gas when injected at the OAPFT and the concentration of the tracer gas at the most down stream point, this allows inference of the total air inflow to the CRE.

Makeup (OAPFT) flow rates are simultaneously measured by a tracer gas dilution technique. Knowledge of the makeup flow rate in combination with a measured total inleakage value allows calculation of the amount of unfiltered air inleakage to the CRE. Unfiltered air inleakage into the CRE is the total air inflow to the CRE minus the makeup (OAPFT) flow.

The uncertainty values were calculated at the 95% confidence level and include random and bias uncertainties/errors.

The results from the October 2003 tracer gas tests are as follows:

Alignment	Unfiltered Leakage
A Train	98 +/- 26 scfm
B Train	131 +/- 36 scfm
A & B Trains	42 +/- 67 scfm

In the calculations of post accident radiation doses, the design basis value for rate of unfiltered inleakage to the control room was set to (a) 20 cfm with no compensatory measures implemented and (b) 610 cfm with the compensatory measure to use station procedures to implement a potassium iodine distribution program [reference MCC-1227.00-00-0095, Calculation of Post LOCA Radiation Dose for Operability Evaluation of MNS Control Room Unfiltered Inleakage]. The highest value measured for rate of unfiltered inleakage to the Control Room in the three series of tracer gas tests discussed above is 167 scfm with the uncertainty included. Taking into account post accident use of the Control Room doors adds 10 scfm for a total of 177 cfm.

As such, significant margin is retained in the rate of unfiltered inleakage to the Control Room between the values measured in the integral tracer gas tests and the value determined in the calculation of Control Room radiation doses following the worst case design basis accident.

The method employed in this calculation uses a source term developed pursuant to Regulatory Guide 1.4. The calculation was performed in support of a compensatory measure that was put into place at McGuire specifically to support the tracer gas testing. This compensatory measure ensures that by procedural controls, potassium iodide is provided to the Control Room operators if conditions warrant it.

(b) That the most limiting unfiltered inleakage into your CRE is incorporated into your hazardous chemical assessment. This inleakage may differ from the value assumed in your design basis radiological analyses. Also confirm that the reactor control capability is maintained from either the control room or the alternate shutdown panel in the event of smoke.

The following sections describe the hazardous chemical assessment and smoke evaluation for McGuire.

Hazardous Chemical Assessment

An evaluation of onsite and offsite hazardous chemicals is documented in a site controlled calculation [MCC-1211.00-00-0141, Control Room Habitability - Toxic Gas Analysis Calculation] that is periodically reviewed for changes that may require revision. The hazardous chemical assessment is performed using the progressive screening steps and Control Room habitability evaluation guidance provided in Regulatory Guide 1.78. In addition, the calculation uses the HABIT code as described in NUREG/CR-6210, "Computer Codes for Evaluation of Control Room Habitability (HABIT)." The evaluation accounts for the most limiting unfiltered inleakage into the McGuire Control Room envelope, which occurs during emergency and normal operational alignments. The conclusion of the analysis is that onsite and offsite releases of hazardous chemicals do not result in unacceptable concentrations within the Control Room.

Smoke Evaluation

The Standby Shutdown System (SSS) provides an alternate and independent means to achieve and maintain a hot shutdown condition for scenarios in which the Control Room is unavailable or equipment it controls are unavailable. The SSS was designed for safe shutdown during postulated fire, security events, and Station Blackout (SBO). The Standby Shutdown Facility (SSF), which houses an emergency diesel generator and various equipment controls and instrumentation, is the assured shutdown location for loss of Control Room due to fire or sabotage. The SSS also includes the turbine driven auxiliary feedwater pumps, and a low capacity reactor coolant system makeup pump for each unit.

The SSF is a separate structure that is physically removed from the station's Auxiliary Building which houses the Control Room. The SSF has its own ventilation system that is completely independent from any of the plant ventilation systems.

The following sections address smoke design and egress pathways to assure reactor control capability is maintained in the event of smoke.

Smoke Design

The strategy used to assure the capability to safely shut down the McGuire units in the event of a fire that results in evacuation of the Control Room relies on the SSS. The SSS provides an alternate means to achieve and maintain a hot shutdown condition in addition to the normal shutdown capabilities available.

Significant physical separation exists between the CRAVS outside air intakes, CRAVS boundary and the SSF ventilation system outside air intake. In addition, there is also significant separation from the point of smoke discharge from the station exhaust points (Turbine Building Exhaust Fan Discharges and Station Ventilation Stack) to the SSF ventilation system outside air intake.

In addition, Self Contained Breathing Apparatus (SCBAs) are maintained in the Control Room in case of a carbon dioxide buildup. Therefore, SCBAs could be used to provide temporary habitability during an emergency egress from the Control Room.

Egress Pathways Evaluation

The McGuire Auxiliary Building has numerous pathways to traverse from the Control Room (which is located at elevation 767'-0") out of the building, to the yard and then to the SSF (which is located at elevation 760'-0"). In addition, manning the SSF is also considered a "time critical evolution" for Operations which is practiced every 2 years at McGuire.

Therefore, a fire in the Auxiliary Building is not expected to significantly challenge the operator's ability to traverse to the SSF and achieve safe shutdown.

Overall Smoke Evaluation Conclusion

McGuire relies on the SSS as an alternate and independent means to achieve and maintain a hot shutdown condition for scenarios in which (a) the Control Room is unavailable or (b) equipment it controls is unavailable. Also, the SSF is physically separated from the McGuire plant by a significant distance and there are numerous egress pathways available for operators to reach the SSF. Based on these facts there is adequate assurance that safe shutdown will be achieved during a smoke event originating inside or outside the Control Room.

(c) **That your technical specifications verify the integrity of the CRE, and the assumed inleakage rates of potentially contaminated air. If you currently have a ΔP surveillance requirement to demonstrate CRE integrity, provide the basis**

for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your ΔP surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable surveillance methodology (e.g., ASTM E-741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.

If your facility does not currently have a technical specification surveillance requirement for your CRE, explain how and on what frequency you confirm your CRE integrity.

McGuire currently performs a positive pressure surveillance of the Control Room envelope every 18 months per Technical Specification Surveillance Requirement (SR) 3.7.9.4. The Control Room envelope tracer gas testing performed in October 2003, as described in Item 1a, revealed that some amount of unfiltered inleakage exists despite McGuire's ability to successfully demonstrate a positive pressure in the Control Room. As a result, McGuire plans to add an inleakage type surveillance to the Technical Specifications per the guidance contained within Technical Specification Task Force (TSTF) Change Traveler 448 (discussed below).

The industry submitted TSTF-448 Revision 1, "Control Room Habitability," to the NRC for review on August 19, 2003. This TSTF will follow the standard TSTF approval process and schedule. McGuire plans to review and implement TSTF-448 on a reasonable schedule once it is approved by the NRC and made available for use.

McGuire does not plan to implement any permanent modifications in order to demonstrate compliance with the new inleakage surveillance requirement. During the tracer testing performed in October 2003, temporary changes necessary to the ventilation system to perform the testing were procedurally controlled.

2. **If you currently use compensatory measures to demonstrate CRE habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures**

McGuire has one compensatory measure currently in place to maintain operability of the Control Room. This compensatory measure was evaluated under the 10 CFR 50.59 process.

Tracer gas testing performed in October 2003, as described in Item 1a, revealed that unfiltered inleakage into the Control Room exceeded the limit in the current design basis accident analyses. As a result, an operability evaluation was performed. To maintain the Control Room operable, a new post Loss of Coolant Accident (LOCA) radiation dose calculation (Ref. 5) was performed to include the contribution of potassium iodide (KI) usage by the Control Room Operators to maintain dose within the regulatory limits.

Credit may be taken for a factor of 10 reduction in thyroid dose due to the administration of KI. The revised calculation determined that KI use will maintain the Operator dose within limits up to an unfiltered inleakage of approximately 610 scfm. As previously stated in response to Item 1a, the highest unfiltered inleakage value measured at McGuire was approximately 177 scfm.

The distribution of KI to the Control Room Operators at McGuire is procedurally controlled (Ref. 16 and 17). Briefly, in the event of a radioiodine release, the Technical Support Center (TSC) Radiation Protection (RP) Manager distributes KI to all station personnel that have been, or suspected of having been, in an area where a significant uptake has occurred. Additional procedural guidance was added to ensure the Control Room Operators were taken into consideration. This distribution can be accomplished within 2 hours of declaring an emergency. Adequate supplies of KI are available in the Control Room for a 30 day period. The Operators have been screened for known reactions to iodide, iodine, iodized salt, shell fish, and contrast dyes used in diagnostic medical radiology.

To retire the KI compensatory measure, McGuire plans to submit a License Amendment Request, pursuant to 10 CFR 50.67, to the NRC to incorporate an Alternative Source Term (AST) methodology into the post LOCA dose consequence calculation. The AST methodology can account for an unfiltered inleakage of approximately 210 scfm without exceeding the regulatory dose limits for the Operators and without the KI contribution.

3. **If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principle Design Criteria" regarding control room habitability, in addition to responding to items 1 and 2 above, provide the documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence, etc.) of the basis for this conclusion and identify your actual requirements.**

The McGuire facility is required to meet the General Design Criteria (GDC) regarding Control Room Habitability.

REFERENCES

1. McGuire Updated Final Safety Analysis Report

2. McGuire Technical Specifications

3. McGuire Selected Licensee Commitments Manual

4. McGuire Control Room Area Ventilation and Chilled Water System Design Basis Document

5. MCC-1227.00-00-0095: Calculation of Post LOCA Radiation Doses

6. NRC Generic Letter 2003-01: Control Room Habitability

7. NEI 99-03, Rev. 0 and 1: Control Room Habitability Guidance

8. NRC Regulatory Guide 1.196: Control Room Habitability

9. NRC Regulatory Guide 1.197: Demonstrating Control Room Envelope Integrity

10. TSTF-448, Rev. 1: Control Room Habitability

11. NRC Regulatory Guide 1.4: Assumptions Used for Evaluating the Potential Radiological Consequences of a LOCA for PWRs

12. NRC Regulatory Guide 1.78: Assumptions for Evaluating the Habitability of a Control Room during a Postulated Hazardous Chemical Release

13. ASTM E-741: Standard Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution

14. NUREG/CR-6210: Computer Codes for Evaluating Control Room Habitability

15. MCC-1211.00-00-0141: Review of Onsite and Offsite Chemicals per Regulatory Guide 1.78

16. Procedure SH/0/B/2005/003: Distribution of Potassium Iodide Tablets

17. Procedure RP/0/A/5700/012: Activation of the Technical Support Center

Table 1
Comparison between GDC and McGuire Licensing Basis

10 CFR 50 Appendix A Criteria	McGuire Current Licensing Basis
Criterion 1 – Quality standards and records Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Where generally recognized codes and standards are used, they shall be identified and evaluated to determine their applicability, adequacy, and sufficiency and shall be supplemented or modified as necessary to assure a quality product in keeping with the required safety function. A quality assurance program shall be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety functions. Appropriate records of the design, fabrication, erection, and testing of structures, systems, and components important to safety shall be maintained by or under the control of the nuclear power unit licensee throughout the life of the unit	Per Chapter 3 of the McGuire UFSAR, the structures, systems, and components of this facility are classified, as defined in ANS N18.2, according to their importance in the prevention and mitigation of accidents using generally recognized engineering codes and standards. The Auxiliary Building, which contains the Control Room, is designed as a Category "I" system with seismic and tornado protection. The Control Room Area Ventilation System (CRAVS) and the Control Room Area Chilled Water System (CRACWS) are QA Condition 1 systems and were designed as Engineered Safety Feature (ESF) systems. Each 100 percent capacity redundant train of air handling units, water chillers, pumps, pressurizing filter trains and fans, and outside air intake isolation valves is served from separate trains of the Emergency Class 1E Power System. All essential air conditioning and ventilating equipment, ductwork and supports are designed to withstand the safe shutdown earthquake. This assures the integrity and availability of one train of the CRAVS in the event of any single active failure. Design of the CRAVS is such that the maximum radiation dose received by the Control Room personnel under accident conditions is within the limits of GDC 19 of Appendix A to 10 CFR 50. The CRAVS is designed to maintain temperature, cleanliness and pressurization in the areas served during normal plant operation, shutdown, post-accident conditions, and in all feasible weather conditions Duke's quality assurance program conforms with the requirements of 10 CFR 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants. This Quality Assurance program is described in Chapter 17 of the McGuire UFSAR. Included in this quality assurance program is specific direction for the maintenance of appropriate records.
Criterion 3 – Fire protection Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and	The station is designed to utilize non-combustible and heat-resistant materials, wherever practical. Duplication and physical separation of components to provide redundancy against other hazards also protects against simultaneous failures due to local fires. The Fire Protection System provides fire detection equipment for areas where potential for fire is greatest or areas not normally occupied by personnel. Also, reliable sources of either water or carbon dioxide are provided to appropriate parts of the station.

Table 1
Comparison between GDC and McGuire Licensing Basis

10 CFR 50 Appendix A Criteria	McGuire Current Licensing Basis
designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components.	In general, pressure-retaining equipment or piping is not permitted in the Control Room. Several small hand-held fire extinguishers are located within the area for local fire control. Several self-contained type breathing devices are located within the Control Room. Areas of the Auxiliary Building and the Service Building which contain high-pressure equipment or piping have no direct interface with the Control Room. The CRAVS and CRACWS are located in several fire areas. In some instances, both trains are located in the same fire area. However, the Standby Shutdown System (SSS) is designed to bring both units to hot standby on loss of the Control Room due to a fire event per 10 CFR 50, Appendix R. Each CRAVS air handling unit is provided with a firestat which annunciates on high duct air temperature. Mechanical fire dampers are installed in the ductwork at all fire barrier penetrations.
Criterion 4 – Environmental and dynamic effects design basis Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.	Structures, systems and components important to safety are designed to function in a manner which assures public safety at all times. These structures, systems and components are protected for all worst-case conditions by appropriate missile barriers, pipe restraints, and station layout. The Control Room is designed to withstand such missiles as may be directed toward it and still maintain the capability of controlling the units. Class 1E electrical equipment is designed and qualified to perform its safety function(s) under the harsh environmental conditions applicable to its location. The Control Building, which is part of the Auxiliary Building, houses the Control Room, battery room and the cable room. The Control Building is a reinforced concrete Category I structure, consisting of a grid of frames connected by continuous slabs, walls and columns. The roof slab of the Control Building is 27 inches thick and the walls are 12 inches thick. Both are constructed of concrete. The Auxiliary Building, which houses the CRAVS and CRACWS, is designed to withstand the effects of tornado generated missiles, turbine generator missiles, and other internal missiles. The CRAVS outside air intakes are tornado missile protected by separation and surrounding structures.

Table 1
Comparison between GDC and McGuire Licensing Basis

10 CFR 50 Appendix A Criteria	McGuire Current Licensing Basis
Criterion 5 – Sharing of systems, structures, and components Structures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units	Structures, systems, and components at McGuire which are either shared between the two units or among systems within a unit, are designed such that there is no interference with basic function and operability of these systems due to sharing. This design protects the ability of shared structures, systems, and components to perform all safety functions properly. The McGuire Control Room is shared by both units. Even though both units use a common Control Room, the mechanical and electrical systems are separate for each unit. Also, the Standby Shutdown System (SSS) is designed to mitigate the consequences of certain postulated fire incidents, sabotage, or station blackout event by providing the capability to bring one or both units to hot standby. The operation of the SSS is governed by SLC 16.9.7.
Criterion 19 – Control room A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including loss-of-coolant accidents. Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident. Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures. Applicants for and holders of construction permits and operating licenses under this part who apply on or after	The station is provided with a Control Room located in the Auxiliary Building where the nuclear power unit is operated under normal and accident conditions. The Control Room is designed and equipped to minimize the possibility of events which might preclude occupancy. In addition, provisions have been made for bringing both units to and maintaining them in a hot shutdown condition for an extended period of time from locations outside the Control Room. If necessary, the reactor may subsequently be placed in the cold shutdown condition. The employment of non-combustible and fire retardant materials in the construction of the Control Room, the limitation of combustible supplies, the location of fire fighting equipment, and the continuous presence of highly trained operators minimize the possibility that the Control Room will become uninhabitable. Additionally, the CRAVS is designed to maintain the Control Room at a positive pressure to minimize airborne radioactivity inleakage. Under high radiation conditions, makeup air is processed through a system of high efficiency filters. Sufficient shielding, distance, and Containment integrity are provided to assure that Control Room personnel are not subjected to doses under postulated accident conditions which would exceed 5 rem whole body. The principal shield for the Control Room is the Reactor Building . Additional shielding is provided by the Reactor Building internal shielding, Control Room concrete floor, concrete ceiling, and concrete walls. Control Room layouts provide the necessary controls to start,

Table 1
Comparison between GDC and McGuire Licensing Basis

10 CFR 50 Appendix A Criteria	McGuire Current Licensing Basis
January 10, 1997, applicants for design certifications under part 52 of this chapter who apply on or after January 10, 1997, applicants for and holders of combined licenses under part 52 of this chapter who do not reference a standard design certification, or holders of operating licenses using an alternative source term under §50.67, shall meet the requirements of this criterion, except that with regard to control room access and occupancy, adequate radiation protection shall be provided to ensure that radiation exposures shall not exceed 0.05 Sv (5 rem) total effective dose equivalent (TEDE) as defined in §50.2 for the duration of the accident.	operate, and shut down the units with sufficient information display and alarm monitoring to assure safe and reliable operation under normal and accident conditions. Special emphasis is given to maintaining control during accident conditions. The layout of the Engineered Safety Feature devices of the control board is designed to minimize the time required for the operator to evaluate system performance under accident conditions. In the event the Control Room must be evacuated, sufficient instrumentation and controls are provided outside the control room to bring the plant safely to a hot shutdown condition. A separate plant system has been incorporated into the McGuire design to allow a means of limited plant shutdown, independent from the Control Room and auxiliary shutdown panels. This system, known as the Standby Shutdown System (SSS), provides an alternate means to achieve and maintain a hot shutdown condition following postulated fire, sabotage, and station blackout events. This system is in addition to the normal shutdown capabilities available. The SSS (except for interfaces to existing safety related systems) is designed in accordance with accepted fire protection and security requirements and is not designed as a safety related system. The SSS utilizes the turbine driven auxiliary feedwater pump to provide adequate secondary side makeup independent from all A.C. power and normal sources of water. If the Control Room is inaccessible on a long term basis, the plant can be brought to cold shutdown. The reactor design does not preclude attaining the cold shutdown condition from outside the Control Room. An assessment of unit conditions can be made on a long term basis to establish procedures for making the necessary physical modifications to instrumentation and control equipment outside the Control Room in order to attain cold shutdown. During such time the unit can be safely maintained in the hot shutdown condition by utilizing the SSS. Even though both units use a common Control Room, the mechanical and electrical systems are separate for each unit. Therefore, each unit can achieve hot shutdown or cold shutdown independent of the other unit.