INSPECTION CRITERIA FOR FIRE PROTECTION OPERATOR MANUAL ACTIONS

3/6/03 CRITERIA VS. DRAFT INTERIM CRITERIA (10/17/03)

3/6/03 INSPECTION CRITERIA FOR FIRE PROTECTION MANUAL ACTIONS	DRAFT INTERIM INSPECTION CRITERIA FOR FIRE PROTECTION OPERATOR MANUAL ACTIONS
Diagnostic Instrumentation Determine whether adequate diagnostic instrumentation, unaffected by the postulated fire, is provided for the operator to detect the specific spurious operation that occurred. Some licensees may have protected only those circuits specified in Information Notice 84-09. Additional instrumentation may be needed to properly assess a spurious operation. Annunciators, indicating lights, pressure gages and flow indicators are among those instruments typically not protected from the effects of a fire. Instrumentation should also be available to verify that the manual action accomplished the intended objective.	Available Indications Diagnostic indication, if credited to support operator manual actions, shall be capable of: • Confirming that the action is necessary; • Being unaffected by the postulated fire; • Providing a means for the operator to detect whether spurious operation of safety-related equipment has occurred; and • Verifying that the operator manual action accomplished the intended objective.

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Environmental Considerations Review environmental conditions the operator may encounter while accessing and performing the manual action. Radiation levels should not exceed normal 10CFR Part 20 limits. Emergency lighting should be provided as required in Appendix R, Section III.J, or by the licensee's approved fire protection program. Temperature and humidity conditions should be reviewed to ensure that temperature and humidity do not affect the capability to perform the manual action. Fire effects should be reviewed to ensure that smoke and toxic gases from the fire do not affect the capability to perform the manual action.	Environmental Considerations Environmental conditions encountered while accessing and performing operator manual actions shall be demonstrated to be consistent with the following human factor considerations for visibility and habitability: • Emergency lighting shall be provided as required in Appendix R, Section III.J, or by the licensee's approved fire protection program, [e.g., lit with 8-hr battery-backed emergency lighting], and sufficient lighting shall be provided for paths to and from locations requiring any actions. • Radiation shall not exceed 10 CFR Part 20, Section 20.1201, limits • Temperature and humidity conditions shall be evaluated to ensure that temperature and humidity do not adversely affect the capability to perform the operator manual action. [See, e.g., NUREG/CR-5680, vol. 2, "The Impact of Environmental Conditions on Human Performance;" or require that licensee provides rationale for temperature/humidity not being factors adversely affecting performance.] • Fire effects shall be evaluated to ensure that smoke and toxic gases from the fire do not adversely affect the capability to access the required equipment or to perform the operator manual action.

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Staffing Review licensee shift staffing to determine whether adequate qualified personnel are available to perform the required manual actions and safely operator the reactor.	Staffing and Training There shall be a sufficient number of plant operators, under all staffing levels, to perform all of the required actions in the times required for a given fire scenario. The use of operators to perform actions shall be independent from any collateral fire brigade or control room duties they may need to perform as a result of the fire. Operators required to perform the manual actions shall be qualified and continuously available to perform the actions required to achieve and maintain safe shutdown. A training program on the use of operator manual actions and associated procedures during a postulated fire shall demonstrate that operators can successfully achieve these objectives.
Training Determine whether operator training on the manual actions and the procedure is adequate and current.	
Communications If manual action coordination with other plant operations is required, then communications capability must be protected from effects of a postulated fire.	Communications To achieve and maintain safe shutdown, adequate communications capability shall be demonstrated for operator manual actions that must be coordinated with other plant operations, with this communications capability continuously available.
Special Tools If special tools are required, determine whether tools are dedicated and available from accessible nearby locations.	Special Equipment Any special equipment required to support operator manual actions, including keys, SCBA, and personnel protective equipment, shall be readily available, easily accessible and demonstrated to be effective.

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Procedures Review procedural guidance to ensure that it is adequate and contained in an emergency procedure. Operators should not rely on having time to study normal plant procedures to find a method of operating plant equipment that is seldom used.	Procedures Procedural guidance on the use of required operator manual actions shall be readily available, easily accessible and demonstrated to be effective.
Accessibility Review accessibility. If a ladder or other special access equipment is needed, verify the availability. Determine whether an operator can reach the required location without personal hazard.	Local Accessibility All locations where operator manual actions are performed shall be assessed as accessible without hazards to personnel, with controls needed to assure availability of any special equipment, such as keys or ladders, being demonstrated.
Verification and Validation Determine whether the manual actions have been verified and validated by plant walkdowns using the current procedure. Ensure that the licensee has adequately evaluated the capability of operators to perform the manual action in the time available before the plant will be placed in an unrecoverable condition.	Demonstration The capability to successfully accomplish required operator manual actions within the time allowable using the required procedures and equipment shall be demonstrated using the same personnel/crews who will be required to perform the actions during the fire; documentation of the demonstration shall be provided.

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N/A	Complexity and Number The degree of complexity and total number of operator manual actions required to effect safe shutdown shall be limited such that their successful accomplishment under realistically severe conditions is assured for a given fire scenario. The need to perform operator manual actions in different locations shall be considered when sequential actions are required. Analyses of the postulated fire time line shall demonstrate that there is sufficient time to travel to each action location and perform the action required to support the associated shutdown function(s) such that an unrecoverable condition does not occur.
N/A	Equipment Pre-conditions Possible failure modes and damage that may occur to equipment used during a fire shall be considered to the extent that the equipment's subsequent use could be prevented, or at least made difficult. Credit for using equipment whose operability may have been adversely affected by the fire due to smoke, heat, water, combustion products or spurious actuation effects shall account for such possibilities (e.g., over-torquing an MOV due to a spurious signal, as discussed in Information Notice 92-18).

NEI 00-01, APPENDIX E
"MANUAL ACTIONS AND REPAIRS"

NEI 00-01 Appendix E (Manual Actions and Repairs)	SECY 03-0100
• Manual operation - Operation of safe shutdown equipment on the required safe shutdown path using the control room control devices (e.g., control switches) **in the event that automatic control of the equipment is either inhibited based on plant procedures or unable to function as a result of fire-induced damage.**	• Proposed definition (post-SECY): • Operator action - An action taken by operators from inside the Main Control Room (MCR) to achieve and maintain post-fire safe shutdown. This action typically is performed by the operator controlling **equipment that is located remote from the MCR.**
• Remote manual operation - Operation of safe shutdown equipment on the required safe shutdown path **using ... plant design features that allow the operation of equipment through a combination of electrically powered control switches and relays ... specifically designed for this purpose** from a location other than the main control room.	• Proposed definition (post-SECY): • Operator manual action - An action taken by operators to perform manipulations of components and equipment from outside the MCR to achieve and maintain post-fire safe shutdown. This action is performed locally by the operator, typically at the equipment.
• Local operation - Operation of safe shutdown equipment on the required safe shutdown path by an operator when automatic, remote manual or manual operation [is] no longer available (e.g., opening of a motor operated valve using the hand wheel).	
• 8/18/03 NEI letter to Chairman Nils J. Diaz from Marvin S. Fertel: "... Actions performed in the control room or **at an auxiliary shutdown facility outside the control room are considered normal operator actions, not operator manual actions ...**"	

NEI 00-01 Appendix E (Manual Actions and Repairs)	SECY 03-0100
• There shall be **sufficient time to travel to each action location** and perform the action. • The action must be capable of being identified and performed in the time required to support the associated shutdown function(s) such that an unrecoverable condition does not occur.	• Analyses of the **postulated fire time line and the concurrent thermal-hydraulic conditions** of the plant should demonstrate that the operator manual actions can be accomplished before unrecoverable conditions occur.
• There shall be a **sufficient number of plant operators** to perform all of the required actions in the times required, **based on the minimum shift staffing.** • The use of operators to perform actions should not interfere with any collateral fire brigade or control room duties they may need to perform as a result of the fire.	• Staffing required to perform operator manual actions should be qualified and **demonstrated to be available,** considering concurrent demands on personnel that may be necessary to achieve and maintain safe shutdown during a fire.
• Personnel shall be trained and qualified, as appropriate, to perform the specified manual actions.	• A training program on the use of operator manual actions and associated procedures during a postulated fire should be **demonstrated to be in effect, current and adequate.**

NEI 00-01 Appendix E (Manual Actions and Repairs)	SECY 03-0100
• Manual actions should be verified and validated by plant walkdowns using the current procedure.	• Capability to accomplish operator manual actions should be verified and validated by plant walkdowns, **timed to assure accomplishment within required time frames** in support of the plant's safe shutdown analysis, using the appropriate procedures, including **documentation of the verification, validation and walkdown timing.**
• The action location shall be accessible. • Actions required in a fire area experiencing a fire, or that require travel through a fire area experiencing a fire, may be credited **if it is demonstrated that these actions are not required until the fire has been sufficiently extinguished, and any resulting fire damage is sufficiently limited**, to allow completion of necessary actions in the fire area.	• Accessibility of all locations where manual operations are performed should be assessed as accessible **without hazards to personnel, with controls needed to assure availability of any special equipment being demonstrated.**

NEI 00-01 Appendix E (Manual Actions and Repairs)	SECY 03-0100
• In specifying manual actions and the route through the plant for performing any manual actions, consideration should be given to the potential effects of temperature, humidity, radiation levels, smoke and toxic gases. • The action locations and the access and egress path for the actions shall be lit with 8-hr battery-backed emergency lighting, **except for paths to and from actions required at remote buildings if other lighting provisions are available.** • **Tasks that are not required until after eight hours do not require emergency lights as there is time to establish temporary lighting.**	• Environmental conditions encountered by operators while accessing and performing the manual action should be demonstrated to be consistent with established human factor considerations. • Radiation should not exceed normal 10 CFR Part 20 limits. • Emergency lighting should be provided as required in Appendix R, Section III.J, or by the licensee's approved fire protection program. • Temperature and humidity conditions should be reviewed to ensure that temperature and humidity do not affect the capability to perform the manual action. • Fire effects should be reviewed to ensure that smoke and toxic gases from the fire do not affect the capability to perform the manual action.
• There shall be indication, **not necessarily a direct reading instrument, and perhaps a system change**, that confirms that an action is necessary and that the action, once completed, has achieved its objective.	• Diagnostic instrumentation utilized in support of operator manual actions should be **demonstrated to be unaffected by the postulated fire and provide a means for the operator to detect whether a spurious operation has occurred.** • Instrumentation should also be available to verify that the manual action accomplished the intended objective.

NEI 00-01 Appendix E (Manual Actions and Repairs)	SECY 03-0100
• Any tools, equipment or keys for the action shall be available and accessible, including consideration of SCBA, personnel protective equipment, ladders or special equipment, if required.	• Any special tools required to support operator manual actions should be available at a **nearby location that has access unimpeded by a postulated fire, with controls needed to assure their dedicated availability being demonstrated.**
• There shall be provisions for communications to allow coordination of actions with the main control room or the remote shutdown facility, if required.	• Adequate communications capability should be **demonstrated** for operator manual actions that must be coordinated with other plant operations, with this communications capability **protected from the effects of a postulated fire.**
• Guidance, prescriptive or symptomatic, should be provided to alert the operator as to when manual actions may be required in response to potential fire damage. • Plant operators should be capable of performing manual actions without detailed instructions, although these should **be readily available if required.**	• Procedural guidance on the use of operator manual actions should be available, adequate and **contained in an emergency procedure,** with operators **not relying on having adequate time** to locate, review and implement seldom used plant procedures to find a method of operating plant equipment during a fire event.
• **Previous action locations should be considered when sequential actions are required.**	• Not explicitly addressed.

NEI 00-01 Appendix E (Manual Actions and Repairs)	SECY 03-0100
• Specific procedures are required for activities not addressed in existing operating procedures for operator actions and repairs as a result of fire-induced failures that cannot be readily diagnosed using fire-protected information to the operator.	• Repairs not explicitly addressed. However, in a 7/2/82 Memorandum to Richard H. Vollmer, Director, Division of Engineering, from Roger J. Mattson, Director, Division of Systems Integration, entitled "Position Statement on Allowable Repairs for Alternative Shutdown and on the Appendix R Requirement for Time Required to Achieve Cold Shutdown," the following interpretations related to allowable repairs were offered: • "... Operability of the hot shutdown systems ... must exist without repairs. Manual operation of valves, switches and circuit breakers is allowed to operate equipment and isolate systems and is not consider a repair. However, the removal of fuses for isolation is not permitted ...Modifications, e.g., wiring changes, are allowed to systems and/or components not used for hot shutdown, but whose fire- or fire-suppressant-induced maloperations may indirectly affect hot shutdown ... Repairs for cold shutdown systems are allowed ... For cold shutdown capability repairs, the removal of fuses for isolation and the replacement of cabling is permitted. Also, selected equipment replacement, e.g., such as replacing a valve, pump, control room controls and instrumentation, will be reviewed on a case-by-case basis ... Repairs not permitted include the use of clip leads in the control panels ..., and the use of jumper cables other than those fastened with terminal lugs ..."
• Procedures should be provided to the operator as to when to perform repairs in response to potential fire damage, providing the level of detail required to enable plant personnel to perform the task.	
• Repairs may only be used to achieve and maintain cold shutdown. • Credit for repair activities for post-fire safe shutdown may only be taken for equipment required to achieve and maintain cold shutdown.	
• Hot shutdown must be capable of being maintained for the time required to perform any necessary repairs to equipment or systems needed to transition to and/or maintain cold shutdown.	
• Additional non-operating personnel may be relied upon to perform repairs, provided their availability is consistent with plant emergency response procedures.	