1. PURPOSE

This chapter provides the minimum standards for performing *independent verification* (see def.) of the correct positioning of components that are critical to the safe operation of a process, system, or facility. Independent verification provides a high degree of reliability in ensuring correct facility operation and correct positioning of components such as valves, switches, and circuit breakers.

2. SCOPE

This chapter applies to *safety-related* (see def.) and non safety-related components where an inappropriate positioning of a component could lead to facility shutdowns, challenges to safety-related equipment, or other undesirable effects on facility safety and reliability. Not all components, systems, and conditions require independent verification because the possibility of mispositioning may be remote or the effect of a mispositioning may not be significant to safe operations. However, components that are critical to ensure safe and reliable operation should require independent verification.

3. RESPONSIBILITIES/PREREQUISITES

3.1 Responsibilities

Performer	Responsibilities
Cognizant Manager/ Supervisor	Ensure procedures, component lineup sheets, or work instruction documents for equipment or system verification are developed and implemented. Ensure operators are trained in the appropriate techniques for verifying the positions of applicable facility components. Approve forms used for independent verification.
Operations Personnel	Perform independent verification as required.

3.2 Prerequisites

None

4. INSTRUCTIONS

4.1 Components Requiring Independent Verification

NOTE: *Specific lists or procedures should be developed by applying an accepted safety analysis method and/or by utilizing expert opinion to identify applicability of independent verification.*

4.1.1 Cognizant manager or supervisor: Ensure that facility, operations, and building-specific lists or procedures (such as valve lineup and setup sheets) for systems and conditions requiring independent verification are developed and approved.

4.1.2 Consider components in systems that have safety-related functions for independent verification; however, some components might not need independent verification if the following criteria are met:

A. Mispositioning would not affect system performance.

For example, if an engineering analysis has shown that mispositioned vent or drain valves do not affect system performance, they might not require independent verification.

B. Mispositioning would be known immediately to an operator.

For example, resetting a steam-supply trip valve might not require independent verification if an annunciator alarm in the control room alerted operators to an improperly reset valve. However, such annunciator alarms should be independent from the valve position lights associated with main control board valve operation switches. Valve position lights alone should not warrant exemption from independent verification requirements because these lights might not alert operators to a mispositioned valve. Mispositionings have occurred when main control board indication was available.

C. Significant radiation or chemical hazard exposure would be received by the person performing the independent verification.

In this case, alternate means for independent verification that do not involve personnel exposure, such as observing process parameters, should be considered.

D. Variances from independent verification requirements in accordance with the above criteria shall be approved by the cognizant manager or supervisor.

4.1.3 Consider components in systems not related to safety for independent verification if, when mispositioned, they could lead to unplanned shutdowns, challenges to safety systems, personnel injury, or disturbance

of equipment or systems that may (through interfaces with safety-related systems) cause radioactive or toxic material release.

For example, component positions necessary to support the operation of important equipment should be independently verified to prevent unnecessary process shutdowns. Also, certain valve positions, such as liquid or gaseous radioactive waste systems, should be independently verified if mispositioning could lead to an unintended radioactive or toxic material release.

4.2 Occasions Requiring Independent Verification

4.2.1 Cognizant manager or supervisor: Ensure that independent verifications are performed on components when the equipment they serve must be available and when a reasonable possibility exists that the critical components might have been mispositioned.

4.2.2 Use the following guidelines to determine situations where independent verifications would be appropriate.

4.2.2.1 Independent verifications should be performed to ensure that systems are properly aligned or setup when equipment is returned to service following maintenance or testing.

A. After maintenance activities, it is appropriate to independently verify that the positions of components have been restored to the correct position following the removal of a Lockout and Tagout. Also, additional components that could have been mispositioned during maintenance should be selected for verification on a case-by-case basis by the individual authorizing equipment for return to service. For example, additional items requiring verification would include any component worked on and might also include instrument stop valves, bypass valves, switches, and isolation valves located within the work boundary.

B. Selected components should be independently verified during or after surveillance tests. Surveillance tests are normally performed in strict adherence to detailed procedures that specifically address each operating component. Components not addressed by the test procedure are not likely to be mispositioned as a result of tests, and independent verification would be necessary only for components that had been repositioned during tests.

4.2.2.2 Independent verification should be performed when equipment is removed from service to ensure that only serviced equipment is rendered inoperable. For example, when tagging out a pump, verification that the redundant pump was not inadvertently affected should be performed. This might be done by checking for correct alignment or setup of components on the redundant equipment or by verifying that all lockouts and tagouts were placed on the correct components.

4.2.2.3 Independent verification of system alignments or setups should be performed following outage or shutdown periods during which normal operating system status was not maintained or restored.

4.2.2.4 Routine, periodic verifications of critical components during operations should be performed to verify that associated equipment is fully functional. Because this check is independent from any other activity that might have caused a component to be mispositioned, it can be considered an independent verification; a second check normally would not be necessary. However, if a mispositioning were discovered while the periodic check was being performed, the component position would then be corrected after review and approval by the cognizant manager or supervisor. An independent verification of this action would be appropriate.

4.3 Verification Techniques

NOTE: *Training in independent verification should include on-the-job training on the requirements and facility-specific techniques and methods to be used.*

4.3.1 Cognizant manager or supervisor: Ensure that operations personnel are trained in the appropriate techniques for verifying the positions of all facility components.

4.3.2 Ensure that the individual performing an independent verification has completed the independent verification training and is authorized to operate the components involved.

4.3.3 Operations personnel: Use the following guidelines.

4.3.3.1 Use lineup sheets, setup sheets, or other documented format for performance of an independent verification.

4.3.3.2 Ensure that forms used for independent verification are approved by the cognizant manager or supervisor.

4.3.3.3 Bring any situations that are unclear on the verification forms to the cognizant manager or supervisor for resolution before proceeding with the verification.

4.3.3.4 Utilize the verification sheet as follows:

NOTE: *Independence means that the person performing the independent verification will not be influenced by the observation of, or involvement in, the performance of the operation to be verified. Independence shall be maintained by minimizing the interaction between the person performing the operation and the person performing the independent verification. Independence shall be achieved by physically separating the operation and the independent verification by time and distance.*

A. An authorized operator verifies that each component listed on the sheet is in the position or condition shown by initialing each step.

NOTE: *The independent verifier should not attempt to change component position or status to correct any inconsistencies*

B. The independent verifier independently verifies that each component listed on the sheet is in the position or condition shown.

C. The independent verifier initials each step on the sheet to signify that the components have been verified to be in the position or condition shown.

D. The first person, or performer, performs a physical and visual check to identify the correct component and then verify the position or reposition the component as required by the alignment or setup sheet.

NOTE: *For some independent verification activities, such as verifying the position of a throttled valve, separation of the performance of the operation (positioning) and the performance of the independent verification may not be possible. In these cases the verification should be performed as concurrent independent verification (see def.)*

E. Physical separation is maintained as appropriate to prevent interaction between individuals.

F. The second person, or independent verifier, independently performs a physical and visual check to identify the correct component and then verify the position of the component is as required by the alignment or setup sheet.

NOTE: *Different remote indicators should be used, if available, if local verification cannot be performed.*

4.3.3.5 Perform at least one verification locally at the component, if possible, and if not subject to excessive or potentially excessive hazardous conditions.

4.3.3.6 Verify remote position indication before deenergizing the control power or motor power, which may result in loss of remote indication.

NOTE: *Exercise care because of the possibility of erroneous indications such as alternate flow paths.*

4.3.3.7 Use process parameters as a second check of a component's position or condition only when specified by approved procedures.

4.3.3.8 Obtain prior cognizant manager or supervisor approval when independent verification requires surveillance testing.

4.3.3.9 Seek assistance from the cognizant manager or supervisor if unable to verify actual position of a component or if the component cannot be located after a reasonable time.

4.3.3.10 Seek assistance from the cognizant manager or supervisor whenever it is suspected that excessive exposure to hazardous conditions (for example, high temperature,

pressure, and toxic chemical releases) will result from an independent verification.

4.3.3.11 Identify and report any components with labels that are missing, worn, illegible, or otherwise not serviceable or that were incorrectly or inadequately labeled.

4.3.4 Use the following guidance when independently verifying valve positions:

A. Do not use relative height of a valve stem as the sole determinant of a valve's position.

B. Ensure that the verification technique used is appropriate to the valve type being verified.

C. Consult the vendor manual or the cognizant manager or supervisor if there is any doubt about the correct verification technique to be used.

4.3.4.1 Verify valves to be OPEN as follows (does not apply to throttled valves):

A. Manipulate the valve in the CLOSED direction only as much as necessary to remove any slack from the operating mechanism and verify valve stem movement.

B. Open the valve fully, subject to normal precautions on back-seating valves.

4.3.4.2 Verify valves to be CLOSED as follows:

CAUTION 1

Use of excessive force to close a valve could damage the valve seat.

CAUTION 2

Opening a valve that is being verified in the closed position could unintentionally release fluid or pressurize piping and other components.

A. Manipulate the valve in the CLOSED direction only as much as necessary to verify the valve is fully closed and not just binding or difficult to operate.

B. Contact the cognizant manager or supervisor if there is any doubt about the valve's actual position.

C. Check valve stem position and process parameters (for example, differential pressure or temperature across valve) when possible.

4.3.4.3 Verify valves or ventilation dampers to be THROTTLED as follows:

A. Throttled valves or ventilation dampers in plant systems that have accurate position indicators or scribe marks indicating desired position may be visually verified in the throttled position.

B. Verify locked throttle valves or dampers by ensuring the locking device is properly installed. If the valve or damper has a position indicator attached, also verify position by visually checking the valve or damper position indicator.

C. When the operation of a throttled valve is necessary to determine its position, the independent verifier may observe the initial valve operator's actions, as repositioning the valve for independent verification would effectively nullify the first actions.

4.3.4.4 Verify motor operated valves (MOVs) and air operated valves (AOVs) as follows:

CAUTION

Operability of a MOV that has been manually operated is not guaranteed. Manually positioning an MOV may result in failure of the valve to respond to a remote actuation signal (that is, possible over-torquing because of manual operation).

A. Report any MOV that has been manually operated to the cognizant manager or supervisor.

B. When verifying MOVs or AOVs, use all available means of valve position indication, for example:

1. When remote operating switches are used, verify that the switch is in the correct position

2. When remote indicating lights are used, verify that the lights reflect the correct position

3. When local valve position indicators are used, verify that the local indicator (on the valve or valve operator) indicates the correct position.

4.3.5 Verify circuit breakers by performing the following, as appropriate:

4.3.5.1 Verify the local operating selector switch is in the specified position (for example, local or remote).

4.3.5.2 If accessible, verify that breaker power fuses are installed with the correct rating.

4.3.5.3 Use local indicator lights, when provided, to verify that the breaker has power and is in the correct position.

4.3.5.4 If the breaker is racked in, use the charging spring indicator, when provided, to verify that the operating spring is charged.

4.3.5.5 Verify that the breaker is in the correct position and that the panel door is in good condition with all fasteners tight.

4.3.5.6 Verify that the breaker is locked in the proper position, if required, and status lights are appropriate for that position.

4.3.6 Cognizant manager or supervisor: Evaluate programmatic operations to ensure that environment, safety, and health considerations, and operating functions (such as training) are being conducted in accordance with established operational criteria.

5. RECORDS

None

6. DEFINITIONS

Concurrent Independent Verification. An independent verification technique used when it is not possible to maintain independence between the performer and the verifier. In these cases the performer and verifier independently verify the identity of the correct component, then the verifier observes the operation and concurs that the activity was performed correctly.

Dual Verification or Witnessing. A verification technique where two individuals share the responsibility for performing an operation or verifying a condition. The activity is performed while both individuals are present and both individuals are responsible for ensuring that the activity is performed correctly. Dual verification is not used in situations requiring independent verification.

Independent Verification. The act of checking a condition, such as a component position, separately from activities related to establishing the condition or the component's position. The positioner and verifier are separated by time and distance to maintain independence.

Safety-Related. This term refers to those systems and components that are relied upon during or following operations, transients, and accidents to ensure that the operations are maintained within the safety limits established by the facility's safety analysis documents or as required by other facility hazard analysis documents or codes.

7. REFERENCES

DOE Order 422.1, “Conduct of Operations”

8. APPENDICES

Appendix A, Procedure Basis

APPENDIX A

Procedure Basis

Step	Basis	Source	Citation
4.1, 4.3.6	Structures, systems, components, operations, and programs requiring independent verification	DOE Order 422.1	Attachment 2, Appendix A, 2.j.(1)
4.2	Situations requiring independent verification	DOE Order 422.1	Attachment 2, Appendix A, 2.j.(2)
4.3	Methods for performing and documenting independent verification	DOE Order 422.1	Attachment 2, Appendix A, 2.j.(3)
4.3.3.4.E Note	Situations, if any, allowing concurrent dual verification	DOE Order 422.1	Attachment 2, Appendix A, 2.j.(4)
4.3.3.4.E Note, 4.3.4.3.C	Methods for performing concurrent dual verification, if used	DOE Order 422.1	Attachment 2, Appendix A, 2.j.(5)