

Revision 2



**Procedure Professionals
Association**

**PPA AP-907-005
Procedure Writer's Manual**

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Approved By Bruce Mills, PPA Chairman

Notice

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REVISION SUMMARY

Revision 2 Non-DOE Changes:

- 2.0 Step 2: New statement dealing with consistent methods for emphasis shown in examples for technical procedures.
- 4.11 Step 2: Revised step for clarity.
- 4.12 Step 1.d: Revised step for clarity.
- Figure 11: Updated items in example.
- Figure 14: Added new Step 1 to show to whom the procedure applies.
- Figures 16, 19, 20: Revised examples to show current procedure standards.
- 4.13.2 Step 2: Added 'the last' and 'in the procedure body'.
- Figure 28: New example of a multiple NOTE; renumbered remaining figures.
- 4.15 Step 3: Clarified step by adding 'such that the most important is located closest to the step'.
- 4.20 Step 2: Added clarifying statement.
- 4.23 Step 6 bullets: Added 'Approximately'.
- 4.27.2 Step 2 bullets: Deleted 'Approximately equal to'.
- Figures 43, 44: Updated examples to current industry standards.
- Attachment 1: Added verb 'Verify' along with a description around use of Check, Ensure, and Verify by a facility.
- Attachment 1: Replaced verb 'Depress' with 'Press'.

Revision 2 Changes in Support of DOE Adoption/Alignment

- 3.0 step 13 - Added Source Requirement to definition as DOE equivalent term.
- 3.0 step 17 - Added definition for Continuous Action Step
- 3.0 step 29 - Added Source Requirement as defined term equivalent to Commitment.
- 4.13.8 step 3 - Added references to DOE Attachment for Tools and Equipment and to Placekeeping Section for examples of approvals by other groups.
- 4.13.9 step 1.c - New step defining Performance Section as equivalent to Instructions Section.
- 4.13.9 step 3 - Added additional detail on restoration steps
- 4.13.12 step 2 - Added flexibility on where the Summary of Alterations is placed.
- 4.31 - Added specific example of sign-off by someone other than the primary procedure performer.

Revision 1 - In 2010, the Procedure Professionals Association (PPA) assumed ownership and maintenance responsibilities for AP-907-001 (Procedure Process) and AP-907-005 (Procedure Writers' Manual). PPA is an industry working group for procedure related interests and is composed of subject matter experts from the U.S. commercial nuclear field, the U.S Department of Energy, and other similar business interests. PPA is an open forum for procedure related issues and accepts membership from a variety of business entities.

In November 2010, PPA formed a standards committee and commenced work on a revision to AP-907-001 and AP-907-005. These revisions were completed and published in August 2011.

Revision 0 - In June 2006, at the direction of the Nuclear Information Management Strategic Leadership (NIMSL) steering committee, an Institute of Nuclear Power Operations (INPO) Community of Practice (CoP), an industry task force was chartered to address the scope of a Procedure Writers' Manual through the development of an industry standard. This task force was composed of representatives from the NIMSL CoP and industry subject matter experts.

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1.0 PURPOSE

1. The purpose of this Procedure Writers' Manual is to provide a nuclear industry consensus standard for writing human factored procedures. This standard should be used in conjunction with PPA AP-907-001, Procedure Process Description, and INPO 11-003, Guideline for Excellence in Procedure and Work Instruction Use and Adherence.
2. This document should be considered for incorporation into facility specific procedures with a recognition of corporate and facility specific policies and requirements. Each facility is encouraged to assess its own procedure writing process and to adapt this information as appropriate to best meet its unique needs.

2.0 SCOPE

1. This document primarily applies to the writing of human factored technical procedures. However, the basic elements of this standard also apply to the writing of administrative procedures.
2. In this standard a consistent method for emphasis is applied to examples from technical procedures. This is not meant to imply that this is the only method that is acceptable, as bounded by other requirements for emphasis within this standard.
3. This document does not apply to Emergency Operating Procedures, Abnormal Operating Procedures, or Annunciator Response Procedures.

3.0 DEFINITIONS

1. **Abbreviation:** A shortened version of a word or phrase that represents the full form of the word.
2. **Acceptance Criteria:** Quantitative or qualitative criteria against which the success or failure of a testing activity will be judged.
3. **Acronym:** A shortened form derived from the initial letters of words that make up the complete form.
4. **Action Step:** An instruction written in active voice that directs the user to perform an action and contains an action verb and an object.
5. **Action Verb:** A verb that directs the action within a step to be taken by the performer.

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6. **Administrative Procedure:** A document that specifies requirements and actions necessary to implement a program or process (definition of Procedure provides additional details).
7. **Alteration:** A generic term used to describe types of activities that modify approved procedures.
8. **Attachment:** Information separated from the main body of the procedure used in the performance or understanding of a procedure such as graphs, figures, tables, sketches, and forms. Appendices and enclosures are equivalent terms.
9. **Bases:** The source of information for or the rationale behind procedure step(s) or sequence of steps.
10. **Branching:** A step that directs the user to other steps or sections in the same or another procedure and the user does not return to the original step.
11. **Caution:** A statement placed immediately before applicable step(s) that informs users of undesirable equipment results such as potential for equipment damage, plant transients, or conditions that may adversely affect plant operation.
12. **Checklist:** A procedural attachment listing specific actions to be performed. Check-off list and check list are equivalent terms.
13. **Commitment:** A uniquely identified requirement that ensures future alterations do not inadvertently remove the requirement. Source Requirement is the DOE equivalent term for Commitment.
14. **Concurrent Verification:** A series of actions by two individuals working together at the same time and place to separately confirm the condition of a component before, during, and after an action, when the consequences of an incorrect action would lead to immediate and possibly irreversible harm to the plant or personnel. [Section 5.0 Step 5]
15. **Conditional Step:** An action step based on plant condition or combination of conditions to be satisfied prior to the performance of an action.
16. **Consistency:** Showing steady conformity to character or method allowing users to move through documents without having to waste effort interpreting the style of presentation for each section they encounter. Comprehension is improved when users can concentrate on the actual performance of the instructions.
17. **Continuous Action Step:** Steps continuously performed during a specific task or time period. The performer continues with the procedure while these steps are being performed. Typically, continuous action steps begin with the words **'WHILE'** or **'IF AT ANY TIME'**.

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18. **Emphasis:** Special formatting applied to text to convey importance or prominence.
19. **Hold Point:** A pre-selected step in a procedure that identifies a point beyond which work may not proceed until the required action is performed.
20. **Independent Verification:** A series of actions by two individuals working independently to confirm the condition of a component after the original act that placed it in that condition (see INPO 06-002, Human Performance Tools for Workers).
21. **Level of Detail:** The technical detail necessary within a procedure step to successfully interface the individual user's knowledge to the technology being used or task being performed.
22. **May:** Denotes permission and is neither a requirement nor a recommendation.
23. **Note:** Statements that provide explanatory information to support a procedure step or series of steps.
24. **Placekeeping:** The process used to help users track performance of steps within a procedure by physically marking steps in a procedure that have been completed or are not applicable.
25. **Procedure:** A controlled document designed to improve human performance by clearly providing the purpose, specific intent, and sequenced direction for an activity, program, or process.
26. **Referencing:** A step that directs the user to other steps, sections, supplemental information within the same procedure or to another document and the user returns to the original step.
27. **Shall:** Denotes a requirement.
28. **Should:** Denotes a recommendation.
29. **Source Requirement:** See definition for 'Commitment'. Source Requirement is the DOE equivalent term for Commitment.
30. **Style:** Specific word selection and physical attributes (such as emphasis techniques, punctuation, capitalization) used in procedures.
31. **Supplemental Information:** Procedure content that supports a procedure step or series of steps and provides explanatory information.
32. **Technical Procedure:** A document that outlines a series of steps for the operation, maintenance, or testing of a structure, system, or component (definition of Procedure, provides additional details).

33. **Time Dependent Step:** A step to be completed within a specified time frame.
34. **Tolerance:** The permissible deviation from a specified value.
35. **Warning:** A statement placed immediately before applicable steps to warn users of potential for personnel injury, loss of life, or health hazards.

4.0 INSTRUCTIONS

4.1 General

1. This section of the writers' manual provides tools, techniques, and an overall style for procedure writing. Procedures written in this manner will enable newly qualified individuals to successfully perform a task in a consistent manner.
2. This section also defines the minimum human performance attributes for procedure format.

4.2 Procedure Designation

1. Number procedures in a unique, logical, and intuitive manner (see Figure 1, Sample Procedure Designation).

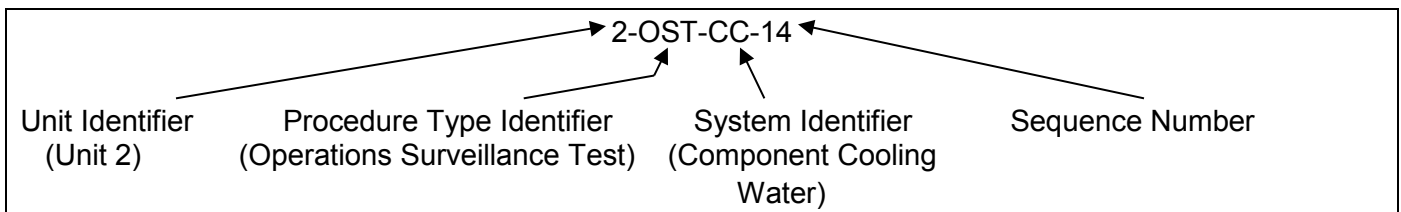


Figure 1, Sample Procedure Designation

2. The numbering convention may include site, unit, procedure type (e.g., operating procedure, maintenance procedure, surveillance procedure, administrative procedure), system designator, discipline, and, where applicable, a component identifier.
3. The procedure designation should enable the end-user to determine that the appropriate procedure has been obtained for the task to be performed.

4.3 Page Layout and Orientation

1. Use paper that meets the following requirements:
 - Size: 8.5 inches by 11 inches
 - Color: White
 - Default Orientation: Portrait

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2. Establish standard margins such that if the procedure is copied or hole-punched, information is not lost even if double-sided. The following margins are recommended:
 - Right: 0.8 inch
 - Left: 0.8 inch
 - Top: 0.5 inch
 - Bottom: 0.5 inch
3. Consider using page borders if there is a risk of losing information when the procedure is copied. Setting margins appropriately usually eliminates the need for page borders.
4. If the content will not fit within the margins established for a portrait page, then place it in a landscape page as an attachment.
5. If a nonstandard paper size must be used, then place the material in an attachment.

4.4 **Fonts**

1. Establish a standard font type and size for all procedures that is readable under the worst anticipated conditions. Ensure the type size is large enough for users to read the procedure at all anticipated distances and lighting conditions.
2. The following are acceptable font types and sizes for the procedure body and attachment steps:
 - Arial 11 or 12 point
 - Times New Roman 12 point
3. Only use one font type within the body of the procedure. However, supplemental information may use a different font type to improve procedure performance.

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4.5 **Page Headers and Footers**

1. Include on each page of the procedure, including all attachment pages, a page header that clearly identifies the following information (see Figure 2, Sample Header):
 - Procedure title
 - Procedure number
 - Revision number
 - Page number

20ST-CC-14	Component Cooling System Quarterly Flow Test	Revision 13 Page 23 of 36
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Figure 2, Sample Header

2. Page headers for technical procedures should have a means for identifying the unit to which it applies.
3. Page headers are not required for the cover page, provided the same information contained within the page header is presented on the cover page.
4. Page footers are optional and may be used for supplemental information (for example, record retention, attachment page control, and form numbers).

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4.6 Page Numbering

1. Include on each page of the procedure a consecutive page number and total page count formatted as Page X of Y (see Figure 3, Sample Page Numbering).

OP-4 Unit 1	Shutdown Cooling	Revision 10 Page 14 of 16
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Figure 3, Sample Page Numbering

2. Maintain the page numbering sequence and a separate internal appendix or attachment page number (see Figure 4, Sample Attachment Page Numbering).

OP-4 Unit 1	Shutdown Cooling	Revision 10 Page 15 of 16
Attachment 1. Data Sheet Page 1 of 2		

Figure 4, Sample Attachment Page Numbering

3. Page numbers are not required for the cover page. However, the cover page should be included in the total page count.

4.7 Line Spacing and Justification

1. Consider using single line spacing. Avoid tightening text by reducing line spacing size.
2. Separate steps by at least one line of white space (for example, a setting of 12 pt after in MS Word) as it improves the readability of a procedure. Adjustments to white space may be used to provide visual anchors.
3. Left justify all section and step text.

4.8 Page Breaks and Section Breaks

1. Adjust the placement of sentences and steps such that they are maintained unbroken and on the same page.
2. When possible, then keep associated information or action substeps and lists together on the same page.
3. Use continuation headings when the content of a step or substep continues onto another page. If the numbering scheme used is clear, the continuation heading may not be necessary.

4. Format continuation headings to include the sequential parent section or step number followed by (continued) (see Figure 5, Sample Continuation Header).

6.4.1 (continued)	
c.	RECORD M&TE information on Attachment 1, Tracking Form. _____
d.	RECORD Stopwatch ID Number on Attachment 2, Instrument Datasheet. _____

Figure 5, Sample Continuation Header

4.9 Step Numbering Scheme

1. Provide a consistent step numbering scheme for all procedures. This numbering scheme should be readable and intuitive.
2. Step numbering schemes should be automatically generated and systematically maintained by the procedure template or authoring program.
3. Step numbering schemes should differentiate between steps and substeps of the procedure by providing identifiable differences from one level or step level to the next (see Figure 6, Sample Numbering Scheme and Figure 7, Sample Numbering Scheme with Procedure Text).

1.0	<u>TITLE</u>	(Section)
1.1	<u>Subtitle</u>	(Subsection Level 1 or step)
1.1.1	Subtitle	(Subsection Level 2 or step)
1.	Step text	(Step Level 1)
a.	Step text	(Step Level 2)
(1)	Step text	(Step Level 3)
(a)	Step text	(Step Level 4)

Figure 6, Sample Numbering Scheme

<p>6.0 INSTRUCTIONS</p> <p>6.1 Emergency Diesel Generator 1A</p> <p>1. CHECK standby lineup as follows:</p> <p>a. PERFORM visual inspection of piping fittings and components for leakage or signs of deterioration on the following systems:</p> <ul style="list-style-type: none"> • Engine Coolant _____ • Fuel Oil _____ • Lube Oil _____ • Starting Air _____ <p>b. CHECK the following:</p> <p>(1) LO CLR LUBE OIL OUTLET TEMP, 0-TI-8235A, is greater than 85°F. _____</p> <p>(2) Lube Oil Circulating Pump is operating with NO apparent problems. _____</p>

Figure 7, Sample Numbering Scheme with Procedure Text

4. Use the same numbering scheme and visual layout for steps and narrative paragraphs.
 - a. Do not use un-numbered paragraphs except for supplemental information in attachments.
 - b. Bulleted steps are not considered to be un-numbered paragraphs.
5. Limit numbered steps to four levels of detail. If the task will exceed four numbered step levels, then consider rewriting the task. Sections and sub-sections are not included in the four levels of detail.
6. Ensure the numbering scheme indentation maintains a five word minimum at the lowest level to avoid challenging the right margin restrictions and provide for an adequate instruction at the lowest step level.

4.10 Step Structure

1. Recognize that alphanumeric steps should be performed in the order written unless otherwise stated (see Figure 8, Sample Alphanumeric Steps).

1.	PERFORM this step first.	_____
2.	PERFORM this step second:	
	a. PERFORM this substep first.	_____
	b. PERFORM this substep second.	_____

Figure 8, Sample Alphanumeric Steps

2. Recognize that bulleted steps within a single alphanumeric step may be performed in any order and shall be completed prior to proceeding to next alphanumeric step (see Figure 9, Sample Bulleted Steps).

1.	PERFORM this step first.	_____
2.	PERFORM this step second:	
	• PERFORM this substep first, second, or third.	_____
	• PERFORM this substep first, second or third.	_____
	• PERFORM this substep first, second or third.	_____

Figure 9, Sample Bulleted Steps

3. A note may be placed prior to a sequence of steps or a step with substeps (presented using alphanumeric characters) to provide special performance information such as the following:
 - Allow the sequence to be performed in a different order
 - Allow the concurrent performance of steps

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4.11 Cover Page

1. Include the following elements on the cover page (first page) of the procedure to provide the user a means to check that the procedure is appropriate for the task at hand:
 - Procedure title
 - Procedure number
 - Revision number
 - Level of use
2. The following additional information may be included (list is not all inclusive):
 - Safety or quality classification
 - Reactivity statement
 - Effective date
 - Approver name
 - Preparer name
 - Station identification

3. Figure 10, Sample Cover Page provides an example cover page.

<p style="text-align: center;">North American Nuclear Plant</p> <p style="text-align: center;">Unit 0</p> <p style="text-align: center;">Mechanical Corrective Instruction</p> <p style="text-align: center;">MCI-0-068-SEL001</p> <p style="text-align: center;">Reactor Water Recirculation Pump Seal Replacement</p> <p style="text-align: center;">Revision 4</p> <p style="text-align: center;">Quality Related</p> <p style="text-align: center;">Level of Use: Reference Use</p> <p style="text-align: center;">Effective Date: 03-27-10</p> <p style="text-align: center;">Responsible Organization: Mechanical Maintenance</p> <p style="text-align: center;">Prepared By: Jane Doe</p> <p style="text-align: center;">Approved By: John Smith</p>

Figure 10, Sample Cover Page

4.12 Table of Contents

1. Include a table of contents that provides an overview of the procedure structure.
 - a. The table of contents should be automatically generated and systematically maintained by the procedure template or authoring program.
 - b. Include the table of contents before the procedure instructions.
 - c. Label the beginning of the table of contents by centering Table of Contents at the beginning and mark subsequent pages with the title followed by (continued).
 - d. List all major section headings and attachments with page numbers.
 - e. An example of a Table of Contents is shown in Figure 11, Sample Table of Contents.

OI-29 Unit 1	SALTWATER SYSTEM	Revision 59 Page 2 of 54
Table of Contents		
1.0	PURPOSE.....	7
2.0	SCOPE.....	7
3.0	REFERENCES AND COMMITMENTS.....	7
4.0	PRECAUTIONS AND LIMITATIONS	7
5.0	PREREQUISITES.....	9
6.0	INSTRUCTIONS.....	13
6.1	Returning 11A SRW HX to Service.....	13
6.2	Returning 11B SRW HX to Service.....	23
<u>ATTACHMENTS</u>		
7.1	Saltwater System Chemistry.....	44

Figure 11, Sample Table of Contents

4.13 Procedure Structure and Sections

4.13.1 General Requirements

1. Use a standard procedure structure that is consistently maintained for all procedure types.
2. The following Table 1 designates the required (R) and optional (O) sections for each procedure type and lists these sections in the recommended order:

Procedure Section	Procedure Type			
	Testing	Maintenance	Operating	Admin
Purpose	R	R	R	R
Scope	R	R	R	R
References and Commitments	R	R	R	R
Definitions	O	O	O	O
Responsibilities	O	O	O	O
Precautions and Limitations	R	R	R	NA
Prerequisites	R	R	R	NA
Instructions	R	R	R	R
Acceptance Criteria	R	O	NA	NA
Retention of Records	O	O	O	O
Summary of Alterations	O	O	O	O
Attachments	O	O	O	O
Table legend: R - Required O - Optional NA - Not Applicable				

Table 1, Procedure Structure

3. Do not omit required sections. Use None or NA when no information is needed for a required section.
4. Some sections may be combined; however, address the intent of each section.

4.13.2 Purpose

1. Place the Purpose section as the first section of the procedure. This section is mandatory, but it may be combined with the Scope section.
2. If writing the Purpose section in an administrative procedure, then clearly and briefly state the primary objective of the procedure (see Figure 12, Sample Administrative Procedure Purpose Statement).

<p>1.0 <u>PURPOSE</u></p> <p>1. This procedure:</p> <ul style="list-style-type: none"> • Establishes administrative controls governing adherence to written instructions in support of excellent human performance. • Identifies actions to be taken when adherence to written instructions is not possible or is unsafe. • Describes requirements for checking activities affecting alignment or status of safety related systems or components or portions of systems.
--

Figure 12, Sample Administrative Procedure Purpose Statement

3. If writing the Purpose section in a technical procedure, then clearly describe the objectives to be achieved by performance of the procedure (see Figure 13, Sample Technical Procedure Purpose Statement).

<p>1.0 <u>PURPOSE</u></p> <p>1. This procedure describes the disassembly, inspection, rework, and reassembly of the auxiliary feedwater pump turbines in support of 18 month turbine preventative maintenance routines.</p>
--

Figure 13, Sample Technical Procedure Purpose Statement

4. Clearly state the primary objective of the procedure without simply repeating the title of the procedure. This is accomplished by answering what, when, and why as appropriate.

4.13.3 Scope

1. Place the Scope section as second section of the procedure. This section is mandatory, but it may be combined with the Purpose section.
2. For administrative procedures, use the Scope section to describe to whom the procedure applies and what the procedure covers (the extent of its boundaries). See Figure 14, Sample Administrative Procedure Scope Statement.

2.0	<u>SCOPE</u>
<ol style="list-style-type: none"> 1. This procedure applies to all employees and all supplemental personnel supporting plant operations. 2. This procedure applies to emergent plant issues that potentially challenge plant safety, regulatory compliance, or continued full power operation. 3. This procedure does not apply to activities previously evaluated during the normal development process for the plant work schedule. 	

Figure 14, Sample Administrative Procedure Scope Statement

3. For technical procedures, use the Scope section to describe the activities covered by the procedure and, if necessary, to address the limitations or boundaries of the procedure (see Figure 15, Sample Technical Procedure Scope Statement). Include the following types of items in this section:
 - The extent to which any technical requirements are fulfilled.
 - Any exceptions or specific boundaries in the applicability of the procedure, including personnel and types of equipment.

2.0	<u>SCOPE</u>
<ol style="list-style-type: none"> 1. This procedure verifies the opening capability of check valves in the Emergency Core Cooling System (ECCS) identified on attachments 1 and 2, thus demonstrating their operational readiness as required by AP-ZZ-003, Pump and Valve In-service Testing Program. 	

Figure 15, Sample Technical Procedure Scope Statement

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4.13.4 References and Commitments

1. Place the References and Commitments section before or after the Instructions section; however, it should be consistent for all procedure types.
2. The References and Commitments section shall identify the documents used in the development of the procedure or required for procedure performance. For example:
 - Regulatory documents
 - Operating experience (internal and external)

4.13.5 Definitions

1. Place the Definitions section before or after the Instructions section; however, the section placement should be consistent for all procedure types.
2. List definitions in alphabetical order. Numbering definitions is optional.
3. Ensure definitions are consistent with those provided in other procedures.
4. Avoid duplication if terms are defined in a referenced, available document.
5. Definitions should be used to define the following items:
 - Terms or phrases which have a special or limited meaning when applied to the context of the procedure.
 - Terms or phrases used in the procedure that are unique to the procedure.
6. Do not provide direction in definitions.
7. Avoid defining terms that are self-explanatory.
8. Avoid using the word being defined in the definition.

4.13.6 Responsibilities

1. Place the Responsibilities section prior to the Instructions section and following the Purpose and Scope sections.
2. The Responsibilities section shall describe the individuals and organizations that have responsibilities for implementing the procedure. This section should be a high-level summary rather than a definitive list and should not repeat procedural requirements (see Figure 16, Sample Responsibilities Section).

<p>3.0 <u>RESPONSIBILITIES</u></p> <p>3.1 <u>Duty Department Manager</u></p> <ol style="list-style-type: none">1. Provides the personnel necessary to support evaluation and resolution of emergent issues. For example:<ul style="list-style-type: none">• Completing an Engineering Work Request• Performing simulator scenarios as necessary to evaluate emergent issues
--

Figure 16, Sample Responsibilities Section

4.13.7 Precautions and Limitations

1. Place the Precautions and Limitations section prior to the Instructions section and following the Purpose and Scope sections. This section may be split into a separate Precautions section and a separate Limitations section.
2. Do not provide direction in this section.
3. Include precautions to alert the procedure user to those measures that protect equipment, personnel, and the general public from abnormal or emergency situations (see Figure 17, Sample Precautions).
 - a. Precautions apply generically to the entire document.
 - b. Do not repeat caution statements in this section that are listed immediately preceding the step to which they apply.

<p>3.0 <u>PRECAUTIONS</u></p> <ol style="list-style-type: none">1. Charged circuit breaker springs can lead to a pinch hazard.

Figure 17, Sample Precautions

4. Include limitations to the performance of Instructions section steps or sections.
 - a. Limitation statements describe regulatory or site administrative limits that the procedure is bound by.
 - b. If limitations are required, then provide specific limits on parameters being controlled and the appropriate corrective measures to return the parameters to the normal control band (see Figure 18, Sample Limitations).

4.0 LIMITATIONS

1. Maximum differential temperature between cylinders is 200°F with D/G loaded greater than 1000 KW.
2. Maximum turbocharger speed is 15,000 rpm.

Figure 18, Sample Limitations

5. Be aware of the following when evaluating precautions and limitations:
 - Radiation or contamination
 - High temperature or high pressure fluids
 - Dangerous chemical or hazardous materials
 - Electrical shock
 - High noise levels
 - Confined space hazards
 - Moving equipment
 - Fire hazards

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4.13.8 Prerequisites

1. Place the Prerequisites section immediately before the Instructions section.
2. Prerequisites shall identify the activities to be completed by the performer and requirements that shall be met prior to procedure performance (see Figure 19, Sample Prerequisites).

<p>5.0 <u>PREREQUISITES</u></p> <ol style="list-style-type: none"> 1. Ensure Instrument Air System is aligned per OP-0101, Instrument Air.
--

Figure 19, Sample Prerequisites

3. The following are examples of prerequisites:
 - Initial conditions
 - Preliminary actions
 - Special tools, Measuring and Test Equipment, parts, and supplies
 - Field preparations
 - Approvals and notifications - See Section 4.17, Signoffs and Placekeeping for examples of approval and notification steps.
 - Prejob briefs

4.13.9 Instructions

1. Place the Instructions section after the Purpose, Scope, Prerequisites, and Precautions and Limitations sections. This section is mandatory.
 - a. In an administrative procedure, the Instructions section contains the program and process steps.
 - b. In a technical procedure, the Instructions section contains the task performance and restoration steps.
 - c. In DOE procedures, the section title 'Performance' is an equivalent term for 'Instructions'.

2. General rules for writing instructional steps are:
 - a. Write the instructional steps in a logical order in which they will be performed.
 - b. Divide the tasks into manageable groups of subordinate sections and related actions.
 - c. Use headings reflective of the sectionalized tasks.
 - d. Include any provision necessary to facilitate recording data, signoffs, placekeeping marks, and remarks (as applicable).
 - e. Include step by step instructions for performing required tasks and subtasks (see Figure 20, Sample Technical Procedure Instructions Section Steps).

4.	REMOVE X Relay Trip Lever Window.	_____
5.	MEASURE and RECORD as-found thickness of the lower section of X Relay Trip Lever Window. As-found thickness:	_____
6.	<u>IF</u> as-found thickness is less than 0.180 inches, <u>THEN REPLACE</u> X Relay Lever per 0-MNT-005, Relay Replacement.	_____

Figure 20, Sample Technical Procedure Instructions Section Steps

3. When writing restoration steps, include the following:
 - Steps required to return the affected structures, systems, or equipment to the configuration appropriate for plant conditions (see Figure 21, Sample Restoration Steps)
 - Return of tools and equipment
 - Disposal or storage of consumables
 - Notification of appropriate personnel of system return to service

6.7	<u>Restoration</u>	
1.	NOTIFY SM overspeed trip maintenance was performed and trip valve was left tripped.	
	_____	_____
	Maintenance Signature	Date
2.	SIGN OFF equipment clearance.	
	_____	_____
	Maintenance Signature	Date

Figure 21, Sample Restoration Steps

4.13.10 Acceptance Criteria

1. The Acceptance Criteria section should follow the Instructions section.
2. The Acceptance Criteria section shall provide a basis for determining the success or failure of an activity. It is the parameter against which collected data is compared to determine satisfactory completion of or adherence to the following:
 - Equipment operability conditions
 - Conditions for functionality
 - Technical Specifications
 - Regulatory requirements
 - Design bases criteria
 - Post maintenance testing

4.13.11 Retention of Records

1. Place the Retention of Records section after the Instructions section.
2. This section shall clearly identify only those records generated as a result of the performance of the procedure.

4.13.12 Summary of Alterations

1. The Summary of Alterations section is optional for all procedure types.
2. The Summary of Alterations section may either appear after the cover page or as the last numbered section in the procedure body before the Attachments.
3. Provide a clear and simple means of identifying the alterations (additions, corrections, or deletions) to the procedure. Revision bars and the summary of alterations remain until the next procedure revision. Common methods include the following:
 - a. Revision Bars:
 - (1) Use revision bars unless the extent of the alteration (major revision) diminishes their benefit (see Figure 22, Alteration with Revision Bars).

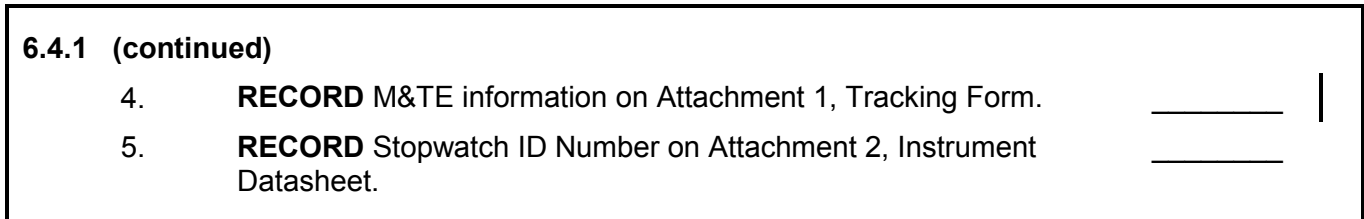


Figure 22, Alteration with Revision Bars

- (2) If the alteration is significant and revision bars are not used, then state it in the summary of alterations.
- (3) Revision bars are not recommended for the cover page, table of contents, headers, footers, or renumbering due to additions or deletions.

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b. Summary of Alterations:

- (1) The Summary of Alterations provides a description of alterations for the current revision (see Figure 23, Summary of Alterations). A summary shall be provided, but is not required to be a procedure section. Instead, it may be provided as part of the procedure alteration package.

Rev. No.	Change Description
34	In attachments 3 and 4, added tagging 4160 V breaker for personnel protection.

Figure 23, Summary of Alterations

- (2) Include a description of material being deleted that is adequate for reviewers without reference to the previous revision.
- (3) If any step numbers are referenced within the Summary of Alterations, they should be the step numbers of the revision being issued and not the step numbers of the previous revision.

4.13.13 Attachments

1. The Attachments section is optional but it should always be the last section in the procedure.
2. Each attachment shall be:
 - Uniquely identified by title and attachment identifier
 - Ordered with a sequential identifier
 - Displayed using the unique attachment page number and total attachment page count
 - Referenced within the body of the procedure
3. Continue the parent procedure header throughout all attachments.

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4. The following are examples of material that may be included in an attachment:

- Illustrations
- Forms
- Enclosures
- Checklists
- Tables
- Data packages
- Supplemental information

4.14 Supplemental Information

1. For human performance reasons, supplemental information such as illustrations, graphs, forms, tables, and flow charts should be placed within the procedure body.
2. If supplemental information is less than a full page, then integrate it into the procedure immediately following the step or substep to which it applies.
3. If supplemental information is too large or difficult to embed into the procedure, then include it as an appropriate supplement (e.g., attachment or appendix) to the procedure.
4. Each supplement should be uniquely identified and consecutively numbered.
5. If used in multiple procedures, then ensure the supplement is consistent among the procedures.
6. Ensure the relationship between the parent step and the supplemental information is immediately apparent.
7. If the supplemental information is a table, then (see Figure 24, Sample Table):
 - a. Ensure the relationship of the entries is immediately apparent by choosing an appropriate title and column headings.
 - b. Use table notes only as necessary to amplify cell information.
 - c. Avoid including critical information or instructions in table notes.
 - d. Use asterisks, letters, or other non-numerical system for designating table notes to avoid confusion with exponents.

- e. Place table notes at the end of the table.
- f. Ensure the table remains within the page margins.
- g. Consider using an exposed grid structure. Vertical lines within the table may be eliminated if there is sufficient spacing.
- h. Use shading or N/A to indicate cells that require no entries.
- i. Provide adequate space for entering values and data.
- j. Include units of measure in headings where applicable.
- k. Carry over the column titles if a table continues onto an additional page.

Minute Interval	Temperature (°F)	Speed (rpm)	Discharge Pressure (psig)
1	100.01	1800	645
2 *	NA	NA	NA
3	102.78	1800	645
4 **	102.78	NA	645

Table 1. Bearing Temperature Stability

* No data required at 2 minutes

** Speed data not required

Figure 24, Sample Table

8. If the supplemental information is a flow chart, then:
 - a. Use consistent flow chart methods and symbols.
 - b. Ensure the flowchart and procedure body are in agreement.
 - c. Consider that flow charts should not contain as much detail as the actual procedure process.
9. If the supplemental information is a graph, then (see Figure 25, Sample Graph):
 - a. Provide sufficient space for notations and values.
 - b. Present layout information in readily readable format.
 - c. Label axes appropriately.

- d. Provide legends and labels so that the user can correctly interpret the representation.
- e. Maintain the aspect ratio for graphs that are scale-dependent.
- f. Consider that the size of a scale-dependent graph may be affected when displayed or printed.
- g. Graphs should be constructed with the following attributes (see Figure 25):
 - Values can be read in the normal reading position
 - Interpolation is limited to half a division
 - Scientific notation is used only when necessary for user readability

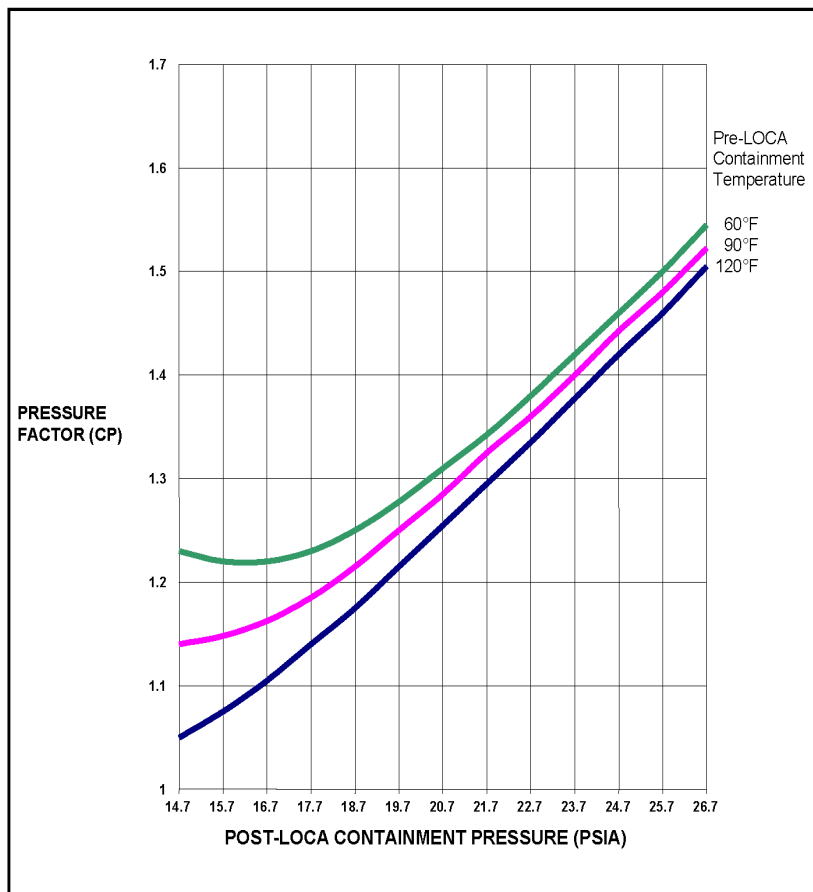


Figure 25, Sample Graph

- If the supplemental information is a figure, then ensure that it is legible, easily understandable, and within the page margins (see Figure 26, Sample Flow Diagram and Figure 27, Sample Component Isometric Diagram).

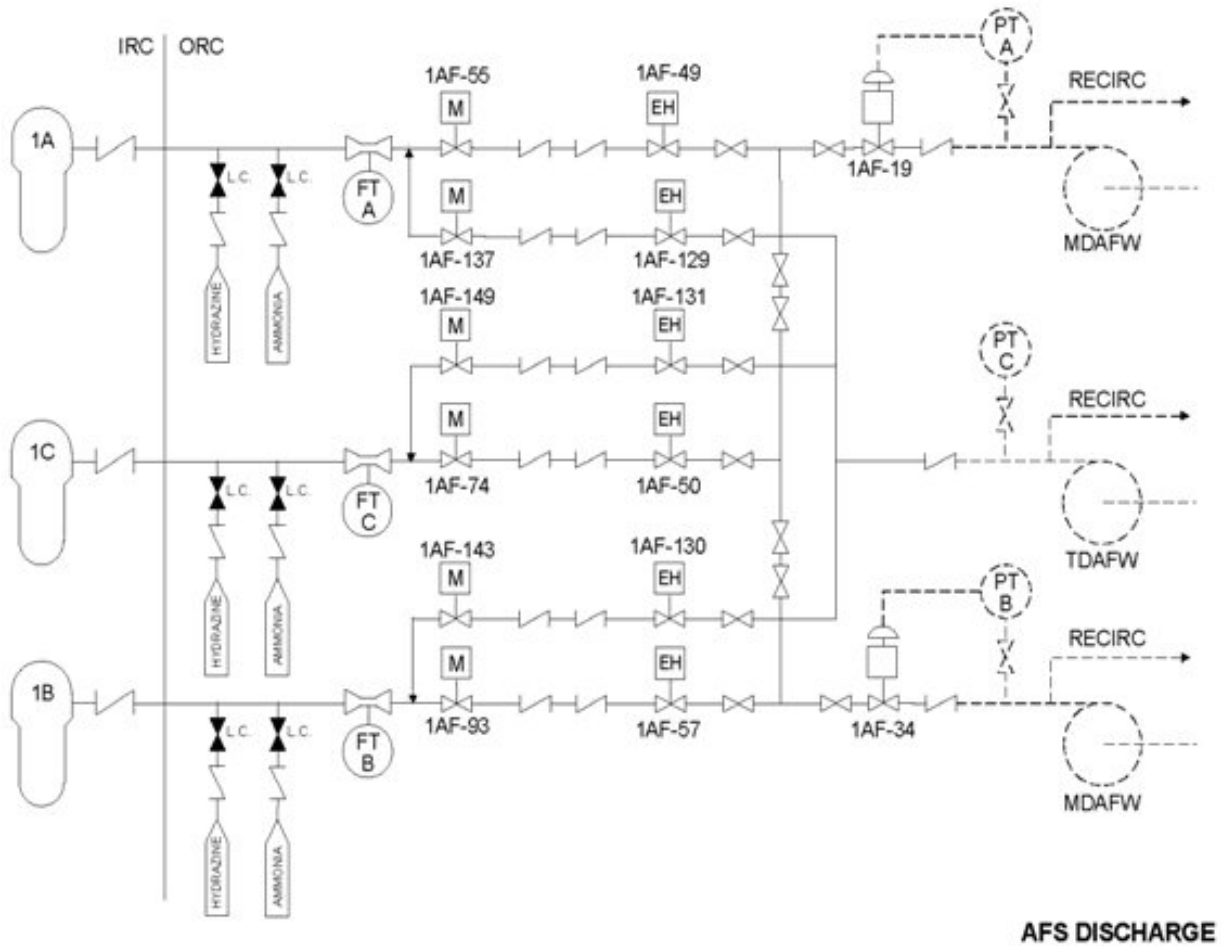


Figure 26, Sample Flow Diagram

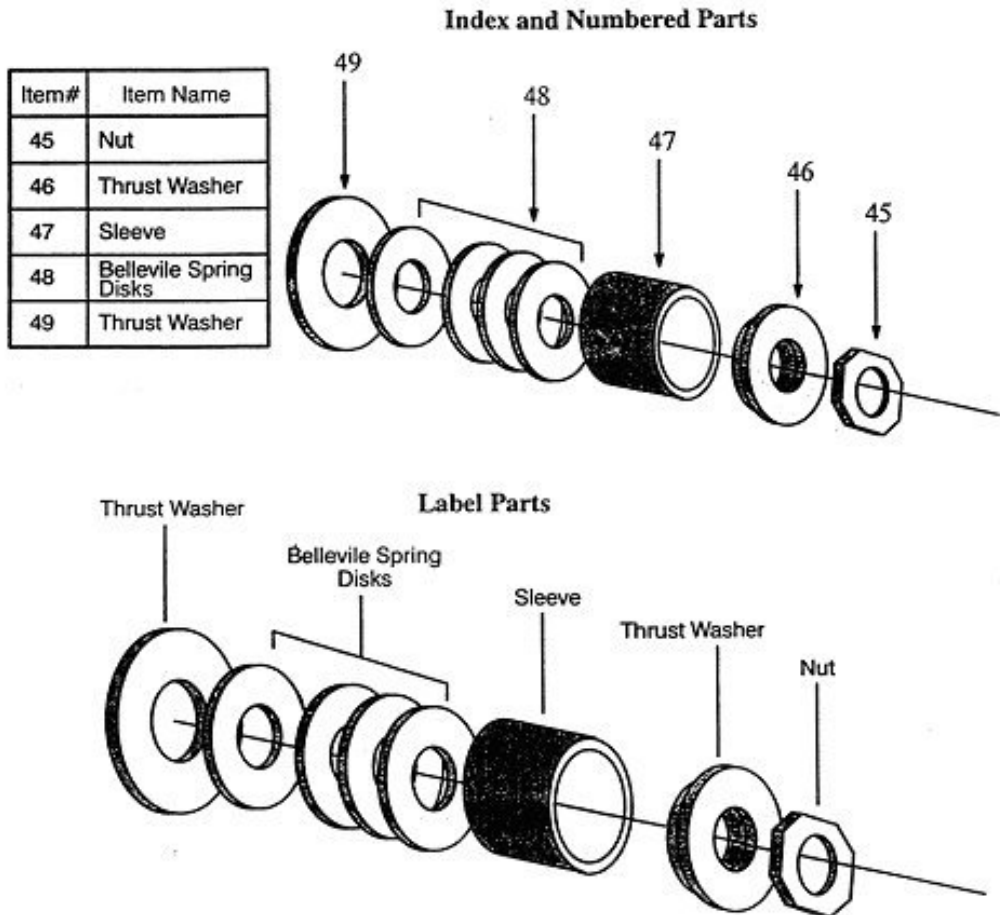


Figure 27, Sample Component Isometric Diagram

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4.15 Notes, Cautions and Warnings

1. Notes, Cautions and Warnings should be placed within uniquely formatted boxes that are different from each other and the procedure text. See Figure 28, Sample Notes, Cautions, and Warnings for formatting examples.
2. Notes, Cautions, and Warnings assigned to a single step should be sequenced in the following order (see Figure 28, Sample Notes, Cautions, and Warnings). This places the most important information closest to the step.
 - Note
 - Caution
 - Warning

NOTE
Steps in Section 6.1 may be performed in any order.

CAUTION
Starting a Reactor Coolant Pump with either Pressurizer Spray Valve open will increase spray flow and affect Reactor Coolant System pressure.

WARNING
Electric shock hazard exists as the circuit may be energized.

Figure 28, Sample Notes, Cautions, and Warnings

3. Multiple Notes that apply to the same step or section should be numbered or bulleted within the same box. The same recommendation applies to Cautions and Warnings (see Figure 29, Sample Note).

NOTE
<ul style="list-style-type: none"> • The PRT to Vent Header path isolates at 10 psig. • PRT rupture disc pressure is 100 psig.

Figure 29, Sample Note

4. Place Cautions and Warnings generic to the entire procedure in the Precautions and Limitations section.

5. Notes, Cautions and Warnings should:
 - Be written such that, if removed from the procedure, the procedure performance would not be affected
 - Be contained on one page and not expand onto two pages
 - Appear on the same page as the impacted step
 - Not contain an implied instruction or action step
 - Be written in a passive voice
 - Be written as short and concise statements
 - Be placed prior to steps to which they apply
 - Be worded the same when appearing in multiple places in a procedure or in multiple procedures
6. Notes may be used for the following (not an inclusive list):
 - Provide supplemental information
 - Provide descriptive or explanatory facts
 - Coordinate responsibilities
 - Denote time dependent steps
 - Denote concurrent steps
 - Denote component locations
7. Cautions may be used for the following (not an inclusive list):
 - Attract attention to information that is essential to prevent damage to equipment
 - Identify the specific nature and location of a hazard
 - State the cause of the condition(s) and the effect of the condition(s)
 - Identify critical time constraints

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8. Warnings may be used for the following (not an inclusive list):
 - Attract attention to information essential to avoid loss of life, personal injury, and health hazards
 - Identify the specific nature and location of a hazard
 - State the effect of the condition and the cause of the condition
 - Identify critical time constraints

4.16 Conditional Steps

1. Use conditional (action) steps when a decision is based upon the occurrences of a condition or combination of conditions to be satisfied prior to the performance of an action.

2. If describing a condition in an action step, then use the following conditional terms as defined in Table 2:
 - **IF**
 - **WHEN**
 - **THEN**

3. If describing logic within a condition, then use the following logic terms as defined in Table 2:
 - **AND**
 - **OR**
 - **NOT**

4. If describing a continuous action step, then use the following continuous action terms as defined in Table 2.
 - **IF AT ANY TIME**
 - **WHILE**

<u>IF</u>	Introduce a condition that may or may not be true. User stops until met or NA.
<u>IF AT ANY TIME</u>	Introduces a condition that may occur. User continues and takes action when met.
<u>THEN</u>	Use between the condition and the action. Do not use between actions.
<u>WHEN</u>	Introduce conditions that are expected to occur.
<u>IF NOT</u>	For a performer to respond to the second of two possible conditions. Avoid double negatives.
<u>AND</u>	Use between two required conditions when both conditions must be met (see Figure 31, Sample Logic Term Usage).
<u>OR</u>	Use between alternative combinations of conditions (inclusive). Inclusive OR means that any one or all conditions may be present. OR Use between alternative actions that are equally acceptable (exclusive). Use of the exclusive OR requires the phrase BUT NOT BOTH.
<u>WHILE</u>	Introduces a condition that may occur. User continues and takes action when met.

Table 2, Conditional and Logic Terms

5. Use consistent emphasis for conditional and logic terms throughout a procedure set (see Section 4.20, Emphasis Techniques).

6. Consider using additional white space to add emphasis to conditional statements by placing the condition and action on separate lines as shown in Figure 30, Sample Logic Term Emphasis.

1.	<u>IF</u> As Found values are acceptable, <u>THEN</u> PERFORM the following:	
	a. COMPLETE As Left columns.	_____
	b. GO TO step 7.2.8.	_____

Figure 30, Sample Logic Term Emphasis

7. Do not use the **AND/OR** construction in the logic statement of a action step.
8. If three or more conditions are described, then consider using a decision table or listing format.
9. For a negative condition, use the conditional term **NOT**. Avoid using **NOT** if a single word can be used and the condition can be stated in a positive manner (see Figure 31, Sample Logic Term Usage).

2.	<u>IF</u> RCP oil lift pump is running <u>AND</u> RCP shaft has been hand rotated, <u>THEN STOP</u> RCP oil lift pump.	_____
Incorrect:		
1.	<u>IF</u> CWS-V-335-1 (Bypass isolation valve) is <u>NOT CLOSED</u> , <u>THEN CLOSE</u> CWS-V-335-1.	_____
Correct:		
1.	<u>IF</u> CWS-V-335-1 (Bypass isolation valve) is OPEN , <u>THEN CLOSE</u> CWS-V-335-1.	_____

Figure 31, Sample Logic Term Usage

4.17 Signoffs and Placekeeping

1. White space should be reserved at the left or right margin for any signoffs and placekeeping. All examples in this document use white space in the right margin for signoffs and placekeeping.
2. Provide initial lines for traceability in procedure steps that require verification of performance or conditions (see Figure 32, Sample Initial Lines for Concurrent Verification).

2.	LIFT lead from 2-RLY-10 terminals 2 and 3.	_____	_____
		Initials	CV
2.	LIFT lead from 2-RLY-10 terminals 2 and 3.		_____
			Initials

			CV

Figure 32, Sample Initial Lines for Concurrent Verification

- a. Explicitly identify the type of verification next to the initial line.
 - b. Provide an adequate number of initial lines so each person has their own line.
 - c. If initials are in the right margin, then align the spaces or lines to the last line of the step.
3. Initial lines, check boxes, or signature lines may also be used for placekeeping as shown in Figure 33, Sample Placekeeping.

7.	CHECK HC-204-1, Letdown Flow Interlock, is in AUTO.	□
7.	PLACE HC-204-1, Letdown Flow Interlock, in AUTO.	_____
7.	PLACE HC-204-1, Letdown Flow Interlock, in AUTO.	_____
		CRS

Figure 33, Sample Placekeeping

4. If writing steps containing the term REPEAT, then consider the following:
 - a. Provide adequate space for placekeeping or data collection for each evolution. See Figure 34, Sample Repetitive Placekeeping for an example.

	1	2	3
1. APPLY input equal to minimum element range.	_____	_____	_____
2. POSITION pointer for minimum reading using zero adjustment.	_____	_____	_____
3. APPLY input equal to maximum element range.	_____	_____	_____
4. IF pointer does not read correctly, THEN ADJUST span adjustment to reposition pointer about halfway toward correct reading.	_____	_____	_____
5. REPEAT steps 6.4.1 through 6.4.4 until zero and span readings are correct OR three iterations have been completed.	_____	_____	_____

Figure 34, Sample Repetitive Placekeeping

- b. Ensure the placekeeping or data collection format is clear and understandable.
5. Provide signature lines for authorization or approvals requiring the signature of specific personnel by placing the position title beneath a solid line (see Figure 35, Sample Signature Line).

2. OBTAIN permission from Unit Supervisor to perform test.	

	Unit Supervisor Signature

	Date

Figure 35, Sample Signature Line

4.18 Hold Points

1. Clearly identify action steps requiring hold points.
2. Ensure the words Hold Point are a part of the notation label and are uniquely emphasized (see Figure 36, Sample Hold Point Notation).
3. If the hold point is a specific type of hold point, then place identifying information before the words Hold Point (for example, QC Hold Point).
4. If the hold point is applicable to one step, then place the hold point notation before the step requiring the hold point.

Nonspecific Hold Point:	
HOLD POINT	
2.	<u>WHEN</u> system is filled, <u>THEN REQUEST</u> Foreman check no leaks are observed at flanges.

	Foreman Signature Date
Specific Hold Point:	
QC HOLD POINT	
4.	REQUEST QC check Class E Cleanliness per MSI-0-000-PRO001 for new part installation.

	QC Inspector Signature Date

Figure 36, Sample Hold Point Notation

4.19 Commitment Referencing

1. Commitments should be referenced at the step level and uniquely identified so they will not be inadvertently removed (see Figure 38, Sample Commitment Reference).

<ol style="list-style-type: none"> 1. ASSEMBLE rebuild valve disc assembly as follows: <ol style="list-style-type: none"> a. ASSEMBLE disc and disc arm. _____ b. INSTALL washer and disc nut. _____ c. INSTALL new locking device. [PER 257317] _____

Figure 38, Sample Commitment Reference

4.20 Emphasis Techniques

1. Use all methods of emphasis sparingly.
2. Apply emphasis techniques consistently across all technical procedures.
 - a. In this standard a consistent method for emphasis is applied to examples from technical procedures. This is not meant to imply that this is the only method that is acceptable, as bounded by other requirements for emphasis within this standard.
3. Emphasis should be used for the following items, and a different emphasis should be applied to each:
 - Action verbs
 - Conditional and logic terms
 - Component positions and noun names
 - Notes, cautions, and warnings
4. Acceptable emphasis techniques include but are not limited to, capitalization, bolding, and underlining as shown in Figure 39, Sample Emphasis Techniques.

<p>ENSURE</p> <p>ENSURE</p>	<p>Ensure</p> <p><u>ENSURE</u></p>
------------------------------------	--

Figure 39, Sample Emphasis Techniques

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5. Avoid using emphasis techniques such as italics, shading, highlighting, and quotes.
6. Use a mixture of both upper and lower case text. Only capitalize single words or phrases for emphasis, and not an entire block of text.

4.21 Use of Color

1. Only use color and colored photographs when the ability for both of the following is provided:
 - Printing of color copies for the execution of procedures
 - Including color documents in the records management system
2. Avoid using soft and pastel colors for text.

4.22 Abbreviations and Acronyms

1. Facilities should maintain a list of commonly used facility-specific abbreviations, acronyms, symbols, and units of measure that are not required to be written out.
2. Acronyms and abbreviations not on the list should be spelled out the first time they are used in a section of the procedure.
3. If an abbreviation or acronym can potentially represent two different terms, then spell out the term completely.

4.23 Vocabulary

1. Use simple, commonly understood words.
2. Use words consistently throughout the document.
3. Keep the use of articles (such as a, an, the) to a minimum in technical procedure action steps. Use articles only as necessary to make sentence more readable.
4. Avoid pronouns in action steps.
5. Do not use contractions.

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6. Avoid vague terms such as the following that require judgment on part of the user. Examples are:
 - Approximately
 - Slowly
 - Often
 - Frequently
 - Gradually
 - Quickly
 - Equivalent to
 - As (if) required
 - As (if) applicable
 - As (if) needed
 - As (if) desired
7. Avoid words that sound similar when read aloud such as increase and decrease.
8. Facilities should maintain a list of commonly used facility-specific action verbs (see Attachment 1, Action Verbs, for standard action verbs used by the industry).

4.24 Tables, Calculations, Graphs and Figures

4.24.1 General Requirements

1. Tables, calculations, graphs, and figures:
 - Shall be legible, reproducible, and easily understandable.
 - Shall comply with page margin requirements.
 - Should be located after the applicable step, preferably on the same page.
2. Avoid including action steps in tables, calculations, graphs, and figures.
3. If it is necessary to refer to tables, calculations, graphs, and figures several times in a procedure, consider placing the material in an attachment rather than at each cited step.

4.24.2 Tables

1. Use tables for the following:
 - Present a large amount of information in a small space
 - Support item to item comparisons
 - Display individual items and data values
 - Support data and information collection and analysis
 - Support decision making
 - Convey complex relationships
2. Align table content consistently and in a manner which complements the text being presented.
3. If action steps are combined into a table format, then structure the steps sequentially (left to right and top to bottom unless otherwise stated).

4.24.3 Calculations

1. Express calculations in the simplest form possible. See sample calculation in Figure 40, Sample Calculation.
2. Ensure all math functions are clear to the user.
3. Define terms used in the calculation in the same area as the calculation.
4. Reference the step where the data is being obtained for use in the calculation.
5. Allow adequate space for calculation data to be recorded and for the calculation itself.

Reference Source Type	Corrective Activity Count Rate CPM	Background Count Rate CPM	Adjusted Activity Count Rate CPM
Co-60	(+)		(=)
Cs-137	(+)		(=)

Figure 40, Sample Calculation

4.25 **Checklists**

1. Checklists are any number of user aids designed to provide the user with a method of capturing data or information in a tabular form. Checklist, check list, and check off list are used interchangeably and mean the same thing.
2. Consider using checklists for the following:
 - Component lineup and alignment
 - Data collection (e.g., battery specific gravity checks)
 - Content inventory (e.g., field monitoring equipment)
3. Checklist for component manipulations developed in accordance with ANSI N18.7/ANS 3.2 are considered to be procedures.
4. Checklists shall be maintained by their parent procedures unless other programmatic controls are provided.

4.26 **Data Collection**

1. Consider the following when providing for data collection:
 - a. Design data collection to be easy and efficient for the user. Accordingly, an integrated data collection method within the procedure instructions is typically the preferred method for effective human performance.
 - b. Also consider the needs of the reviewer and approver.
 - c. After the needs of the user, reviewer, and approver have been addressed, consider the cost of documentation that must be retained as a record. However, consider using a separate data package if a small amount of data is collected or a few signoffs are recorded in a long procedure.
2. Attempt to structure data collection such that the data is recorded in vertical columns rather than horizontal rows.
3. Provide sufficient space to allow the user to enter the requested data to the required level of accuracy in normal handwriting.
4. Ensure adequate separation to easily distinguish between groups of information and data.

5. See Figure 41, Sample Data Collection Table for a sample data collection table.

4. **ADJUST** input to AEFT0510 as listed below and **RECORD** AEFT0510 output (as read on DMM) in the As Found column.

Input (psig)	Required (VDC)	As Found (VDC)	As Left (VDC)
0.0	0.980 to 1.020		
14.62	1.980 to 2.020		
29.24	2.990 to 3.010		
43.85	3.990 to 4.010		
58.47	4.980 to 5.020		
43.58	3.990 to 4.010		
29.24	2.990 to 3.010		
14.62	1.980 to 2.020		
0.0	0.980 to 1.020		

Figure 41, Sample Data Collection Table

4.27 Numerals, Symbols, Units, and Tolerances

4.27.1 Numerals

1. Use Arabic numbers.
2. For numbers less than one, precede the decimal point by a zero (0.25 rather than .25).
3. Avoid placing numerals in parentheses after spelled out number (for example, three (3) operators).
4. Write out numbers from zero to nine except when followed by a unit of measure or symbols.
5. Use commas in numbers with five or more digits.
6. If a sentence begins with a number, then spell out the number.

4.27.2 Symbols

1. Use acceptable universally understood symbols. The Gregg Reference Manual or any other nationally accepted reference may be used.
2. For procedure text, write out the following terms:
 - Greater than or equal to
 - Less than or equal to
 - Greater than
 - Less than
 - Equal to
 - Does not equal
3. The symbols associated with the above terms may be used in a calculation, formula, equation, or data sheet.

4.27.3 Units

1. Use the same units of measurement that appear on corresponding equipment.
2. Express exponent values using an upper case E to signify value of 10 (see Figure 42, Scientific Notation).

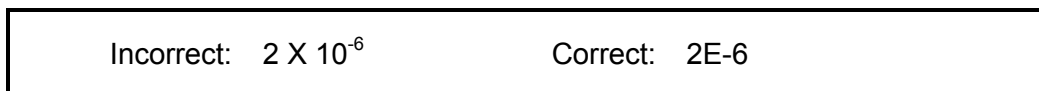


Figure 42, Scientific Notation

3. Do not specify numbers at a greater precision than can be read from instrument panel displays, graphs, or other sources (a user can read to one-half the distance between the smallest minor division).

4.27.4 Tolerances

1. Do not use a tolerance band with a plus or minus symbol.
2. Write the required value followed by the upper and lower limits (see Figure 43, Tolerances).

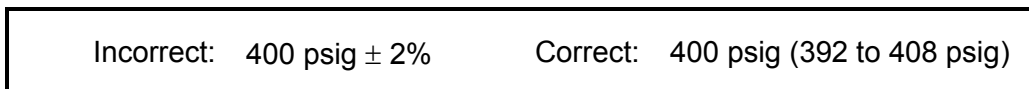


Figure 43, Tolerances

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4.28 Level of Detail

1. Provide a level of detail that takes into account the following variables:
 - Experience and Qualification Level of the User - An appropriate level of detail is necessary in order for the inexperienced, qualified user to successfully complete the task with no direct supervision.
 - Skill of the Craft - Step by step instructions are not needed for activities determined to be skill of the craft for the discipline that will be performing the procedure.
 - Complexity of Task - As task complexity increases, the level of detail in the instruction should increase. Individual instructions should remain as simple as practical.
 - Frequency of Task Performance - As task frequency increases, the level of detail may decrease.
 - Consistency of Task Performance - The level of detail varies directly with the degree of standardization desired. Increasing the level of detail provides for more standardization and produces a more consistent result.
 - Consequence of Error - The level of detail should increase as the risk of personal injury, equipment damage, reduction in effectiveness of safety related systems, and potential regulatory challenge increases.
2. Conditional steps are considered in-field decisions. When creating conditional steps, provide sufficient detail to ensure the performer makes the correct decision. State the condition in a concise and precise manner.
3. Providing the component location within a procedure step is optional; however, if used, place within parentheses after the component name for the users' convenience.

4.29 Consistency

1. Maintain consistency in procedure style, form, and organization, both within and among procedures.
 - a. Consistency allows users to move through documents without the effort of interpreting the style of presentation for each section they encounter.
 - b. Consistency facilitates comprehension and allows users to concentrate on the actual performance of the instructions.
2. Maintain consistency in the use of terminology, acronyms, nomenclature, etc. Inconsistencies can result in users attributing differences in meaning to spurious differences in presentation.

4.30 Branching and Referencing

4.30.1 General Requirements

1. Conditions within a procedure may require the use of a different procedure or supplemental information. Referencing and branching direct these actions.
2. Avoid referencing and branching to the greatest extent possible. Use referencing and branching only when necessary to direct the performer to information vital to the performance of a task and incorporation of the referenced or branched material is not practical.
3. If any of the following criteria are met, then consider incorporating the material in the originating document:
 - The material can be inserted in a logical sequence.
 - The material is difficult to locate or use in other documents.
 - The material requires signoffs or data collection which, if not incorporated into the same document, could result in failure to retain essential records.
 - The steps can be easily incorporated rather than referenced.
 - The likelihood of human error is increased.
 - The user could bypass any precautions or limitations.
4. If the procedure being referenced or branched to contains relevant prerequisites, precautions, or warnings that may be overlooked by the user, then reference the entire procedure instead of individual steps or sections.
5. Each facility should use referencing and branching terms consistently.

4.30.2 Branching

1. Branching directs the user to another procedure or a step in the same procedure, but the user does not return to the original step (see Figure 44, Branching Terminology Use).

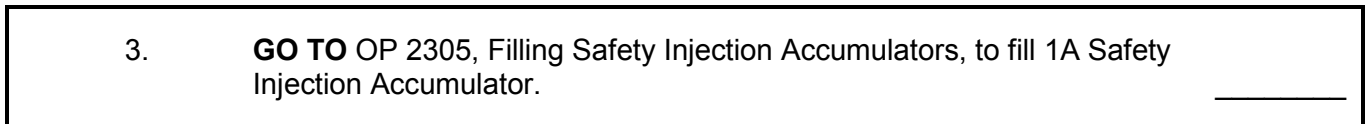


Figure 44, Branching Terminology Use

2. The following are branching terms:
 - Go to
 - Proceed to
3. If the user is not to return to the original procedure, then provide direction for the disposition of the original procedure.

4.30.3 Referencing

1. Referencing directs the user to another step or section within the same procedure or to another document, and the user returns to the original step (see Figure 45, Referencing Terminology Use).

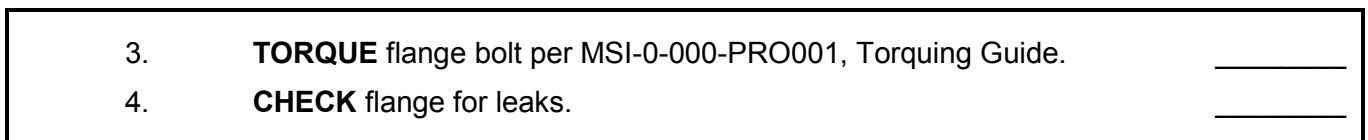


Figure 45, Referencing Terminology Use

2. The following are referencing terms:
 - Refer to
 - Per
 - See
 - Use
 - Repeat
3. Repeat is a unique referencing term applied when a series of previously performed steps will be used for multiple evolutions. When using, provide a method to exit the evolution once the criteria is satisfied.

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4. The first time a procedure or procedure attachment is referenced in a section, include both the procedure or attachment number and title.
5. Guidance should be provided in the referencing instructions to tell the user when to return to the initial procedure or step.

4.31 Action Steps

1. Only write action steps in the following sections of a procedure:
 - Prerequisites
 - Instructions
 - Attachments
2. An action step clearly and concisely communicates instructions for performance of a specific action or task to the intended user(s) of the procedure.
3. An action step answers the following questions:
 - WHO performs the specific task?
 - WHAT task is to be performed?
 - HOW to correctly perform the task in a safe and efficient manner?
4. An action step, in its simplest form, has the following two parts:
 - An action verb
 - One or more objects of the action verb (items that receive the action)
5. In addition, an action step may contain other information about the action verb or its object, including the following:
 - Location of the action
 - Type of action
 - Name of the component or the component identification number
 - Who is to perform the action

6. Write action steps as positive statements using definitive wording and present tense (see Figure 46, Sample Action Step with a Positive Action).

Incorrect:		
7.	DO NOT cool down greater than 100°F/hr.	_____
Correct:		
7.	MAINTAIN cool down rate less than 100°F/hr.	_____

Figure 46, Sample Action Step with a Positive Action

7. An action step should contain only one idea or objective followed by one or two related objects of the action. Three or more objects should be listed in bullet form below the step.
8. As shown in Figure 47, Sample Action Steps, there are three specific types of action steps used in procedures. The following three types of action steps cover most procedure writing needs:
- Single Action Step - Contain a single action verb.
 - Multiple Action Steps - Contain actions that are functionally related and have to be performed simultaneously to obtain a single result.
 - Action Step with a Modifying Phrase - Contain information important for the user to know prior to performing the action. In this case, the modifying phrase is placed at the beginning of the sentence.

Single action:		
8.	PLACE old filter cartridge in plastic bag.	_____
Multiple actions:		
7.	DEPRESS and HOLD 2-HS-082-0001A until 2-FCV-082-0001A, BYPASS FLOW CONTROL VALVE, is fully OPEN.	_____
Action with a modifying phrase:		
6.	Using calibrated torque wrench, TORQUE nut to 30 in-lbs (30 to 32).	_____

Figure 47, Sample Action Steps

4.32 Steps for Multiple Components

1. If writing procedures which describe action sequences for two or more trains or components, and the trains are not identical (task steps are not identical), then provide separate procedures or procedure sections for each train.
2. If a single procedure is used for identically designed components or trains, then the format shall support human error reduction techniques.

4.33 Punctuation

1. Use the standard American English rules for punctuation.
2. Use punctuation consistently.
3. The following exceptions to the standard rules are practiced within the nuclear industry:
 - a. Quote equipment labels, drawings, and other plant documents verbatim, including punctuation.
 - b. Use brackets ([]) to avoid a double set of parentheses (see Figure 48, Brackets).

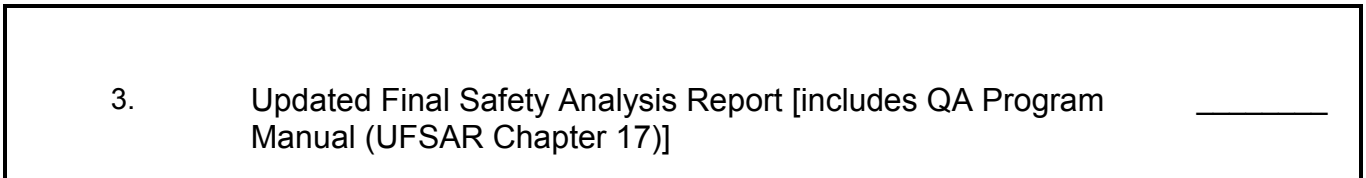


Figure 48, Brackets

- c. Do not break words, component numbers, or procedure numbers with hyphens from one line to another (see Figure 49, Hyphens).

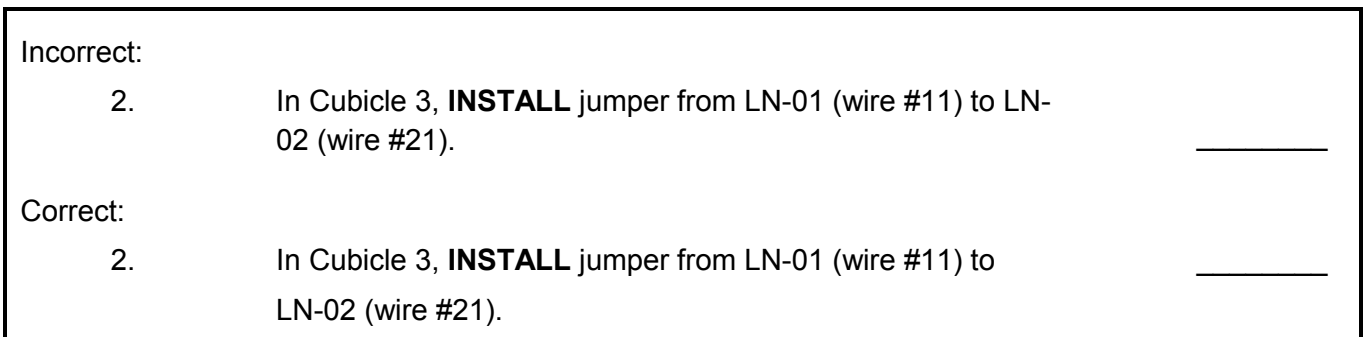


Figure 49, Hyphens

- d. Use parentheses () to indicate an additional train or unit in common procedures (see Figure 50, Parentheses).

- | |
|--|
| <ul style="list-style-type: none"> • RHR Pump A (B) • SG 1A (2A) |
|--|

Figure 50, Parentheses

4. Do not use periods in acronyms, units, and listed items (see Figure 51, Periods).

- | | | |
|-----------|------------|------------|
| Acronyms: | Incorrect: | A.T.W.A.S. |
| | Correct: | ATWAS |
| Units: | Incorrect: | lbm. |
| | Correct: | lbm |

Figure 51, Periods

- a. Avoid semicolons in the procedure body because they promote long sentences (see Figure 52, Semicolons).

Incorrect:	5. STOP permit process; NOTIFY Chemistry.	_____
	_____	_____
	Person Contacted	Date
Correct:	5. STOP permit process.	_____
	6. NOTIFY Chemistry.	_____
	_____	_____
	Person Contacted	Date

Figure 52, Semicolons

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5.0 REFERENCES AND COMMITMENTS

1. ANSI N18.7-1976/ANS-3.2, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants
2. DOE-STD-1029-92, Writer's Guide for Technical Procedures
3. EPRI 1011903, Maintenance Work Package Planning Guidance
4. IAEA-TECDOC-1058, Good Practices with Respect to the Development and Use of Nuclear Power Plant Procedures
5. INPO 06-002, Human Performance Tools for Workers
6. INPO 11-003, Guideline for Excellence in Procedure and Work Instruction Use and Adherence
7. NUREG/CR-3968, Study of Operating Procedure in Nuclear Power Plants: Practices and Problems
8. PPA AP-907-001, Procedure Process Description

Action Verbs

1. The following is a list of action verbs used within the nuclear industry. These words apply to multiple procedure types such as administrative, instrument and control, electrical, operations, maintenance, radiation protection, and emergency planning. This list is not all inclusive and is not required to be adopted in its entirety.
2. Each station or company should maintain a list applicable for their plant, procedure series, and regional dialect. Definitions may be worded differently from those presented here provided the intent of the definition remains the same.
3. Check, Ensure, and Verify are verbs which are frequently used to establish the type of action to be taken in a specific step. These verbs have been used interchangeably by facilities with some facilities defining Ensure and Verify differently between groups at the same facility. This type of inconsistency can lead to worker confusion on expectations and consequential errors in step execution. PPA defines all three of these verbs in this list with check and verify being defined the same. Facilities should select the combination of two verbs that best fits the facilities historical use of these verbs and apply those two verbs consistently.

VERB	DEFINITION
ACKNOWLEDGE	Recognize an alarm.
ACTIVATE	Formally institute a special activity/function.
ACTUATE	Put into action or motion.
ADAPT	Fit in a new situation or use.
ADD	Increase the size or quantity.
ADJUST	Regulate or bring to a more satisfactory state.
ADVANCE	Move forward or ahead.
ALERT	Warn; call to a state of readiness.
ALIGN	Arrange components into a desired configuration, bring into line, or come into precise alignment or correct relative position.
ALLOW	Permit a stated condition to be achieved prior to proceeding.
ALTERNATE	Wrap out of service component and an in service component such that the out of service component is placed in service.
ANALYZE	Examine or interpret test or inspection results.
ANNOUNCE	Make known publicly.
APPLY	Put, lay, or spread on.
ARRANGE	Order, group according to quality, value, or other characteristics.

Action Verbs

VERB	DEFINITION
ASSEMBLE	Create by forming combining or altering material; construct.
ASSIST	Give support or help.
ATTACH	Join one item to another.
AVAILABLE	Place into state or condition of being ready and able to be used.
AVOID	Prevent occurrence of or keep away from.
BACKOFF	Cause to go in reverse or backward.
BACKSEAT	Adjust a valve disk against its seat in a fully open position.
BACKWASH	Use a backward flow of air or water to clean or purge.
BALANCE	Adjust controller process signals to equalize parameters or to arrange so weight distribution is equal.
BEGIN	Perform the first part of an action.
BEND	Turn by force from straight to curved or circular.
BLEED	Remove fluid from a piece of equipment at a restricted flow rate. Extract or let out some or all of a contained substance.
BLOCK	Inhibit an automatic actuation.
BLOW	Send forth air.
BLOWDOWN	Clear out or free of obstruction by forcing air through.
BORATE	Add a borated solution to a system.
BREAK	Destroy the unity or completeness of.
BYPASS	Circumvent a piping system component, a logic system function, or an installed switch.
CALCULATE	Determine a work or value of.
CALIBRATE	Check, adjust, or standardize the graduation of a quantitative measuring instrument.
CAP	Provide with covering.
CENTER	Place in the middle.
CHANNEL	Form, cut, or wear a groove in.
CHARGE	Furnish or fill to capacity. Restore active materials in a storage battery.
CLAMP	Fasten grip or support and object.
CLEAN	Rid of dirt impurities or extraneous matter.
CLEAR	Remove from service; move people or objects away from.
CHECK	Observe an expected condition exist (no actions to correct).
CLOSE	Change physical position of a mechanical device to prevent physical access or flow or permits passage of electrical current.

Action Verbs

VERB	DEFINITION
COAT	Cover or spread with a finishing or protective layer.
COLLECT	Cause the assembly of something in fixed location or container.
COMMENCE	Begin an activity.
CONDUCT	Lead, manage, or direct.
CONFIRM	Use available indications to establish that specified actions have occurred or specified conditions exist or specific conditions have been met.
CONNECT	Bring or fit together to form a unit.
CONSULT	Confer or seek expert advice.
CONTACT	Get in communication with.
CONTINUE	Go on with a particular action.
CONTROL	Manually operate equipment as necessary to satisfy guideline requirements to exercise restrain or direct influence over to fix or adjust the time amount or rate of to regulate.
COOL	Lower the temperature of equipment or an environment.
COORDINATE	Arrange for activity involving other personnel.
CORRECT	Amend for the purpose of improving.
CRACK OPEN	Slightly open a valve to establish low initial flow.
CRIMP	Compress or deform a connection barrel around a cable to make an electrical connection.
CUT	Separate, penetrate, or decrease an item.
CYCLE	Cause repetition of an action or activity.
DECLARE	State officially or formally.
DE-ENERGIZE	Remove power from a component.
DEFEAT	Nullify or prevent the success of.
DEPRESSURIZE	Release gas or fluid pressure from.
DETERMINE	Calculate, find out, decide, or evaluate.
DEVELOP	Set forth or make clear by degrees or in detail.
DIAGNOSE	Recognize and identify the cause or nature of a condition, situation, or problem by examination or analysis.
DILUTE	Reduce the concentration or add water to.
DIRECT	Cause to move in or follow a particular path. Instruct a person or group to do something.
DISASSEMBLE	Dismantle, take to pieces, or take apart.
DISCONNECT	Separate or detach.
DISCONTINUE	Stop the use of.

Action Verbs

VERB	DEFINITION
DISCHARGE	Give outlet to, vent, or remove electrical energy from.
DISENGAGE	Release or detach interlocking parts; unfasten.
DISPATCH	Send personnel outside control room.
DISSOLVE	Cause of pass into solution.
DISTRIBUTE	Deliver or divide among several or many.
DOG	Restrain a device or component to maintain it in particular position.
DON	Bear or have on one's person; wear.
DOWN RANGE	Select lower range on an instrument which has multirange selection capabilities.
DRAIN	Draw or flow off a liquid.
DUMP	Discharge or remove the contents of a vessel.
ELIMINATE	Get rid of or set aside as unimportant.
EMPTY	Transfer by emptying or discharging contents.
ENERGIZE	Supply electrical energy to component.
EQUALIZE	Make the value of a given parameter equal to the value of another parameter.
ENSURE	Perform a comparison with stated requirements and take action as necessary to satisfy the requirements.
ESTABLISH	Make arrangements for a stated condition.
ESTIMATE	Approximate the size extent or nature of a variable.
EVACUATE	Vacate.
EVALUATE	Examine and decide with respect to some criteria.
EXAMINE	Look at critically or carefully.
EXCEED	Go above a given value.
EXECUTE	Carry out or put into effect.
EXIT	Leave or withdraw.
EXTEND	Cause to be drawn out to a greater length.
EXTINGUISH	Cause to cease burning.
FABRICATE	Construct from standardized parts.
FILL	Occupy with an object or substance.
FOLD	Lay one part over another.
FORCE	Exert strength or power to overcome resistance.
GAG	Act of restraining a service or component.
GO TO	Proceed or move on.

Action Verbs

VERB	DEFINITION
GRIND	Pulverize, polish, wear down, sharpen, or smooth.
GROUND	Connect al electrical circuit to ground.
GUIDE	Manage or direct the movement of.
HANDLE	Manipulate objects manually or with specially designated equipment such as hoists.
HANG	Fasten to some elevated point without support from below; suspend.
HEAT	Increase the temperature of.
HOLD	Maintain something at a given level or position.
IDENTIFY	Make know or establish the identity of.
IMMERSE	Plunge into something that surrounds or covers.
IMPLEMENT	Commence a program or series of procedures.
INCLUDE	Contain within.
INDICATE	State or express briefly.
INFORM	Communicate information.
INHIBIT	Block an automatic action or disable a component function.
INITIAL	Affix one's initials.
INITIATE	Begin activity function or process.
INJECT	Drive fluid into. Force into by pumping action.
INSERT	Push, move, or activate a component or system inward.
INSPECT	Measure observe evaluate a featured against specified limits.
INSTALL	Establish an indicated place or setup for use or service.
ISOLATE	Separate, set apart, seal off, or close boundary.
JOG	Apply momentary electrical force to a motor to check rotation direction.
JUMPER	Bypass or cause to leap over.
LAND	Replace a lifted lead back into original position.
LATCH	Secure with device or reset the function of machinery.
LEVEL	Cause equipment to become even or parallel with the plane of the horizon.
LIFT	Remove or pickup. Disconnect an electrical lead from a terminal point.
LIMIT	Restrict or set bounds.
LINE UP	Establish the perquisites necessary for system operation.
LOAD	Connect an electrical component or unit to a source of electrical energy.
LOCATE	Determine place or position.

Action Verbs

VERB	DEFINITION
LOCK	Fasten or secure for control.
LOOSEN	Cause to become less tight fitting or release from restraint.
LOWER	To let down, diminish, or move down.
LUBRICATE	Grease or oil an object.
MAINTAIN	Control, hold, or keep in an existing state.
MAKE UP	Add fluid to a container in compensation of fluid depleted.
MARK	Identify or set apart.
MATCH MARK	Mark the relative positions of two or more components.
MAXIMIZE	Raise to the highest or greatest possible value.
MEASURE	Determine the dimensions of an object.
MINIMIZE	Make as small as possible.
MIX	Blend, merge, or mingle.
MONITOR	Continuous or frequently repeated activity of watching, observing, regulating, or keeping track of.
MOUNT	Attach to a support or specified location.
MOVE	Go or place from one position to another.
NEUTRALIZE	Make chemically neutral or electrically inert; nullify.
NOTIFY	Inform specified personnel or organization as of past, present of future actions or results.
OBTAIN	Come into possession of, gain, or attain.
OPEN	Change the physical position of a mechanical device to allow flow through a valve or prevents passage of electrical current.
OPERATE	Manipulate or control as necessary to achieve stated objective.
PACK	Fill with packing material.
PERFORM	Carry out the functions.
PLACE	Put, set, or fix in designated position or location.
POSITION	Place control in a discrete position.
POST	Place signs.
POUR	Cause to flow in a stream.
PREPARE	Make ready.
PRESS	To push steadily against.
PRESSURIZE	Raise pressure in a controlled manner.
PROVIDE	Make preparation to meet a need.
PUNCTURE	Pierce with a pointed instrument or object.

Action Verbs

VERB	DEFINITION
PURGE	Get rid of or eliminate. Force flow through an enclosed volume.
PUSH	Move equipment or actuate equipment away from motivating force.
RACK IN	Place an electrical circuit breaker in place by physically connecting it to associated power source.
RACK OUT	Disconnect an electrical circuit breaker by physically removing from associated power source.
RAISE	Increase the amount; move to higher position.
RECORD	Document specified condition data or characteristic.
REDUCE	Cause a parameter to decrease in value.
REFURBISH	Brighten or freshen up; make like new.
REMOVE	Transfer or move, take off, out of, or away.
REPEAT	Say or do again.
REPLACE	Substitute; put back into former position or place.
REQUEST	Ask for.
RESET	Remove an active output signal from retentive logic device even with the input signal still present.
RESTORE	Bring a specified parameter or component back within specified limits or original condition
RETRACT	Draw back.
RETURN	Move backwards, bring, go, or send.
SAMPLE	Take a representative portion for the purpose of examination.
SECURE	Fasten, make safe, or tie; remove from service; stop a device.
SELECT	Choose from among several.
SET	Physically adjust and adjustable feature to a specified value.
SHAKE	Move or cause to go to and from in a quick jerky manner; agitate.
SHIELD	Provide with protective cover or barrier.
SHIFT	Change mode of operation, usually speed.
SHUT DOWN	Stop operating equipment and place in standby.
START	Initiate operation of an electrical or mechanical device either directly or by remote control.
STOP	Shut down equipment, terminate operation, or cease.
STROKE	Operate a valve over its full travel. Go through a motion as in a valve or damper movement.
SURVEY	Investigate an area, generally for radiological purposes.
SYNCHRONIZE	Make exactly simultaneous in operation.

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Action Verbs

VERB	DEFINITION
TAG	Label for identification.
THROTTLE	Operate a valve in an intermediate position to obtain certain flow rate up to and including full open.
TORQUE	Apply turning or twisting force to specified value.
TRIP	Manually activate or deactivate a semiautomatic feature.
TROUBLESHOOT	Investigate for purpose of locating or eliminating sources of problem.
TURN	Cause to move at an angle or circle.
USE	Put into action or service; employ.
VENT	Permit a gas or liquid contained under pressure to escape from a vent.
VERIFY	Observe an expected condition exist (no actions to correct).
WITHDRAW	Move from a position.

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