Revision 03

PPA AP-907-005
Procedure Writer's Manual

DECEMBER 3RD, 2019

PPA AP-907-005, Revision 3, Procedure Writer's Manual

Approved on 12/03/2019

Approved By Linda Mar, PPA Chair

Notices

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REVISION SUMMARY

Throughout - Removed nuclear specific language. Customer base is no longer just nuclear generation.

2.0 Scope Step 3 and 4 – New steps to introduce basic alignment concepts between this standard and digital forms of procedure execution.

Figure 7 – Used CHECK consistently vs VERIFY and eliminated negative term in example.

Figure 20 – Removed one of two verbs from step 5 in example (unnecessary distraction).

Figure 30 – Verb 'Perform' bolded for consistent use of emphasis.

Figure 33 – Made verb 'Verify' upper case for emphasis.

Figure 34 - Replaced repeating step example with one from training lesson that does not include a negative term.

Figure 36 – Rewrote first HOLD Point example in a positive manner.

Figure 37 – Moved instruction in a NOTE to a step.

4.4 step 2 - Added Verdana 12 Point to the list of allowed fonts.

4.4 step 4 – New step that adds a warning on using standard font sources for text and symbols.

4.6 step 2 – Deleted appendix as PPA does not define appendix separate from attachment.

Table 1 – Added notes on section order.

4.13.2 step 1 – Addressed option for Summary of Alterations to be before the Purpose Section.

4.13.3 step 1 – Addressed option for Scope to not be the second section when Summary of Alterations precedes the Purpose and the Purpose/Scope are not combined.

4.13.7 step 3 – New third bullet that provides guidance on how to write Precautions consistent with the guidance given on how to write Cautions.

4.13.7 step 4 – Expanded guidance on including corrective measures for exceeded Limitations.

4.13.9 step 1 – Reordered sections to be in alignment with procedure outline.

4.14 step 2 – Deleted this step and expanded the following step to list criteria for placing supplemental information in an attachment instead of placing at the impacted step(s). Wording is consistent with current training materials (Module 2B slide 64).

Table 2 - Added definition for NOT; added clearer description and examples for inclusive conditional use of OR; added exclusive conditional use of OR to the definition of OR in Table 2 along with an example of its use and guidance that it should NOT be used; corrected the definition for WHILE.

4.20 Step 3 – Removed Precautions and Limitations and added Prerequisites.

4.20 Step 4 second bullet – Editorial change to add computer terms.

4.24 – New section on Computer Terms to provide a standard set of styles. This section draws style content from the Microsoft TechNet page on Documentation Conventions.

4.27 step 7 – New step on use of fractions. Included example of a confusing application along with a revised version.

4.28.2 step 3 – Added 'tables' to the areas where symbols for the terms listed in step 4.28.2 step 2 may be used.

4.32 step 8 – New fourth bullet to add an Action Step type for important 'why' based supplemental information.

Attachment 1 – Expanded the Verb List to include a broader selection of verbs. Many Maintenance and Chemistry terms were omitted from the original version. A basic set of computer terms has also be added. Used bulleted items in a cell to separate unique definitions for the same word. Used semi-colon to separate similar descriptions for the same definition. Computer term definitions that are specific to computerized processes include the keyword 'computer'.

Attachment 3 – Listed Standards Committee members who supported this revision.

TABLE OF CONTENTS

1.0 PURPOSE

1. The purpose of this Procedure Writer's Manual is to provide a consensus standard for writing human factored procedures. This standard should be used in conjunction with PPA AP-907-001, Procedure Process Description, and provides writing methods that support the procedure use guidance in 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. The document styles in this standard are developed with paper based procedure execution in mind. These same styles are appropriate for some forms of computer (digital) based procedure execution (e.g., PDF execution on a mobile device).

4. The instruction (step) writing methods outlined in this standard are equally valid for either paper or electronic procedure execution.

5. 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.

3.0 Definitions (cont.)

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.

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.

3.0 Definitions (cont.)

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**'.

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).

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.

3.0 Definitions (cont.)

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).

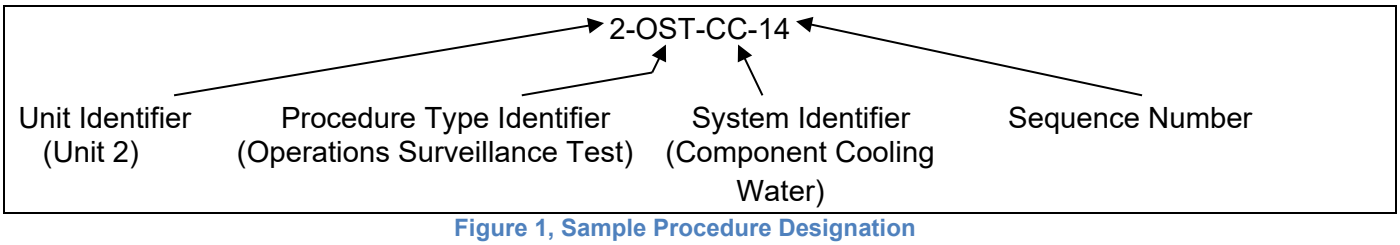

Figure 1, Sample Procedure Designation

4.2 Procedure Designation (cont.)

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

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. Each font is typed in the font that it represents.

   - Arial 11 or 12 point
   - Times New Roman 12 point
   - Verdana 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.

4. Use a font source that is commonly available and germane to the digital platform the procedures will be authored in (e.g., If authoring in Microsoft Windows Platform use True Type fonts for text and symbols). Use of less common fonts, introduces the risk that the font will be removed from the desktop, resulting in font substitution/rendering issues.

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

2OST-CC-14	**Component Cooling System Quarterly Flow Test**	**Revision 13 Page 23 of 36**

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.

4.5 Page Header and Footers (cont.)

4. Page footers are optional and may be used for supplemental information (for example, record retention, attachment page control, and form numbers).

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 as shown in Figure 3, Sample Page Numbering .

OP-4 Unit 1	**Shutdown Cooling**	**Revision 10** **Page 14 of 16**

Figure 3, Sample Page Numbering

2. Maintain the page numbering sequence and a separate internal attachment page number as shown in 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.

4.8 Page Breaks and Section Breaks (cont.)

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) or (cont.) as shown in 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. Set numbering schemes should differentiate between steps and substeps of the procedure by providing identifiable differences from one level to the next as shown in Figure 6, Sample Numbering Scheme, and Figure 7, Sample Numbering Scheme with Procedure Text.

1.0 **TITLE** (Section)
1.1 Subtitle (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

4.9 Step Numbering Scheme (cont.)

6.0 INSTRUCTIONS

6.1 Emergency Diesel Generator 1A

1. **CHECK** standby lineup as follows:

   a. **PERFORM** visual inspection of piping fittings and components for leakage or signs of deterioration on the following systems:

   - Engine Coolant _____
   - Fuel Oil _____
   - Lube Oil _____
   - Starting Air _____

   b. **CHECK** the following:

   (1) LO CLR LUBE OIL OUTLET TEMP, 0-TI-8235A, is greater than 85°F. _____

   (2) Lube Oil Circulating Pump is in service. _____

Figure 7, Sample Numbering Scheme with Procedure Text

4. Use the same numbering scheme and visual layout for steps and narrative paragraphs.

   - Do not use un-numbered paragraphs except for supplemental information in attachments.
   - 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

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 verify the procedure is appropriate for the task at hand:

   - Procedure title
   - Procedure number
   - Revision number
   - Level of use

4.11 Cover Page (cont.)

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. See Figure 10, Sample Cover Page for an example cover page.

North American Plant

Unit 0

Mechanical Corrective Instruction

MCI-0-068-SEL001

Recirculation Pump Seal Replacement

Revision 4

Quality Related

Level of Use: Reference Use

Effective Date: 03-27-10

Responsible Organization: Mechanical Maintenance

Prepared By: Jane Doe

Approved By: John Smith

Figure 10, Sample Cover Page

4.12 Table of Contents

1. Include a table of contents that provides an overview of the procedure structure.

   - The table of contents should be automatically generated and systematically maintained by the procedure template or authoring program.
   - Include the table of contents before the procedure instructions.
   - 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).
   - List all major section headings and attachments with page numbers.
   - 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

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, Procedure Structure, 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 Note 1	R	R	R	R
Definitions Note 1	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 Note 2	O	O	O	O
Attachments	O	O	O	O

Note 1 – These sections may be placed before or after the Instructions Section.

Note 2 – This section may be placed at the beginning (after the Cover Page) or at the end of the procedure body (before the Attachments).

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 (except when preceded by the Summary of Alterations).

2. This section is mandatory, but it may be combined with the Scope section.

3. 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).

1.0 PURPOSE

1. This procedure:
   - 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 verifying activities affecting alignment or status of safety related systems or components or portions of systems.

Figure 12, Sample Administrative Procedure Purpose Statement

4. 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).

1.0 PURPOSE

1. This procedure describes the disassembly, inspection, rework, and reassembly of the auxiliary feedwater pump turbines in support of turbine preventative maintenance routines.

Figure 13, Sample Technical Procedure Purpose Statement

5. 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 immediately following the Purpose section (except when combined with the Purpose section).

2. This section is mandatory, but it may be combined with the Purpose section.

3. 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 SCOPE

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

4. 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 SCOPE

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

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).

3.0 RESPONSIBILITIES

3.1 Duty Department Manager

1. Provides the personnel necessary to support evaluation and resolution of emergent issues. For example:
   - 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).

   - Precautions apply generically to the entire document.

   - Do not repeat caution statements in this section that are listed immediately preceding the step to which they apply.

   - State the effect of the condition(s) and the cause of the condition(s).

3.0 PRECAUTIONS

1. Pinch hazards can result from charging circuit breaker springs.

Figure 17, Sample Precautions

4.13.7 Precautions and Limitations (cont.)

4. Include limitations to the performance of Instructions section steps or sections.

- Limitation statements describe regulatory or site administrative limits that the procedure is bound by.
- If limitations are required, then provide specific limits on parameters being controlled (see Figure 18, Sample Limitations).
- Appropriate corrective measures to return the parameters to the normal control band should be provided in the Instruction section.

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

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).

5.0 PREREQUISITES

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, Precautions and Limitations, and Prerequisites sections. This section is mandatory.

   - In an administrative procedure, the Instructions section contains the program and process steps.
   - In a technical procedure, the Instructions section contains the task performance and restoration steps.
   - In DOE procedures, the section title 'Performance' is an equivalent term for 'Instructions'.

4.13.9 Instructions (cont.)

2. General rules for writing instructional steps are:

- Write the instructional steps in the logical order they will be performed.
- Divide the tasks into manageable groups of subordinate sections and related actions.
- Use headings reflective of the sectionalized tasks.
- Include any provision necessary to facilitate recording data, signoffs, placekeeping marks, and remarks (as applicable).
- 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.	**RECORD** as-found thickness of the lower section of X Relay Trip Lever Window.	
	As-found thickness: ____ inches	_____
6.	**IF** as-found thickness is less than 0.180 inches, **THEN REPLACE** X Relay Lever per 0-MNT-005, Relay Replacement.	_____

Figure 20, Sample Technical Procedure Instructions Section Steps

4.13.9 Instructions (cont.)

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 Restoration

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:

   - Revision Bars:

     (1) Use revision bars unless the extent of the alteration (major revision) diminishes their benefit (see Figure 22, Alteration with Revision Bars).

6.4.1 (continued)

4. **RECORD** M&TE information on Attachment 1, Tracking Form. _____

5. **RECORD** Stopwatch ID Number on Attachment 2, Instrument Datasheet. _____

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.

4.13.12 Summary of Alterations (cont.)

- 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.

4.13.13 Attachments (cont.)

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 meets any of the following criteria, then include it as an appropriate supplement in an attachment.

   - Is too large or difficult to embed into the procedure
   - Material must be situated on a landscape page
   - It is necessary to refer to the information throughout the procedure.

3. Each supplement should be uniquely identified and consecutively numbered.

4. If used in multiple procedures, then ensure the supplement is consistent among the procedures.

5. Ensure the relationship between the parent step and the supplemental information is immediately apparent.

4.14 Supplemental Information (cont.)

6. If the supplemental information is a table, then (see Figure 24, Sample Table):

- Ensure the relationship of the entries is immediately apparent by choosing an appropriate title and column headings.
- Use table notes only as necessary to amplify cell information.
- Avoid including critical information or instructions in table notes.
- Use asterisks, letters, or other non-numerical system for designating table notes to avoid confusion with exponents.
- Place table notes at the end of the table.
- Ensure the table remains within the page margins.
- Consider using an exposed grid structure. Vertical lines within the table may be eliminated if there is sufficient spacing.
- Use shading or N/A to indicate cells that require no entries.
- Provide adequate space for entering values and data.
- Include units of measure in headings where applicable.
- 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

4.14 Supplemental Information (cont.)

7. If the supplemental information is a flow chart, then:

- Use consistent flow chart methods and symbols.
- Ensure the flowchart and procedure body are in agreement.
- Consider that flow charts should not contain as much detail as the actual procedure process.

8. If the supplemental information is a graph, then (see Figure 25, Sample Graph):

- Provide sufficient space for notations and values.
- Present layout information in readily readable format.
- Label axes appropriately.
- Provide legends and labels so that the user can correctly interpret the representation.
- Maintain the aspect ratio for graphs that are scale-dependent.
- Consider that the size of a scale-dependent graph may be affected when displayed or printed.
- Graphs should be constructed with the following attributes (see Figure 25, Sample Graph):
  - ◊ 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.

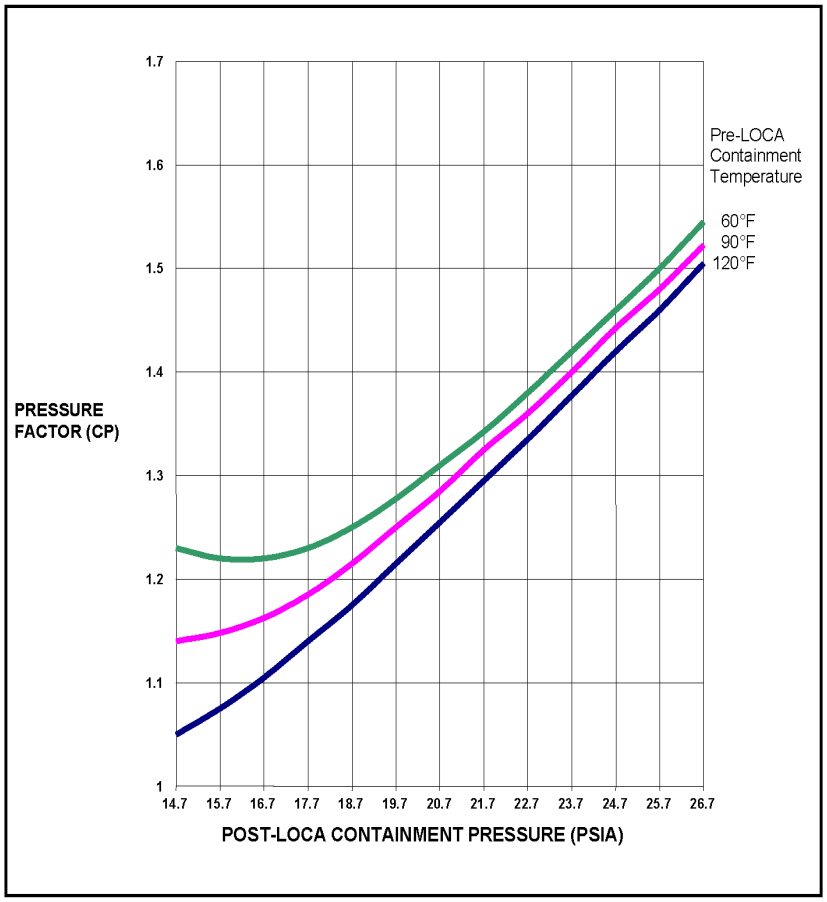

Figure 25, Sample Graph

4.14 Supplemental Information (cont.)

9. 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).

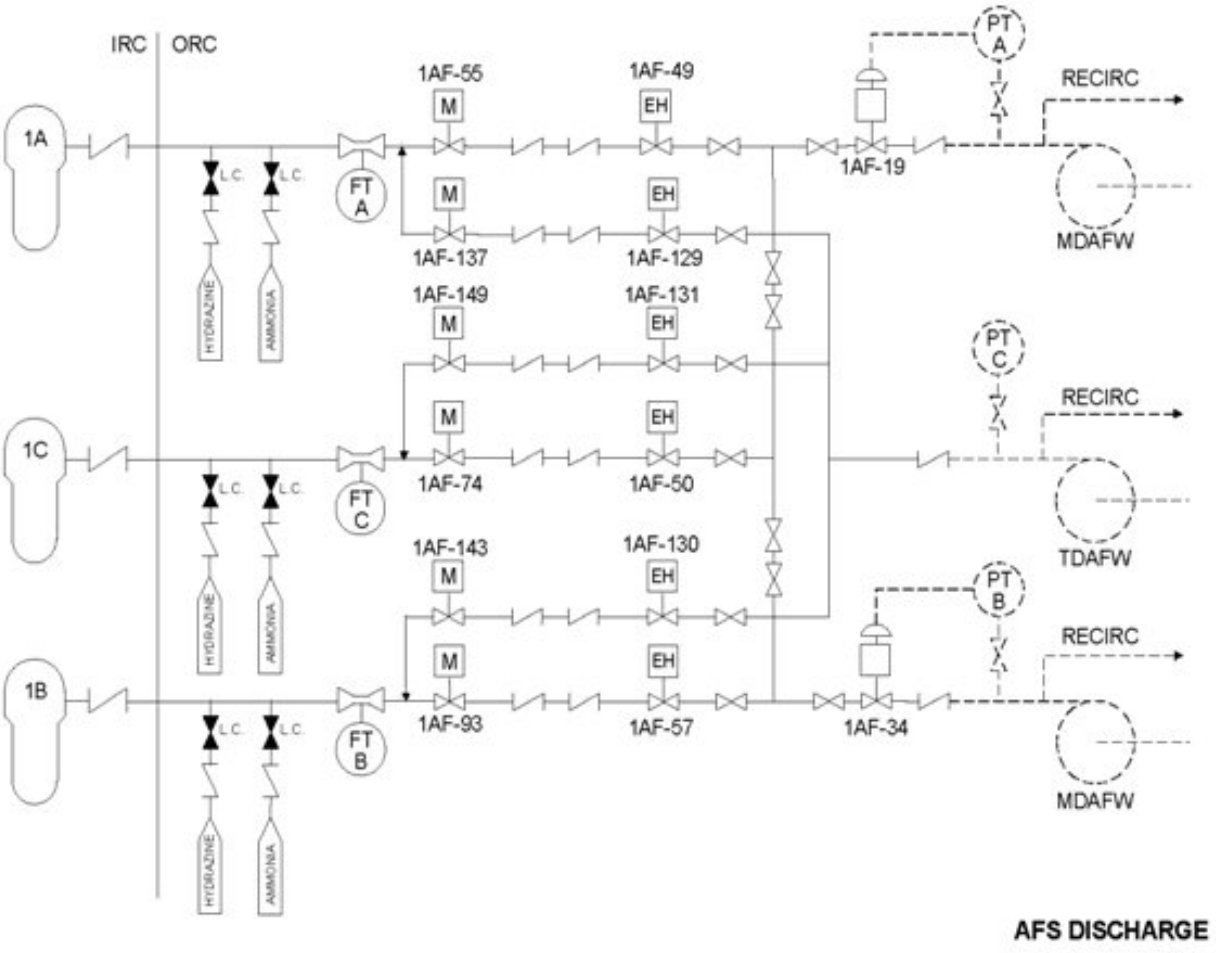

Figure 26, Sample Flow Diagram

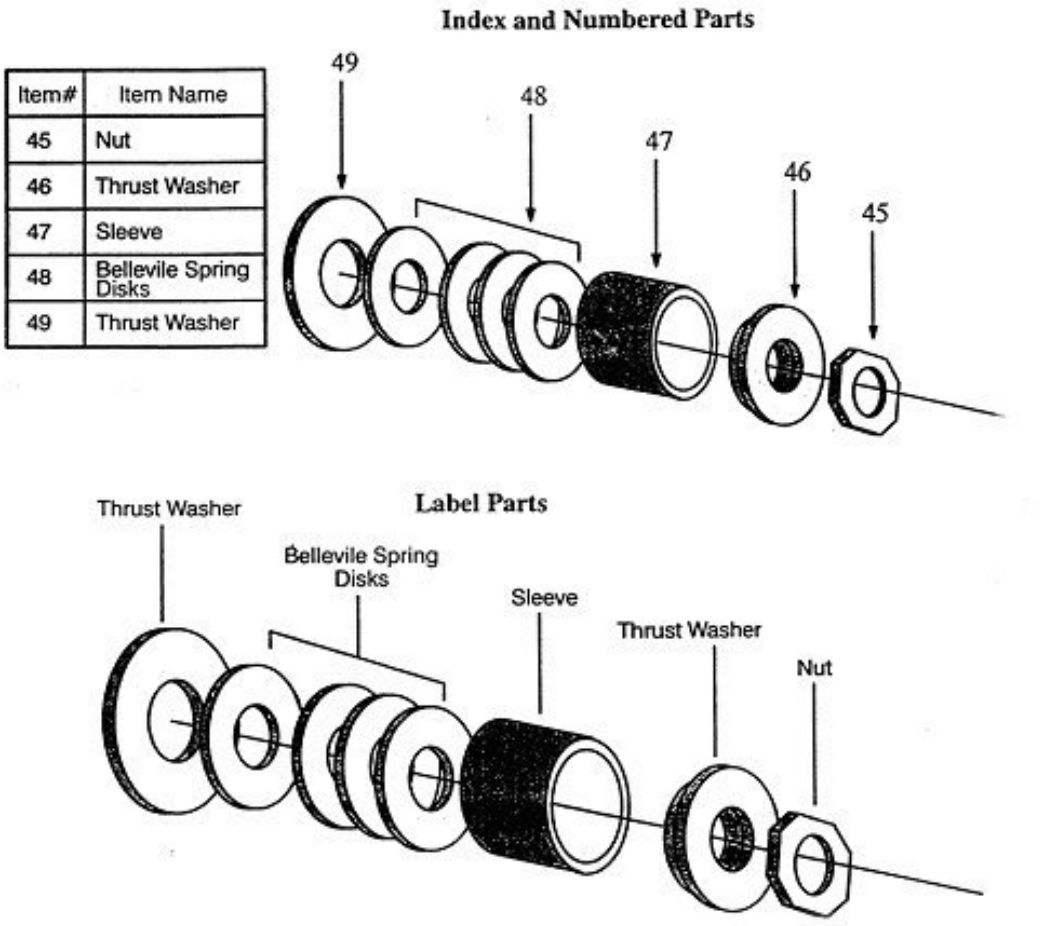

Figure 27, Sample Component Isometric Diagram

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

Reactor Coolant System pressure will be affected by starting a Reactor Coolant Pump with either Pressurizer Spray Valve open due to increased spray flow.

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

- 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.

4.15 Notes, Cautions and Warnings (cont.)

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 effect of the condition(s) and the cause of the condition(s)
- Identify critical time constraints

4.15 Notes, Cautions and Warnings (cont.)

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(s) and the cause of the condition(s)
- 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, Conditional and Logic Terms:

- **IF**
- **WHEN**
- **THEN**

3. If describing logic within a condition, then use the following logic terms as defined in Table 2, Conditional and Logic Terms:

- **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**

IF	Introduce a condition that may or may not be true. User stops until met or NA.
IF AT ANY TIME	Introduces a condition that may occur. User continues and takes action when met.
THEN	Use between the condition and the action. Do not use between actions.
WHEN	Introduce conditions that are expected to occur.
NOT	Used to make a word or group of words negative. **IF** the condition can be stated simply in a positive manner, **THEN** AVOID using **NOT**.
IF NOT	For a performer to respond to the second of two possible conditions. Avoid double negatives.
AND	Use between two required conditions when both conditions must be met (see Figure 31).
OR	Inclusive Use of **OR** - Use between alternative combinations of conditions such that, any one or all conditions described can meet the conditional requirements. Example: **IF** smoke **OR** open flame is observed, **THEN NOTIFY** the control room operator. Example: **IF** temperature is greater than 200 Degrees **OR** Pressure is below 375 PSIG, **THEN STOP** 1A Coolant Pump. Example: **IF** snowing **OR** plant roads are wet, **THEN SPREAD** salt on plant roads.
	Exclusive Use of **OR** - Use between alternative combinations of conditions, such that. any one of the conditions described being true meets the conditional requirements but **NOT** both. Example: **IF** either A D/G **OR** B D/G is out of service, but **NOT** both, **THEN PERFORM** a monthly surveillance run on the operable D/G. Exclusive use between a set of conditions should **NOT** be used. A negative "but **NOT** both" is always implied if not stated when using exclusive or. The step can usually be written in a simpler and more directing manner using other methods. The example above is better written as follows: Example: **IF** only one of the two installed D/Gs is operable, **THEN PERFORM** a monthly surveillance run on the operable D/G.
WHILE	Introduces an action during which the associated action step or steps are to be continuously performed until met. Once met, the user continues with the procedure. Example: **WHILE** holding the pump control switch in START position, **PRESS** Reset pushbutton.

Table 2, Conditional and Logic Terms

4.16 Conditional Steps (cont.)

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

2. 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. **IF** As Found values are acceptable,
THEN PERFORM the following: _____

   a. **COMPLETE** As Left columns. _____

   b. **GO TO** step 7.2.8. _____

Figure 30, Sample Logic Term Emphasis

3. Do not use the **AND**/**OR** construction in the logic statement of a action step.

4. If three or more conditions are described, then consider using a decision table or listing format.

5. 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. **IF** RCP oil lift pump is running **AND** RCP shaft has been hand rotated,
THEN STOP RCP oil lift pump. _____

Incorrect:

1. **IF** CWS-V-335-1 (Bypass isolation valve) is **NOT CLOSED**,
THEN CLOSE CWS-V-335-1. _____

Correct:

1. **IF** CWS-V-335-1 (Bypass isolation valve) is **OPEN**,
THEN CLOSE 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

- Explicitly identify the type of verification next to the initial line.
- Provide an adequate number of initial lines so each person has their own line.
- 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.	**VERIFY** 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
7.	PLACE HC-204-1, Letdown Flow Interlock, in AUTO. Performed by: _____	

Figure 33, Sample Placekeeping

4.17 Signoffs and Placekeeping (cont.)

4. If writing steps containing the term REPEAT, then consider the following:

- Provide adequate space for placekeeping or data collection for each evolution. See Figure 34, Sample Repetitive Placekeeping, for an example.

		1	2	3
1.	**CLOSE** CW-1, Cooling Water Supply.	____	____	____
2.	**WHEN** temperature increases to 95 °F, **THEN OPEN** CW-1 Cooling Water Supply.	____	____	____
3.	**RECORD** pump data in Table 1.	____	____	____
4.	**REPEAT** steps 1 through 3 until three iterations have been completed.			____

Figure 34, Sample Repetitive Placekeeping

- 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. **WHEN** system is filled,
THEN REQUEST Foreman verify flanges are leak free.

_____ _____
Foreman Signature Date

Specific Hold Point:

QC HOLD POINT

4. **REQUEST** QC verify Class E Cleanliness per MSI-0-000-PRO001 for new part installation.

_____ _____
QC Inspector Signature Date

Figure 36, Sample Hold Point Notation

4.18 Hold Points (cont.)

5. If the hold point is applicable to more than one step (see Figure 37, Multiple Step Hold Point):

   - Provide the hold point notation at the first step to which it is applicable.
   - Place a note before the hold point steps specifying how the hold point is to be applied and to which steps it is applicable.
   - Place a signature line or signoff after the last hold point step.

QC HOLD POINT

NOTE

QC Hold Point applies to Step 1 and all substeps.

1. **REFURBISH** non-conforming leads as follows:
   a. **REMOVE** old lug by cutting lead as close as possible to existing hardware barrel. _____
   b. **STRIP** insulation from lead. _____
   c. **INSERT** lead fully into new hardware barrel. _____
   d. **CRIMP** lug on lead. _____
   e. **RECORD** the following:

      Hardware Size: _____ Lead Size: _____

      Crimper ID No.: _____ Cal Due Date: _____

_____ _____

QC Inspector Signature Date

Figure 37, Multiple Step Hold Point

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).

1. **ASSEMBLE** rebuild valve disc assembly as follows:
   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.

   - 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 in the following sections of Technical Procedures:

   - Prerequisites
   - Instructions
   - Action steps in Attachments

4. 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
   - Computer Terms as specified in Section 4.24.

4.20 Emphasis Techniques (cont.)

5. Acceptable emphasis techniques include but are not limited to, capitalization, bolding, and underlining as shown in Figure 39, Sample Emphasis Techniques.

VERIFY	**Verify**
VERIFY	**VERIFY**

Figure 39, Sample Emphasis Techniques

6. Avoid using emphasis techniques such as italics, shading, highlighting, and quotes.

7. 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.

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 Computer Terms

1. Use the computer terms included in Attachment 1, Action Verbs.
2. Place single quotation marks around computer prompts.
3. Match the computer screen styles for a command when writing steps that execute the command.
4. Write command-line commands and options in bold lower case style (e.g., **copy** command, ***/*a** option).
5. Write menu titles in bold Title Case style (e.g., **File** menu).
6. Write dialog box options in bold Title Case style (e.g., **CLICK Continue**).
7. Write dialog box titles in bold Title Case style (e.g., **Find and Replace** dialog box).
8. Write directory names and file paths in the same style as they are presented on the computer.
9. Write file names in the same style as they are presented on the computer.
10. Write program names in Title Case.

4.25 Tables, Calculations, Graphs and Figures

4.25.1 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.

4.25.2 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).

4.25.3 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

4.26 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.

4.27 Data Collection

1. Consider the following when providing for data collection:

   - 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.
   - Also consider the needs of the reviewer and approver.
   - 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. **VARY** 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

4.28 Numerals, Symbols, Units, and Tolerances

4.28.1 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.

4.28.1 Numerals (cont.)

7. If using a fraction, then ensure the following:

- Fractional element is clearly associated with the whole number component as a fraction. In Figure 42, Sample Fractions in Action Steps below, it's possible to misunderstand the valve size as 30 ½ " instead of a quantity of 30 valves that are all ½ " in size.
- The font used for the fraction is the same font size as the whole portion.

SIMPLE use of a fraction. 2. **ADD** 5 1/2 cups of boron to the beaker. _____
INCORRECT use of number and fraction together that represent separate and unique items. 2. **SET** the 30 1/2 inch valves on the drying rack. _____
CORRECT use of a number and fraction together that represent unique items. 2. **SET** the thirty 1/2 inch valves on the drying rack. _____

Figure 42, Sample Fractions in Action Steps

4.28.2 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, table or data sheet.

4.28.3 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 43, Scientific Notation).

Incorrect: 2×10^{-6}	Correct: 2E-6

Figure 43, 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).

4.28.4 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 44, Tolerances).

Incorrect: 400 psig $\pm$ 2%	Correct: 400 psig (392 to 408 psig)

Figure 44, Tolerances

4.29 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.

4.30 Consistency

1. Maintain consistency in procedure style, form, and organization, both within and among procedures.

    - Consistency allows users to move through documents without the effort of interpreting the style of presentation for each section they encounter.

    - 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.

4.31 Branching and Referencing

4.31.1 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.

4.31.2 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 45, Branching Terminology Use).

3.	**GO TO** OP 2305, Filling Safety Injection Accumulators, to fill 1A Safety Injection Accumulator.	_____

Figure 45, 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.

4.31.3 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 46, Referencing Terminology Use).

3.	**TORQUE** flange bolt per MSI-0-000-PRO001, Torquing Guide.	_____
4.	**CHECK** flange for leaks.	_____

Figure 46, Referencing Terminology Use

2. The following are referencing terms:
   - Refer to
   - Per
   - See
   - Use
   - Repeat

4.31.3 Referencing (cont.)

3. Repeat is a unique referencing term that is used when a series of previously performed steps will be used for multiple evolutions. When using steps with this term, provide a method to exit the evolution when the criteria is satisfied. This exit may direct the user to another step in this procedure or another procedure without returning to the original step.

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.

4.32 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)

4.32 Action Steps (cont.)

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 47, Sample Action Step with a Positive Action) except when writing the step in a positive form will be significantly more complex that making a simple negative statement (see Figure 48, Sample Action Step with acceptable use of a Negative Term).

Incorrect:

7. **DO NOT** cool down greater than 100°F/hr. _____

Correct:

7. **MAINTAIN** cool down rate less than 100°F/hr. _____

Figure 47, Sample Action Step with a Positive Action

Acceptable use of **NOT**:

1. **IF** conditions are **NOT** as expected, **THEN**:

   A. **SECURE** the work area. _____

   B. **CONSULT** with supervision. _____

Figure 48, Sample Action Step with acceptable use of a Negative Term

Figure

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.

4.32 Action Steps (cont.)

8. As shown in Figure 49, Sample Action Steps, there are four specific types of action steps used in procedures. The following types of action steps cover most procedure writing needs:

   (1) Single Action Step - Contain a single action verb.

   (2) Multiple Action Steps - Contain actions that are functionally related and have to be performed simultaneously to obtain a single result.

   (3) 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.

   (4) Action Step with supplemental information on why the step is being performed – Contain information that is very important to understanding the objective (why) of the step and cannot be assumed to always be known by a qualified worker.

      - Addition of supplemental information should be kept to a minimum, as it can clutter the procedure and detract from the more important goal of providing simple action steps.

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. _____

Action with important supplemental information:

7. Rapidly **CLOSE** 1NV-1A, Letdown Isolation, to prevent over pressurization and subsequent relief/overflow of the Volume Control Tank. _____

Figure 49, Sample Action Steps

4.33 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.

4.34 Punctuation

1. Use the standard American English rules for punctuation.

2. Use punctuation consistently.

3. The following exceptions to the standard rules are adopted to improve human factored procedure execution reliability:

   - Quote equipment labels, drawings, and other plant documents verbatim, including punctuation.

   - Use brackets ([ ]) to avoid a double set of parentheses (see Figure 50, Brackets).

3. Updated Final Safety Analysis Report [includes QA Program Manual (UFSAR Chapter 17)] _____

Figure 50, Brackets

   - Do not break words, component numbers, or procedure numbers with hyphens from one line to another (see Figure 51, Hyphens).

Incorrect:

2. In Cubicle 3, **INSTALL** jumper from LN-01 (wire #11) to LN-02 (wire #21). _____

Correct:

2. In Cubicle 3, **INSTALL** jumper from LN-01 (wire #11) to LN-02 (wire #21). _____

Figure 51, Hyphens

4.34 Punctuation (cont.)

- Use parentheses ( ) to indicate an additional train or unit in common procedures (see Figure 52, Parentheses).

- RHR Pump A (B)
- SG 1A (2A)

Figure 52, Parentheses

4. Do not use periods in acronyms, units, and listed items (see Figure 53, Periods).

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

Figure 53, Periods

- Avoid semicolons in the procedure body because they promote long sentences (see Figure 54, Semicolons).

Incorrect:

5. **STOP** permit process; **NOTIFY** Chemistry. _____

_____ _____

Person Contacted Date

Correct:

5. **STOP** permit process. _____

6. **NOTIFY** Chemistry. _____

_____ _____

Person Contacted Date

Figure 54, Semicolons

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. Microsoft TechNet Document Conventions Page at:

   (https://technet.microsoft.com/enus/library/dd632806.aspx)

8. NUREG/CR-3968, Study of Operating Procedure in Nuclear Power Plants: Practices and Problems

9. PPA AP-907-001, Procedure Process Description

Action Verbs

1. The following is a list of typically used action verbs. 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 different from those presented here as long as the intent 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	Confirm or 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.
ADMINISTER	Manage.
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	Perform or cause to occur by turns or in succession.
ANALYZE	Examine or interpret test or inspection results.
ANNOTATE	To make note.
ANNOUNCE	Make known publicly.

Action Verbs

VERB	DEFINITION
APPLY	• Put, lay, or spread on. • For digital systems: Commit a set of changes or pending transactions made in a secondary window, typically without closing that computer window.
APPROACH	Come very close to or make advances toward an action or setpoint level in such a manner that meeting or exceeding that setpoint or action level is imminent.
APPROVE	To accept as satisfactory.
ARRANGE	Order, group according to quality, value, or other characteristics.
ASSEMBLE	Create by forming combining or altering material; construct.
ASSIGN	Give direction to, appoint to a post or duty.
ASSIST	Give support or help.
ATTACH	Join one item to another.
ATTEMPT	Make an effort to perform an action.
ATTEND	Be present.
AUGMENT	To become larger.
AUTHORIZE	To sanction.
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 a gas or liquid to clean or purge.
BALANCE	Place in equilibrium or match one item to another.
BEGIN	Perform the first part of an activity or function.
BEND	Turn by force from straight to curved or circular.
BEVEL	Cut or shape to an angle.
BLEED	Extract or let out some or all of a contained substance.
BLOCK	Inhibit a capability of a system or component, obstruct.
BLOW	Send forth a current of air or another gas.
BLOWDOWN	Clear out or free of obstruction by forcing a fluid or gas through.
BOIL	Generate bubbles of vapor by heating.
BOLT	Attach with fasteners.
BORATE	Add boric acid to a fluid.
BRAZE	Solder with a non-ferrous alloy that melts at a lower temperature than the metal being joined.

Action Verbs

VERB	DEFINITION
BREAK	• Destroy the unity or completeness of. • Open or separate a mechanical connection.
BRIEF	Give essential information.
BUMP	• To strike or knock with force. • To momentarily energize a motor to obtain a rotation check.
BYPASS	Circumvent a piping system component, a logic system function, or an installed switch.
CALCULATE	To determine by mathematical processes.
CALIBRATE	Check, adjust, or standardize the graduation of a quantitative measuring instrument.
CAP	Provide with covering.
CAPTURE	Preserve in a relatively permanent form.
CATCH	• To take hold of. • To prevent from falling.
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.
CHECK	Observe an expected condition exist (no actions to correct).
CHILL	Make cool without freezing.
CHOKE	• Enrich the fuel mixture of a motor by reducing the air intake to the carburetor. • To obstruct by filling up or clogging.
CHOOSE	Make a selection.
CIRCLE	Draw a circle around.
CLAMP	• Fasten or press two or more parts together. • Close off at a predetermined level.
CLASSIFY	Assign to a category.
CLEAN	Rid of dirt impurities or extraneous matter.
CLEAR	• Remove from service. • Move people or objects away from. • Free from obstruction. • Erase from memory.
CLICK	Select by pressing a button on a control device (e.g., computer mouse).
CLOSE	Change physical position of a mechanical device to prevent physical access or flow or permits passage of electrical current.
COAT	Cover or spread with a finishing or protective layer.

Action Verbs

VERB	DEFINITION
CODE	• Mark with identifying symbols. • Create or edit computer code.
COIL	Wind in a spiral shape.
COLLECT	Cause the assembly of something in fixed location or container.
COMMENCE	Begin an activity.
COMMUNICATE	Exchange information.
COMPARE	Examine the character or quality of two or more items to discover similarities and differences.
COMPILE	• Compose or put together using materials drawn from several sources • To run through a compiler on a computer.
COMPLETE	Bring to an end, finish.
COMPRESS	• Press or squeeze together. • To reduce in size, quantity, or volume. (e.g., compress a computer file).
CONDITION	• Adapt to a specific environment. • Put into a proper state for work or use.
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 (no actions to correct).
CONNECT	• Bring or ft together to form a unit. • Attach or mate a piping or electrical connection.
CONSIDER	Think about carefully in regards to taking some action.
CONSULT	Confer or seek expert advice.
CONTACT	Get in communication with.
CONTINUE	Go on with a particular action or the next action.
CONTROL	• To exercise restraining or directing influence over another entity. • To fix or adjust the time amount or rate of a process or system. • To regulate a process or system.
CONVERT	• To change from one form or function to another. • To alter for more effective utilization.
COOL	Lower the temperature.
COOLDOWN	Lower the temperature of a system or component.
COORDINATE	• To arrange performance of an activity involving other personnel. • To put in the same order or rank.
COPY	Make an imitation.
CORRECT	Amend for the purpose of improving.

Action Verbs

VERB	DEFINITION
COUNT	To include in a tallying or reckoning.
COUPLE	To connect, fasten together, or link.
COVER	To protect or shelter by placing something over or around.
CRACK OPEN	Slightly open a valve to establish low initial flow.
CRIMP	Compress or deform a connection barrel around a cable to make a connection.
CUT	Separate, penetrate, or decrease an item.
CYCLE	Cause repetition of an action or activity.
DECLARE	State officially or formally.
DECON	Remove contamination (decontaminate).
DE-ENERGIZE	Remove power from a component.
DEFEAT	• Nullify or prevent the success of. • Prevent or block an actuation by taking some action.
DEFLATE	Release air or gas from.
DELETE	Eliminate by blotting out, cutting out, or erasing.
DELIVER	Take and hand over to or leave for another.
DEPRESS	Press down.
DEPRESSURIZE	Release gas or fluid pressure from.
DESIGNATE	• Indicate and set apart for a specific purpose. • To point out.
DESTROY	Make useless and illegible.
DETECT	Discover or determine the existence, presence, or fact of.
DETENSION	Remove tension from a mechanical component.
DETERMINE	Calculate, find out, decide, or evaluate.
DEVELOP	Set forth or make clear by degrees or in detail.
DEVISE	Invent, form by new combinations or application of ideas or principles.
DEWATER	Remove water from.
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.
DISCARD	Throw away.

Action Verbs

VERB	DEFINITION
DISCHARGE	Give outlet to, vent, or remove electrical energy from.
DISCONNECT	• Separate or detach. • Unplug.
DISCONTINUE	Stop the use of.
DISENGAGE	Release or detach, unfasten.
DISCHARGE	Give outlet to, vent, or remove electrical energy from.
DISENGAGE	Release or detach interlocking parts; unfasten.
DISPATCH	Send off or away with speed.
DISPOSE	Get rid of, destroy.
DISSOLVE	Cause of pass into solution.
DISTILL	Subject to or transform by distillation.
DISTRIBUTE	Deliver or divide among several or many.
DIVIDE	• Perform mathematical division. • Separate.
DOCUMENT	Provide written support for actions taken or observations made.
DOG	Restrain a device or component to maintain it in particular position.
DON	Bear or have on one’s person; wear.
DOUBLE-CLICK	Click a computer link or icon twice in rapid succession.
DOWNLOAD	Transfer data from one computer to a second computer or to another device.
DOWN RANGE	Select lower range on an instrument which has multirange selection capabilities.
DRAG	Press and hold a button while moving a computer pointer device (e.g, mouse, etc.).
DRAIN	Draw or flow off a liquid.
DRAW	• Produce by marking on a surface. • Cause to come out of a container, extract.
DRILL	Bore or drive a hole into material.
DRIVE	• Move, either in or out. • Operate a vehicle. • Install or remove bearing races.
DRY	Cause to be free from water or fluid.
DUMP	Discharge or remove the contents of a vessel or system.
EDIT	To correct, revise.
ELIMINATE	Get rid of or set aside as unimportant.
EMPTY	Transfer by emptying or discharging contents.

Action Verbs

VERB	DEFINITION
ENCLOSE	Surround on all sides.
ENERGIZE	Supply electrical energy to component.
ENFORCE	Carry out effectively.
ENGAGE	Cause to interlock or mesh.
ENSURE	Perform a comparison with stated requirements and take action as necessary to satisfy the requirements.
ENTER	• Gain access to an area, cabinent, or bounded space. • Put in, insert data, or computer commands.
EQUALIZE	Make the value of a given parameter equal to the value of another parameter.
ERASE	• Rub or scrape out (something such as written, painted, or engraved letters). • Remove stored data from a computer storage medium (e.g., magnetic tape).
ERECT	Put up by fitting together.
ESCORT	Accompany.
ESTABLISH	Perform necessary actions to cause a specified set of conditions to exist.
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.
EXCAVATE	Make a hole or channel by digging.
EXCEED	Go beyond a given value or limit.
EXECUTE	• Carry out or put into effect. • Perform indicated task according to encoded instructions – used in a computer program or routine.
EXIT	Leave or withdraw.
EXPAND	Open up or increase the size.
EXPOSE	• Submit to an influence, such as radiation. • Cause to be visible or open to view, reveal.
EXPRESS	Make known or indicate.
EXTEND	Cause to be drawn out to a greater length.
EXTINGUISH	• Bring to an end. • Cause to cease burning.
EXTRACT	• Withdraw by physical or chemical process. • Determine by calculation.
FABRICATE	Construct from standardized parts.

Action Verbs

VERB	DEFINITION
FEED	Supply to a system or component.
FILE	• Rub smooth or cut away with a file. • Place among official records.
FILL	Occupy with an object or substance to a specified level; flood; replenish.
FILTER	Pass a liquid or gas through a porous material.
FLOOD	Fill abundantly or excessively.
FOCUS	Adjust to a clear image.
FLUSH	Lay one part over another part.
FOLD	Lay one part over another.
FOLLOW	Comply; accept as authority; obey; conform with directions or rules.
FORCE	Exert strength or power to overcome resistance.
FORM	• Give a particular shape to; shape or mold into a certain state • Make up.
FORMAT	• Layout or plan arrangement of something. • Prepare for storing data in a particular form (e.g., computer disk).
FORWARD	Send; transmit.
FRISK	Survey radiologically.
GAG	Install restraining devices that prevent operation; act of restraining a service or component.
GIVE	Put into the possession of another.
GO TO	• Proceed or move to. • Route user to another procedure or a new location in the same procedure.
GRAPH	Record data by means of dots and lines so relationships between the data can be seen.
GREASE	Smear or lubricate with grease.
GRIND	Pulverize, polish, wear down, sharpen, or smooth.
GROOVE	Cut or make a long narrow channel.
GROUND	Connect an electrical circuit to ground.
GUARD	• Be on watch; tend to carefully. • Prevent unauthorized entry.
GUIDE	Manage or direct the movement of.
HAND	Give, pass, or transmit with the hands.
HANDLE	Manipulate objects manually or with specially designated equipment such as hoists.
HANG	Fasten to some elevated point without support from below; suspend.
HAVE	Cause to occur.

Action Verbs

VERB	DEFINITION
HEAT	Increase the temperature of.
HOIST	Raise; lift.
HOLD	• Maintain something at a given position or condition. • Continue to press a computer keyboard or pointer device button.
HONE	Use a fine grit stone for sharpening a cutting implement or smoothing a surface.
IDENTIFY	Make know or establish the identity of.
IMMERSE	Plunge into something that surrounds or covers.
IMPLEMENT	Commence a program or series of procedures.
IMPROVE	Make greater in amount or degree; make better.
INCLUDE	Take in or comprise as a part of, add to.
INCORPORATE	Unite closely or so as to form one.
INDENT	Set in (from the margin).
INDICATE	State or express briefly.
INFLATE	Fill with a given amount of a gas or air.
INFORM	Communicate information.
INHIBIT	Block an automatic action or disable a component function.
INITIAL	Affix one's initials.
INITIALIZE	Set a computer or computerized equipment to a starting position or value.
INITIATE	Begin activity function or process.
INJECT	• Drive fluid into. • Introduce a new element.
INSERT	• Push, move, or activate a component or system inward. • Push or set into, between, or among.
INSPECT	Measure, observe, evaluate a featured against specified limits.
INSTALL	Establish at a predetermined place; setup for use or service.
INSULATE	Separate from conductive bodies with nonconductors.
INVERT	Turn upside down.
ISOLATE	Separate, set apart, seal off, or close boundary; remove from service.
ISSUE	Officially put forth or distribute.
ITEMIZE	Set down item by item.
JACK	Raise; break free.
JOG	Apply momentary electrical force to a motor to check rotation direction.
JUMPER	Bypass or cause to leap over.

Action Verbs

VERB	DEFINITION
LABEL	Title, describe, or designate.
LAND	Replace a lifted lead back into original position.
LAP	Dress, smooth, or polish.
LATCH	Secure with device or reset the function of machinery.
LAUNCH	Initiate a subroutine such as on a computer.
LEAVE	• Cause to be or remain in some specified condition. • Go away from; depart.
LEVEL	Cause to become even or parallel with the plane of the horizon.
LIFT	• Remove by exerting force to overcome resistance of weight. • Remove an electrical lead from a terminal point.
LIGHT	Illuminate or ignite.
LIMIT	Restrict or set bounds.
LINE UP	• Place in alignment (e.g., establish the perquisites necessary for system operation). • Place in proper order.
LINK	Form a connection between two objects.
LIST	Make a written series of something, often in a particular order.
LISTEN	Pay attention to sound.
LOAD	Connect an electrical component or unit to a source of electrical energy.
LOCATE	Determine place or position.
LOCK	Fasten or secure for control.
LOG	Enter details.
LOOSEN	Cause to become less tight fitting or release from restraint.
LOWER	• Let down or move down. • Reduce in size, amount, number, or intensity.
LUBRICATE	Put lubricant on specified locations.
MACHINE	Reduce or finish by turning, shaping, planning, or milling using machine operated tools.
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	Correspond precisely.
MATCH MARK	Mark the relative positions of two or more components.
MAY	Denotes permission, is neither a requirement nor a recommendation.

Action Verbs

VERB	DEFINITION
MAXIMIZE	• Raise to the highest or greatest possible value. • Display a computer window at the largest size.
MEASURE	Determine the dimensions, capacity, or amount of an object by use of standard instruments or utensils.
MEGGER	Measure electrical insulation resistance to ground by use of an insulation test set.
MELT	Change from a solid to a liquid state by adding heat.
MIC	Measure with a micrometer.
MILL	Process raw material by grinding, stamping, cutting, or finishing.
MINIMIZE	• Make as small as possible. • Reduce a computer window to its smallest size or, in some cases, hide the window.
MIX	Blend, merge, or mingle into one mass.
MODULATE	Position a valve to a required position by use of controller to establish and maintain a required parameter.
MONITOR	Continuous or frequently repeated activity of watching, observing, regulating, or keeping track of.
MOUNT	Attach to a support or specified location.
MOVE	Change from one location or position to another.
MULTIPLY	• Perform multiplication on as part of a mathematical calculation. • Increase an object in multiples.
NAVIGATE	Move toward or follow a map toward a destination.
NEUTRALIZE	• Make chemically neutral or electrically inert. • Destroy the effectiveness of; Nullify.
NOTE	Pay attention to some activity, parameter, condition, or other information as it relates to instructions.
NOTIFY	Inform specified personnel or organization as of past, present of future actions or results.
NULL	Make invalid; insignificant.
NUMBER	Affix numbers to objects (e.g., pages of a document).
OBSERVE	Pay special attention to.
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. • Make available for entry or passage.
OPERATE	• Cause or influence the operation of. • Manipulate or control as necessary to achieve stated objective.

Action Verbs

VERB	DEFINITION
OVERHALL	The act of disassembling equipment units down to all removable parts; cleaning, critically inspecting, repairing, restoring, and replacing where necessary; assembling, adjusting, aligning, recalibrating, and verifying operational readiness by test or checkout.
PACK	Fill with packing material.
PACKAGE	Enclose in a box, wrapper, or covering.
PAINT	Apply color or pigment (suspended in suitable liquid) to a surface.
PARALLEL	Place as to be aligned in direction with something.
PATCH	Mend, cover, or fill up a hole or weak spot.
PERFORM	Carry out the functions, requirements, or terms, do, carry, or bring about.
PIPET	Draw and volumetrically transfer fluid using a pipette.
PLACE	Put, set, or fix in designated position or location.
PLAN	Arrange the parts of, devise or project the achievement of.
PLOT	• Locate a point by means of coordinates. • Represent by means of a curve.
PLUG	• Close off the open end of a tube/pipe using a device that fits internally to the tube/pipe. • Insert an electrical plug into a service outlet.
POINT	Position the pointer over a particular object and location.
POLISH	Make smooth and shiny.
POSITION	Put or set in a specific configuration, place, or orientation.
POST	• Affix signs or notices. • Station in a given place.
POUR	Cause to flow in a stream.
PRECOAT	Perform actions required to complete a precoating process.
PREPARE	Make ready.
PRESENT	Introduce formally.
PRESS	To push steadily against.
PRESSURIZE	Raise pressure in a controlled manner.
PREVENT	Keep from happening or existing.
PRIME	• Put in working condition by filling or charging. • Apply the first color, coat, or preparation to a surface.
PRINT	• Write in characters similar to those commonly used in print (not cursive writing). • Produce a printed copy.
PROCEED TO	Route user to another procedure or a new location in the same procedure.

Action Verbs

VERB	DEFINITION
PROCESS	Submit to a series of actions or operations leading to a particular end.
PROVIDE	Make preparation to meet a need.
PULL	• Exert force upon an object so as to cause motion toward the force. • Perform a sampling function.
PULL OUT	Exert force upon an object so as to cause motion toward the force and away from the objects base.
PUMP	Move by operating a device which raises, transfers, or compresses fluids by suction, pressure, or both; move up and down or in an out as if with a pump handle.
PUNCTURE	Pierce with a pointed instrument or object.
PURGE	• Get rid of or eliminate. • Force flow through a system, component, or container such that the contents of the volume are replaced.
PUSH	Move ahead or away by steady pressure without striking.
PUT	Deposit or leave.
RACK IN	Physically insert a circuit breaker to full in or other specified position (e.g., Test).
RACK OUT	Physically withdraw a circuit breaker to full our or other specified position (e.g., Test).
RAISE	Increase the amount; move to higher position.
RAMP	Change gradually and constantly until desired result is achieved.
READ	Obtain the value or meaning by visual observation.
REAM	Enlarge, shape, or clear with a reamer.
RECALL	Cal back.
RECEIVE	Come into possession of.
RECIRCULATE	Cause a liquid or gas to follow a closed system that returns to the starting point.
RECOGNIZE	Perceive to be something previously known or diagnosed.
RECOMMEND	Urge the acceptance or use of.
RECORD	Document specified condition, data, or characteristic.
RECYCLE	Pass again through a series of changes or treatments.
REDUCE	Cause a parameter to decrease in value.
REFER TO	Direct to a source of help or information.
RE-ESTALISH	Restore a previous condition, alignment, or process.
REFURBISH	Brighten or freshen up; make like new.
REGULATE	Control or restrict.
REHANG	Preplace a tag that was previously attached to a component.
REJECT	Refuse to have, use, or take for some purpose.

Action Verbs

VERB	DEFINITION
RELEASE	• Set free from restraint or confinement. • To give permission. • Unlock, set free from a fixed position.
RELIEVE	• Reduce load. • Free from duty. • Furnish assistance.
REMOVE	Transfer or move, take off, out of, or away.
REPAIR	Restore to proper condition of function.
REPEAT	Say or do again.
REPLACE	Change or substitute serviceable equipment. Put back into former position or place.
REPORT	Describe as being in a specific state or condition.
REQUEST	Ask for.
RESET	• Remove an active output signal from retentive logic device even with the input signal still present. • Clear a mechanical trip.
RESTORE	• Bring a parameter or component back within specified limits or original condition. • Return to service.
RESTRAIN	Hold back from action; keep under control.
RESTRICT	Keep within limits; restrain.
RESUME	Return to or begin again after interruption or a pause.
RETAIN	Hold in possession or use.
RETRACT	Draw back or in.
RETURN	• Go back or come back again. • Pass back to an earlier possessor.
RETURN TO	• Move backwards on a course of action from one point to another. • For procedures, return to the procedure and step specified.
REVERSE	Change direction.
REVIEW	Examine, inspect, or survey critically and deliberately.
REVISE	Change or modify.
REWORK	The process by which a nonconforming item is made to conform to a prior specified requirement by completion, remachining, reassembling, or other corrective measures.
RIG	Put in a condition or position for use.
RIGHT-CLICK	Select right side of a pointer device (e.g., mouse) to access computer functions.
RINSE	Clean by using clean water.

Action Verbs

VERB	DEFINITION
ROLL	Place in motion.
ROPE OFF	Partition, separate, or divide by a rope.
ROTATE	Cause to revolve about an axis or center; turn.
ROUTE	Send by a selected course of travel; divert in a specified direction.
RUN	• Direct the operation of a business or set of activities. • Start a computer program.
RUNBACK	Establish a reduction in demand for a component, system, or unit.
SAMPLE	Take a representative portion for the purpose of examination or evaluation.
SAND	Scour, smooth, or polish with an abrasive.
SATURATE	Treat, furnish or charge with something to the point where no more can be absorbed, dissolved, or retained.
SAVE	Electronically store information or files (paper and electronic).
SCAN	Observe briefly.
SCHEDULE	Appoint, assign, or designate for a specific time.
SCORE	Mark a surface using a sharp blade or a file.
SCRAM	To fully insert control rod(s) into a nuclear reactor.
SCRAPE	Remove from, smooth, or clean a surface by repeated strokes of an edged instrument.
SCREED	Produce a smooth flat layer of concrete or similar material.
SCREW	• Attach, fasten, or close by means of a screw. • Attach by means of a twisting motion in the proper direction.
SCRIBE	Etch a mark in a surface by use of a sharp pointed tool.
SCROLL	Move through text or numbers across a computer display.
SCRUB	Clean with hard rubbing.
SEAL	Secure with a closure against access or leakage.
SEARCH	Look into carefully or thoroughly in an effort to locate or discover something.
SEAT	Fix firmly in place.
SECURE	• Fasten, make safe, or tie. • Remove from service. • Stop a device.
SEGREGATE	• Set or keep apart. • Classify or categorize.
SELECT	• Choose from among several; take by preference of fitness from a number or group (e.g., pick using a computer pointer device). • Turn a switch to a desired position.

Action Verbs

VERB	DEFINITION
SEND	• Forward information or equipment to others. • Direct an individual to another location.
SEPARATE	• Set or keep apart. • Classify or categorize.
SET	Physically adjust and adjustable feature to a specified value.
SET UP	Assemble and arrange tools and apparatus required for an assigned task.
SHAKE	Move or cause to go to and from in a quick jerky manner; agitate.
SHALL	Denotes a requirement or a mandatory activity.
SHAPE	Manipulate into a particular form.
SHIELD	Provide with protective cover or barrier.
SHIFT	Change mode of operation, usually speed.
SHIP	Send material to another location.
SHOULD	Used to denote a recommendation that is to be performed unless specific conditions preclude it.
SHOW	Cause or permit to be seen; exhibit.
SHUT DOWN	Stop operating equipment and place in standby.
SIGN	Write signature on a specified space.
SIGN OFF	Approve or acknowledge something by or as if by a signature.
SIGNAL	• Notify or communicate by signals (e.g., prearranged sign, notice, symbol conveying a command, warning, direction, other message). • Contact.
SLIDE	Cause to move in a smooth manner over a surface.
SLIP	Move with a smooth, sliding motion.
SLUICE	Moving a medium using water and pressure.
SMEAR	Take contamination surveys using a paper or fabric collection medium.
SOLDER	Unite or repair with a melted metallic alloy.
SNUG	Cause to fit tightly.
SPARGE	Agitate (a liquid) by means of compressed air or gas entering through a pipe.
SPECIFY	Name or state explicitly or in detail.
SPIN	Cause to move rapidly.
SPLICE	Unite by joining ends together.
SPRAY	Apply with a device which disperses a jet of fine droplets.
SPREAD	Apply over a surface.
SQUARE	Form with four equal sides and right angles or flat surfaces.

Action Verbs

VERB	DEFINITION
SQUEEZE	Exert pressure on opposite sides.
SQUIRT	Eject liquid in a short, thin stream.
STABLIZE	Hold or maintain steady; minimize fluctuations.
STAGE	Gather materials required to complete a task or evolution.
STAND	• Maintain a position or remain stationary. • Set upright.
START	• Initiate operation of a device, either directly or by remote control. • Initiate or originate an activity.
START UP	• The act of setting in operation or motion. • Perform operations necessary for equipment to start operating; initiate operation.
STATION	Assign to or set into position.
STIR	Disturb relative position of particles or parts of, especially by a continued circular motion.
STONE	Grind or polish a metal surface by use of a solid abrasive wheel or block.
STOP	Shut down equipment, terminate operation, or cease.
STORE	Deposit or leave in a specified place for future use.
STRETCH	Lengthen or widen by exerting force.
STRIP	Remove, expose, or peel away.
STROKE	• Operate a valve over its full travel. • Go through a motion (e.g., valve or damper movement).
SUBMIT	Make available; offer, deliver.
SUBTRACT	Perform subtraction; deduct.
SUPERVISE	Oversee.
SUPPORT	Hold up or provide a foundation or props for.
SURVEY	Examine comprehensively, inspect carefully.
SUSPEND	Stop actions at a point.
SWIRL	Move in a whirling motion.
SYNCHRONIZE	• Make exactly simultaneous in operation. • Establish a phase to phase alignment.
TAG	• Label for identification; mark. • Connect a tag to.
TAKE	• Get into or carry in one’s hands or one’s possession; obtain. • Deliver.
TAP	• Strike lightly. • Add internal threads.

Action Verbs

VERB	DEFINITION
TAPE	Apply strip of adhesive covering.
TARE	Weigh to determine the gross weight of a substance and its container making an allowance for the weight of the container.
TENSION	Tighten a mechanical component with force.
TERMINATE	• End a function; stop an activity. • Install a lug on a cable.
TEST	Perform specified operations o confirm operational readiness or capability of a system, subsystem, or component; check out.
THAW	Go from a frozen to a liquid state.
THREAD	Form a screw thread; install a threaded rod; move or cause to move in a sinuous, spiral, or circular course.
THROTTLE	Operate a valve in an intermediate position to obtain certain flow rate or pressure.
THROTTLE CLOSED	Place a valve in an intermediate position by moving in the closed direction.
THROTTEL OPEN	Place a valve in an intermediate position by moving in the open direction.
TIE	Fasten, attach, or close by means of a line or cord.
TIGHTEN	Perform necessary operations to fix more firmly in place.
TIME	Measure a span of time.
TITRATE	Determine the concentration of a dissolved substance in terms of the smallest amount of a known concentration required to bring about a given effect in reaction with a known volume of the test solution.
TORQUE	Apply turning or twisting force to specified value; tighten.
TRACE	Follow or study out in detail or step by step.
TRAIN	Teach or instruct.
TRANSFER	• Convey, transport, transmit or cause to pass from one place to another. • Change the mode of operation of a controlling device. • Alternate between operating trains or components.
TRANSMIT	• Send out a radio or microwave signal. • Electronically deliver to a computer device.
TRANSPORT	Transfer or convey from one place to another.
TREND	Identify the direction (increasing or decreasing) of the average rate of change on the value of a parameter.
TRIM	Remove excess material by cutting.
TRIP	Manually activate or deactivate a semiautomatic feature.
TROUBLESHOOT	Investigate for purpose of locating or eliminating sources of problem.

Action Verbs

VERB	DEFINITION
TURN	• Cause to move around an axis; rotate or revolve. • Reverse sides.
TWIST	Subject to a wrenching by which one part is under pressure to turn about a longitudinal axis while the other part is held fast or is under pressure to turn in the opposite direction.
UNBOLT	Open or unfasten by withdrawing a bolt or nut.
UNCAP	Remove or uncover.
UNCOUPLE	Disconnect, unfasten, or unlink.
UNLOAD	• Take off; take cargo from. • Remove load from a generator.
UNLOCK	Unfasten the lock of.
UNPLUG	Disconnect from an electrical circuit by removing a plug.
UNSCREW	Loosen or withdraw by turning in the proper direction.
UNWIND	Cause to uncoil or unroll.
UPDATE	Revise or include new information or data.
UPLOAD	Transfer data into a computer.
USE	Put into action or service; employ.
VACUUM	Operate a suction device.
VALIDATE	Confirm or verify.
VARY	Alter or change.
VENT	Permit a gas or liquid contained under pressure to escape from a vent.
VERIFY	Observe an expected condition exist (no actions to correct).
WALK DOWN	Perform inspection activities.
WARM UP	The act or instance of warming a component or system.
WASH	Cleanse by or as by the action of a liquid.
WEAR	• Have on the person; put on. • Cause to deteriorate by use.
WEIGH	Measure the heaviness of as by a scale.
WELD	Unite metal parts by heating and allowing the parts to flow together.
WIPE	Rub with something soft for cleaning or drying.
WITHDRAW	Take back, away, or out.
WRAP	Wind or coil as to encircle or cover something.
WRITE	Compose or set down by inscribing words, letters, or symbols.

Action Verbs

VERB	DEFINITION
ZERO	• Perform a series of commands that bring instrumentation values back to zero. • Null a device or component.

Acknowledgements

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