

## **Standard**

# **Technical Procedure Writing**

**Idaho  
Cleanup  
Project**

CH2M • WG Idaho, LLC is the Idaho Cleanup Project contractor for the U.S. Department of Energy

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 1 of 104 |
|------------------------------------|---|

|                       |          |   |                          |
|-----------------------|----------|---|--------------------------|
| Idaho Cleanup Project | Standard | For Additional Info:<br><a href="http://EDMS">http://EDMS</a> | Effective Date: 08/19/10 |
|-----------------------|----------|---|--------------------------|

Manual: 1 – Administration

Change Number: 330459

\*The current revision can be verified on EDMS.

## CONTENTS

|    |  |    |
|----|--|----|
| 1. | PURPOSE .....                                | 9  |
|    | 1.1 Scope of This Standard .....             | 9  |
|    | 1.2 Applicability of This Standard .....     | 10 |
| 2. | USING TPRs .....                             | 10 |
| 3. | DEVELOPING TPRs .....                        | 11 |
| 4. | CRITERIA FOR TPRs .....                      | 12 |
| 5. | CONTENT OF TPRs .....                        | 13 |
| 6. | STYLE, USAGE, AND GRAMMAR IN TPRs .....      | 13 |
| 7. | TPR FORMAT AND FRONT MATTER SUMMARY .....    | 14 |
|    | 7.1 TPR Format Summary .....                 | 14 |
|    | 7.2 General Format Elements .....            | 17 |
|    | 7.2.1 Margins .....                          | 17 |
|    | 7.2.2 Tab Settings .....                     | 17 |
|    | 7.2.3 Justification .....                    | 17 |
|    | 7.2.4 Fonts .....                            | 18 |
|    | 7.2.5 TPR Header Information .....           | 19 |
|    | 7.3 Front Matter Page Formats .....          | 21 |
|    | 7.3.1 Cover Page .....                       | 22 |
|    | 7.3.2 Contents Page .....                    | 24 |
| 8. | DEVELOPING TPR SECTIONS .....                | 25 |
|    | 8.1 TPR Titles .....                         | 25 |
|    | 8.2 Purpose Statement .....                  | 25 |
|    | 8.3 Scope and Applicability Statements ..... | 25 |

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 2 of 104 |
|------------------------------------|---|

|        |  |    |
|--------|--|----|
| 8.4    | Precautions and Limitations.....   | 26 |
| 8.4.1  | Identifying and Writing P&Ls.....  | 27 |
| 8.4.2  | Formatting the P&Ls Section.....   | 28 |
| 8.5    | Prerequisites Section.....   | 29 |
| 8.5.1  | Identifying Prerequisites.....   | 29 |
| 8.5.2  | Formatting the Prerequisites Section.....  | 30 |
| 8.6    | Instructions Section Elements.....   | 33 |
| 8.6.1  | Procedure Step Numbering.....  | 33 |
| 8.6.2  | Sign-offs.....   | 34 |
| 8.6.3  | Performer Designation.....   | 38 |
| 8.7    | General Procedure Step Writing Standards.....  | 43 |
| 8.8    | Conditional Action Steps.....  | 49 |
| 8.9    | Nonsequential Action Steps.....  | 53 |
| 8.10   | Equally Acceptable Alternative Action Steps.....   | 53 |
| 8.11   | Time-Dependent Action Steps.....   | 55 |
| 8.12   | Concurrent Action Steps.....   | 57 |
| 8.13   | Continuous Action Steps.....   | 58 |
| 8.14   | Repeated Action Steps.....   | 59 |
| 8.15   | Action Steps Containing Verifications, Checks, Notifications,<br>and Data Recording..... | 60 |
| 8.16   | Lists.....   | 62 |
| 8.17   | Hold Points.....   | 63 |
| 8.18   | Referencing and Branching.....   | 64 |
| 8.18.1 | Referencing and Branching Criteria.....  | 65 |
| 8.18.2 | Referencing and Branching Considerations.....  | 66 |
| 8.18.3 | Branching.....   | 66 |
| 8.18.4 | Referencing.....   | 67 |
| 8.18.5 | Complex Situations Involving Branching and Referencing.....                              | 68 |
| 8.18.6 | Routing Tables.....  | 69 |

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 3 of 104 |
|------------------------------------|---|

|        |  |     |
|--------|--|-----|
| 8.18.7 | General Referencing Instructions.....        | 71  |
| 8.19   | Warnings and Cautions.....                   | 73  |
| 8.19.1 | Identifying Warnings and Cautions.....       | 73  |
| 8.19.2 | Developing Warnings and Cautions.....        | 73  |
| 8.19.3 | Formatting Warnings and Cautions.....        | 75  |
| 8.20   | Notes.....                                   | 78  |
| 8.21   | Forms.....                                   | 80  |
| 8.22   | Procedure Close-out Actions.....             | 80  |
| 8.22.1 | Testing.....                                 | 80  |
| 8.22.2 | Restoration.....                             | 80  |
| 8.22.3 | Results.....                                 | 81  |
| 8.23   | Records.....                                 | 82  |
| 8.24   | Definitions, Acronyms, and Initialisms.....  | 83  |
| 8.24.1 | Definitions.....                             | 83  |
| 8.24.2 | Handling Acronyms and Initialisms.....       | 83  |
| 8.25   | References.....                              | 83  |
| 8.26   | Appendixes Section.....                      | 86  |
| 9.     | CONTENT AND FORMAT OF APPENDIXES.....        | 87  |
| 9.1    | Content.....                                 | 87  |
| 9.2    | Format.....                                  | 88  |
| 9.2.1  | Appendix Header.....                         | 88  |
| 9.2.2  | Appendix Designator and Title.....           | 88  |
| 9.2.3  | Appendix Page Numbering.....                 | 88  |
| 9.2.4  | Appendix Footer.....                         | 89  |
| 9.2.5  | Generating Appendixes.....                   | 89  |
|        | Appendix A, TPR Style Sheet.....             | 92  |
|        | Appendix B, Example Technical Procedure..... | 104 |

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 4 of 104 |
|------------------------------------|---|

**EXAMPLES**

1-1. Purpose statement .....10

7-1. TPR primary section headings, formats for procedure section headings, and action step numbering, along with [MS Word TEM-5 styles].....16

7-2. Form 412.09 first-page header information .....19

7-3. Information in the header that is repeated on each page of the procedure .....20

7-4. Document Management information that appears only on the first page of the procedure.....21

8-1. Purpose statement .....25

8-2. Scope and applicability statements .....26

8-3. Precaution and limitation statements .....29

8-4. Format of prerequisites section without second-order section headings .....31

8-5. Format of prerequisites section with second-order section headings .....32

8-6. First-, second-, and third-level procedure step and substep numbering, alignment, and indentation.....33

8-7. First-, second-, and third-order section heading numbering, alignment, and indentation.....34

8-8. Signature and date lines .....35

8-9. Upper- and lower-level step sign-offs—sign-offs are placed at substeps when the substeps must be performed in sequence .....36

8-10. Upper- and lower-level step sign-offs—sign-off is placed at the upper-level step in this example with two substeps that may be performed in any sequence .....37

8-11. Designating performers for individual steps when several performers with different job functions perform procedure steps.....39

8-12. Designating a performer for a series of substeps completed by the same performer. The upper-level step identifies the performer of the substeps .....40

8-13. Identification of each performer when several individuals perform a series of substeps. In this example, all the performers of the substeps are shown as performers of the upper-level step..... 41

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 5 of 104 |
|------------------------------------|---|

8-14. Identification of each performer when several individuals perform a series of substeps. In this example, the performer specified at the upper-level step is the individual (Technical Leader) directing the activity .....42

8-15. Designating a performer in the first step following each section heading when there are multiple procedure performers.....42

8-16. Imperative sentence structure used for action steps.....43

8-17. State the action or objective of the step followed by the means to achieve the action or objective.....44

8-18. “Ensure” versus “verify.”.....45

8-19. Proper referencing instructions in lieu of “per” when “per ”directs the performer to depart from the current location in the base procedure to perform a task .....46

8-20. Three closely related action verbs combined in a single action step .....47

8-21. Proper page breaks .....48

8-22. Imperative sentence structure for upper-level action step that introduces a series of substeps.....49

8-23. Format for conditional action steps. IF presents the condition; THEN presents the action to be performed if the condition is satisfied .....50

8-24. Format for conditional action steps using the logic term AND when two conditions must be satisfied prior to performing the action.....50

8-25. Format for conditional action step using the logic term OR when one or both conditions must be satisfied prior to performing the action .....50

8-26. Format for conditional action step using a list to present three or more conditions that must be satisfied prior to performing the action .....51

8-27. Format for conditional action step using a decision table to present multiple conditions and actions to be performed for each condition.....51

8-28. Using “and” as an unemphasized conjunction rather than emphasized logic term in a conditional action step .....52

8-29. Format for a conditional action step illustrating the use of the logic term NOT to emphasize an event or condition to be avoided.....52

8-30. Nonsequential action step series preceded by a note specifying the steps of the series. Checkoff boxes or sign-off lines may be used to ensure no steps are skipped.....53

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 6 of 104 |
|------------------------------------|---|

8-31. Alternative action steps with a single condition for each equally acceptable action.....54

8-32. Format used for equally acceptable alternative action steps. Note the alignment of “OR.” .....54

8-33. Format for time-dependent action steps.....56

8-34. Time-dependent action step with time requirement specified in the step. No note identifying the time requirement is needed.....57

8-35. Format for concurrent action steps performed by one person .....57

8-36. Format for concurrent action steps performed by more than one person .....58

8-37. Format for continuous action steps .....59

8-38. Notification that continuous action steps have been discontinued .....59

8-39. Format for repeated action steps .....59

8-40. Verification steps .....61

8-41. Format for data recording step with calculations.....62

8-42. List item format.....63

8-43. Format for explicit hold point designation prior to an action step.....64

8-44. Format for an implicit hold point.....64

8-45. Branching step format.....67

8-46. Referencing step format.....68

8-47. Complex referencing steps using conditional step statements.....68

8-48. Referencing step (4.4.1), complex referencing step (4.4.2.1), and complex branching step (4.4.2.2) .....69

8-49. Routing table used to direct the performance of procedure steps based upon current and desired system conditions; steps that are not relevant to the current and desired condition are not performed .....70

8-50. Routing table used to direct the performance of procedure sections based upon an existing condition. This table serves as a convenient tool for the user to determine which sections are to be performed to respond to a condition.....71

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 7 of 104 |
|------------------------------------|---|

8-51. General referencing instructions. These steps do not require detailed referencing instructions specified in Section 8.18.4 (GO TO... THEN RETURN TO...) because the referencing instruction stated in the action step is obvious to the procedure user .....72

8-52. A warning that identifies the hazard and states the potential consequences to the procedure performer followed by a step that tells the performer how to avoid the consequences.....74

8-53. A caution that states the hazard and consequences of the hazard to equipment followed by steps that tell the performer how to avoid the consequences.....75

8-54. The warning shown in this example illustrates the format used for warnings and cautions. They are formatted the same (bold font, uppercase warning or caution title), except for the width of the box border .....76

8-55. Format for multiple, numbered warnings in one warning box .....77

8-56. Note containing an embedded action step (hidden command) and rewritten to remove the embedded action .....78

8-57. Numbered notes .....79

8-58. Format for a note that precedes the associated action step. Example shows two blank lines before the note .....79

8-59. Citing and managing forms in procedures .....80

8-60. List of records generated or received during the performance of a procedure and note explaining records management requirements.....82

8-61. Format for specifying acronyms and initialisms.....83

8-62. List of references.....85

8-63. Format for listing appendixes .....86

9-1. Format for the appendix designator and title located at the top of the first page of the appendix.....88

9-2. Appendix footer. .... The appendix designator appears at the bottom of each page of the appendix.....89

9-3. Format for numbered items in appendixes.....90

9-4. Subordinate numbering and indentation in appendixes for steps and section headings .....91

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>8</b> of 104 |
|------------------------------------|--|

**FIGURES**

7-1. Form 412.14, “ICP Controlled Document Cover” (reduced to fit) .....23

7-2. Sample of optional contents page (reduced to fit).....24

**TABLES**

6-1. Company standards and company-accepted references.....14

7-1. Font attributes of TPR elements .....18

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 9 of 104

## 1. PURPOSE

Technical procedures (TPRs) give directions for performing hands-on, technical tasks, usually at the “how-to-do” level of detail. TPRs state how to accomplish the various technical tasks necessary to start, test, operate, and maintain equipment and systems. TPRs describe the processes to be followed to ensure that the various task functions are effectively integrated and that applicable requirements are appropriately implemented. This standard explains how TPRs are used and specifies their content and format. STD-9 assists in producing TPRs that promote safe and efficient operations.

This document establishes the company standard for developing TPRs. This standard provides for:

- Developing accurate, complete, clear, consistent, and usable content within an established format
- Writing action steps that present correct, concise, and easily understandable instructions
- Providing and clearly presenting adequate precautions, cautions, and warnings to promote safe task completion.

### 1.1 Scope of This Standard

This standard assists writers, reviewers, document owners, subject matter experts, support personnel, and users involved in developing, writing, and using TPRs by providing specific content and format standards. Universal grammar and usage conventions provided in standard reference books are not addressed in this standard. Company standards and reference books are listed in Table 6-1 located in Section 6, “Style, Usage, and Grammar in TPRs.”

This standard does not cover:

- Procedure bases, which describe the requirements and other considerations that cause a procedure to have a given content, organized and presented in a specific sequence. A procedure basis is necessary to develop a useful TPR and maintain requirements implementation traceability. Anyone assigned responsibility for developing a TPR should confirm that a procedure basis has been developed in accordance with STD-7, “Procedure Basis Development.”
- Management control procedures (MCPs), which prescribe the accomplishment of administrative processes and actions necessary to carry out programs at the “what to do” level of detail. Refer to STD-8, “Management Control Procedure Writing,” if the procedure to be written is administrative.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 10 of 104 |
|------------------------------------|--|

- Emergency, abnormal operating, and alarm response procedures, collectively identified as EAR procedures, which define action steps to be taken when an off-normal condition exists. Refer to STD-10, “Emergency, Abnormal Operating, and Alarm Response Procedure Writing,” when an EAR is to be written.
- Emergency plan implementing procedures (EPIs), which have their own content requirements and organization. Only the Emergency Management organization is authorized to approve EPIs, and any organization that thinks it has identified a situation requiring an EPI should contact Emergency Management.

This standard specifies TPR content, format, and style. Because this document is a standard, its format and style differ from the format and style required for TPRs. Do not use nor confuse the format and style required to write this standard with format and style used for TPRs.

Content, format, and style requirements for TPRs are detailed in the remaining sections of this standard and are illustrated in examples and figures presented in this document. To aid readers in distinguishing between the text of this standard and text of examples, examples will be numbered, given a title, and set apart with horizontal lines as shown below in Example 1-1.

---

Example 1-1. Purpose statement.

---

### **1.1 Purpose**

Testing and adjusting pressure relief valves to their specified relief pressures ensures that system operating pressures remain within safety limits.

---

### **1.2 Applicability of This Standard**

This standard applies to all TPRs for any company organization and to all personnel developing, reviewing, approving, or releasing TPRs. This standard applies to all TPRs written or revised after the effective date of this standard.

The examples in this standard cannot cover every situation. Apply the principles defined in the standard, when writing or revising TPRs for any company organization.

## **2. USING TPRs**

A TPR gives users directions for performing a technical task. Sound procedures, properly used, are among the most direct and effective methods available to managers to ensure that their operations meet the company’s objectives. TPRs provide managers with a critical management tool to communicate detailed expectations for how individual workers are to perform specific tasks. Procedures integrate requirements, management

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 11 of 104 |
|------------------------------------|--|

philosophies and strategies, and technical knowledge to aid in safe, efficient work performance.

### 3. DEVELOPING TPRs

Technical procedures are prepared, approved, controlled, and performed in accordance with the requirements specified in Chapter XVI, “Operations Procedures,” of DOE Order 5480.19, “Conduct of Operations Requirements for DOE Facilities.”

Procedures are written for the persons who use them; therefore, procedure users are an important information source when developing procedures. Procedure users should be involved in the process from the initial decision to write a procedure through development, verification (a check that determines whether a procedure is technically accurate, complete, and up to date), and procedure validation (a demonstration that the procedure can be performed by the intended users exactly as written).

Procedure users provide valuable insight into the job being performed and information about past operating experience, which is the foundation of a successful procedure. Their involvement in the process can include participating in analyses, walkthroughs, and walkdowns; and identifying behavioral obstacles, cautions, and valuable nonstandard source documentation beyond safety analysis reports, job safety analyses, probabilistic risk assessments, technical safety requirements, vendor manuals, and old procedures. These types of inputs greatly speed actual procedure writing, decrease the likelihood that subsequent revision will cause loss of a step that implements a critical requirement, and increase the likelihood that the procedure will do its intended job in a safe, cost-effective manner.

Procedures are a key factor affecting safe and proper facility operations. The extent of detail in a procedure should depend on the complexity of the task, experience and training of the user(s), frequency of performance, and the significance of the consequences of procedural error. Procedures should be sufficiently detailed to perform the required work without direct supervision. Appropriate attention should be given to writing, reviewing, and monitoring procedures. Consistency in procedure format, content, and wording, as presented in this standard, is essential for preparing procedures that can be easily performed without user error.

New TPRs, TPR revisions, and TPR cancellations are proposed, processed, and controlled as directed by MCP-135, “Document Management.” TPR research, analysis, and development are also performed in accordance with MCP-135. The extent of the effort is subject to the application of the graded approach. Grading is applied in determining the extent of review needed and the type of validation that is appropriate.

TPRs are one controlled document type. Controlled documents are documents released within a system that imposes necessary controls on document development, revision, distribution, receipt, and recall. The Document Management organization manages

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 12 of 104

controlled documents, organizing information into document types to meet information needs.

#### 4. CRITERIA FOR TPRs

TPRs serve two purposes:

- To help personnel perform technical tasks safely, consistently, and efficiently
- To communicate management's expectations of how work is to be performed.

When these purposes are considered, it is apparent that not every technical operation requires a TPR; procedures do not automatically add value. Some activities may benefit more from other types of work control, such as operator aids, training, or day-to-day supervision. Therefore, the first task in the procedure process is to determine whether a given activity would benefit from a procedure. Managers must consider risk analysis, lessons learned, and informed advice from subject matter experts to make this determination.

A TPR may be appropriate when any of the following criteria is met:

- A procedure would significantly reduce risk and protect the safety of the workers, the public, or the environment during any operation, such as:
  - Operations involving radioactive or other hazardous materials
  - Tasks involving operation or maintenance of safety systems and high-energy systems
  - Tasks that could cause an unplanned change to the working status of safety systems.
- Prescribing activities to comply with laws, regulations, and DOE orders and standards, and to meet corporate and company objectives or facility policies and requirements.
- Verifying the integrity of quality-related operations and documentation.
- Providing written instructions when management's judgment suggests procedures are warranted to ensure integrity of operations. Managers may consider many factors in making this determination:
  - How frequently is the activity performed?
  - How complex is the operation?
  - Are adequate oral instructions readily available to all users at all times?

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 13 of 104 |
|------------------------------------|--|

- What are the consequences of error in performing the activity?
- What is the employee turnover rate on the activity? Will training, oral instructions, and close supervision be required frequently because new performers will be involved?
- Will standardization provide sufficient value to justify procedure development and maintenance cost?

If none of these criteria applies to an operation, a procedure probably will not add value to the activity. Other ways of conveying information to workers, such as signs, training, or verbal instructions, should be evaluated. However, if even one criterion applies, a procedure or procedures should be considered.

## **5. CONTENT OF TPRs**

Successful TPRs assist users by presenting actions clearly, concisely, and in the proper sequence. This standard provides a method for writers to ensure that procedures contribute to maintaining safe, efficient operations and that the following key questions are addressed:

- What technical and administrative requirements are to be met?
- Who is the user and what is the user's level of experience and training?
- How does this TPR relate to or affect other documents?
- What materials and equipment are to be used?
- What tasks are to be accomplished?
- Why, when, where, and how are the tasks to be accomplished?

## **6. STYLE, USAGE, AND GRAMMAR IN TPRs**

This standard presents style, usage, and format conventions that are specific to TPRs. For company style, usage, and format conventions not covered in this standard, use the company standards and company-accepted references listed in Table 6-1.

Universal grammar and usage conventions are not discussed in this standard. Procedure writers should rely on company standards and the leading national references listed in Table 6-1.

Appendix A, "TPR Style Sheet," of this standard provides a quick reference style guide for formatting and writing TPRs. Appendix B shows an example TPR that illustrates the styles, formats, and TPR writing practices specified in this standard.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 14 of 104 |
|------------------------------------|--|

Table 6-1. Company standards and company-accepted references.

| Subject                                | Reference   |
|--|---|
| Style, usage                           | Primary: STD-7029, “Editorial Style Standard”<br>Alternate: <i>The Chicago Manual of Style, United States Government Printing Office Style Manual</i>   |
| Grammar                                | Primary: STD-7029, “Editorial Style Standard”<br>Alternate: <i>The Chicago Manual of Style, Hodges’ Harbrace Handbook</i>   |
| Spelling, word forms                   | Primary: STD-7029, “Editorial Style Standard”<br>Alternate: <i>The American Heritage Dictionary, Webster’s New Third International Dictionary (Unabridged), Webster’s New Collegiate Dictionary, United States Government Printing Office Style Manual</i>  |
| Figure captions                        | STD-7028, “Format and Style for Technical Reports and Other Publications”   |
| Table formatting                       | STD-7028, “Format and Style for Technical Reports and Other Publications,” except (a) lines are added around each table cell, (b) font size is 12 point (see Section 7.2.4 for additional information on table font size), (c) cells are left blank in lieu of an em dash (—) to indicate no information is available for the cell, and (d) the continued table label, for tables continued on the next page, is not used in TPRs |
| Acronyms                               | <i>Acronyms and Abbreviations</i> ( <a href="http://webhome4/acronym/">http://webhome4/acronym/</a> )   |
| Abbreviations for units of measurement | <i>Acronyms and Abbreviations</i> ( <a href="http://webhome4/acronym/">http://webhome4/acronym/</a> ) or STD-7028, “Format and Style for Technical Reports and Other Publications”  |
| Metric use                             | IEEE/ASTM SI-10, “Standard for Use of the International System of Units (SI): The Modern Metric System”   |

## 7. TPR FORMAT AND FRONT MATTER SUMMARY

### 7.1 TPR Format Summary

TPR information is organized into the seven primary sections shown in Example 7-1. Each primary section is identified with a first-order number and section heading (title).

The contents of a primary section, for example, Section 4, “Instructions,” may consist solely of numbered action steps (see Section 4 of Example 7-1), or may comprise a combination of subordinate lower-order numbered section headings (titles) and numbered action steps (see Section 4 of Example 7-1). Subordinate lower-order section headings are optional. However, using lower-order numbered section headings in TPRs helps to

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 15 of 104

organize the process flow of complex tasks by grouping action steps into separate process segments, routines, and tasks. This provides clarification for the procedure user.

The seven primary section headings are always used in TPRs. If a primary section does not contain any contents or information, the word “None” is placed below the section heading, where the text would begin.

In this standard, all sections and their section contents, whether they are first-order numbered section headings (4.), second order (4.1), or third order (4.1.1), etc., are called “sections.” Terms, such as “subheading” or “sub-subheading” are not used.

Action steps are referred to as first level (4.4), second level (4.4.1), third level (4.4.1.1), etc. The level of a step depends on its numbered placement in the procedure. For example, the first-level step under the second-order numbered heading of **“4.6 Pump P-NCC-235 Startup,”** is 4.6.1, second level is 4.6.1.1, and third level is 4.6.1.1.1. The lower-level step of an upper-level step is also referred to as a substep, regardless of its numbered placement (see Section 4 of Example 7-1). The term, parent-child step, refers to an action step sequence where the parent step presents the general action to be completed and the child steps present the specific actions to be performed to complete the general action (see Example 8-12 of Section 8.6.3).

Example 7-1 illustrates the seven primary TPR section titles (first-order section headings), action step numbering, and second- and third-order section head numbering and formatting. Example 7-1 also identifies the appropriate MS Word style of Template (TEM)-5, “General Use Procedure Template,” in brackets following each TPR procedure element.

The formats for the procedure elements shown in Example 7-1 are applied using the MS Word styles built into TEM-5. Other TEM-5 styles used for formatting TPRs include font formats for the various levels of section headings, steps, warnings, cautions, notes, and body text; also included are preset margins, tabs, paragraph indentations, and text justifications. The procedure header form, Form 412.09, “ICP Controlled Document Header,” (see Section 7.2.5) is included in TEM-5 along with page formats for appendixes.

TEM-5 may be downloaded from the Electronic Data Management System (EDMS) Web page. Instructions on how to use TEM-5 are also available at the EDMS Web site.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 16 of 104 |
|------------------------------------|--|

---

Example 7-1. TPR primary section headings, formats for procedure section headings, and action step numbering, along with [MS Word TEM-5 styles].

---

- 1. INTRODUCTION** (Primary, required, first-order section heading) [Heading 1]
  - 1.1 Purpose** (Required, second-order section heading) [Heading 2]

Purpose statement [H2 body text]
  - 1.2 Scope and Applicability** (Required, second-order section heading) [Heading 2]

Scope and applicability statement [H2 body text]
- 2. PRECAUTIONS AND LIMITATIONS** (Primary, required, first-order section heading) [Heading 1]
  - 2.1 Precaution and limitation number one [Heading 2-step]
  - 2.2 Precaution and limitation number two [Heading 2-step]
- 3. PREREQUISITES** (Primary, required, first-order section heading) [Heading 1]
  - 3.1 Prerequisite number one [Heading 2-step]
  - 3.2 Prerequisite number two [Heading 2-step]
- 4. INSTRUCTIONS** (Primary, required, first-order section heading) [Heading 1]
  - 4.1 First-level step [Heading 2-step] (or **4.1 Second-Order Section Heading** [Heading 2] when a section heading)<sup>a</sup>
    - 4.1.1 Second-level substep [Heading 3-step]<sup>a</sup> (or **4.1.1 Third-Order Section Heading** [Heading 3] when a section heading)
      - 4.1.1.1 Third-level substep [Heading 4-step]<sup>a</sup>
      - 4.1.1.2 Third-level substep [Heading 4-step]

---

a. If 4.1 is a second-order section heading, 4.1.1 will be a first-level step and 4.1.1.1, a second-level step.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 17 of 104 |
|------------------------------------|--|

Example 7-1. (continued)

4.1.2 Second-level substep [Heading 3-step]

A. List item [List A3]

B. List item [List A3]

4.2 First-level step [Heading 2-step] (or **4.2 Second-Order Section Heading** [Heading 2] when a section heading)

4.2.1 Second-level substep [Heading 3-step]

**5. RECORDS** (Primary, required, first-order section heading) [Heading 1]

Enter “None” if there are no records [H1 body text]

**6. REFERENCES** (Primary, required, first-order section heading) [Heading 1]

Document designation and title, or title only if no designation [H1 body text]

**7. APPENDIXES** (Primary, required, first-order section heading) [Heading 1]

Enter “None” if there are no appendixes [H1 body text]

---

## 7.2 General Format Elements

### 7.2.1 Margins

Left, right, and bottom margins for all procedure pages are 1.0 in. The top margin for all procedure pages is 0.5 in. Margins are preset in the controlled document headers (see Section 7.2.5, “TPR Header Information”). The bottom margin may be reduced to as little as 0.5 in., if that will aid in meeting other procedure format requirements, such as not separating warnings, cautions, and notes from associated steps with a page break.

### 7.2.2 Tab Settings

Initial tab settings every 0.5 in. are recommended, but tab settings may be modified as necessary. Tab settings should be consistent, if possible, throughout the procedure.

### 7.2.3 Justification

All procedure body text is left-justified, except warning and caution headings, which are centered (see Section 8.19.3, “Formatting Warnings and Cautions”).

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 18 of 104 |
|------------------------------------|--|

## 7.2.4 Fonts

Except for preformatted fields in Forms 412.09, “ICP Controlled Document Header,” and 412.14, “ICP Controlled Document Cover,” the font used in TPRs is Times New Roman. Section headings (first order) are 14 point. Other type in TPRs is 12 point. Type used for tables may be smaller than 12 point to fit a table on the same page, but must be readable for the working conditions under which the TPR is being used (no smaller than 10 point is recommended). Specific font attributes for TPR elements are shown in Table 7-1.

Table 7-1. Font attributes of TPR elements.

| Element                                       | Attribute  | Point Size |
|---|--|------------|
| Text  | Normal, upper- and lowercase sentence structure  | 12         |
| Section heading (first order)                 | Bold, uppercase  | 14         |
| Section heading (second order or lower)       | Bold, initial caps and lowercase   | 12         |
| Contents heading                              | Bold, uppercase  | 12         |
| First page appendix designator (“Appendix A”) | Bold, initial caps and lowercase; appears only at the top of the first page of an appendix   | 12         |
| Appendix designator— footer (“Appendix A”)    | Regular font (no bold), initial caps and lowercase; appears on every page of an appendix in a footer   | 12         |
| Appendix title                                | Bold, initial caps and lowercase; appears one line (12 points) below the appendix designator only on the first appendix page   | 12         |
| Warning or caution heading                    | Bold, uppercase  | 12         |
| Warning or caution text                       | Bold, upper- and lowercase sentence structure  | 12         |
| Note heading                                  | Bold, uppercase  | 12         |
| Note text                                     | Italic, upper- and lowercase sentence structure  | 12         |
| Form 412.09, “ICP Controlled Document Header” | Preformatted; font, size, and other attributes vary; see Section 7.2.5, “TPR Header Information”   |            |
| Form 412.14, “ICP Controlled Document Cover”  | Preformatted; font, size, and other attributes vary. This form is optional for TPRs that are a part of a manual system, unless a contents page is used. Form 412.14 is required for stand-alone TPRs that are not a part of a manual system; see Section 7.3.1, “Cover Page” |            |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 19 of 104 |
|------------------------------------|--|

### 7.2.5 TPR Header Information

Every page of a TPR, except the optional cover page (see Sections 7.3 and 7.3.1), must use Form 412.09, “ICP Controlled Document Header,” as the page header (see Example 7-2). The header starts at the top of the first page of the TPR. If an optional cover page is used, the header starts at the top of the first page immediately following the cover page.

Example 7-2. Form 412.09 first-page header information.

|   |                     |   |                              |
|---|---------------------|---|------------------------------|
| <b>Idaho Cleanup Project</b>  |                     | 412.09 (2/1/2006 – Rev. 10)                                   |                              |
| <b>SAFETY AND OPERATIONAL FUNCTION TESTS<br/>FOR BOILER CFA-650</b> |                     | Identifier: TPR-5631<br>Revision: 2<br>Page: 1 of 18          |                              |
| CFA Utilities   | Technical Procedure | For Additional Info:<br><a href="http://EDMS">http://EDMS</a> | Effective Date: 02/07/06     |
| Manual: Utilities Technical Procedures                              |                     | <b>USE TYPE 1</b>   | Change Number: <u>119312</u> |

Form 412.09 is a controlled form. Do not modify the form. Periodically, the form is revised to update editorial information, such as Idaho National Laboratory and company logos, or to reformat the location of the technical components of the form that are required by this standard and company-controlled documents. Whenever you create or revise a procedure, check the revision level of Form 412.09 to verify you are using the latest revision.

The header conveys sufficient information to positively identify the pages of the TPR if the pages become separated from the document. Only the information that needs to be repeated on each page is located in the header portion of Form 412.09 (see Example 7-3). The information needed by Document Management is located outside the header on the first page of the procedure where the header appears (see Example 7-4). The Document Management information appears only on the first page.

#### 7.2.5.1 Landscape Page Headers

The same header is used for both portrait and landscape pages. For landscape pages, the header is placed at the top of the page when the landscape page is turned for viewing. The header is horizontally centered on the landscape page.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 20 of 104 |
|------------------------------------|--|

Example 7-3. Information in the header that is repeated on each page of the procedure.

|                              |  |   |
|------------------------------|--|---|
| <b>Idaho Cleanup Project</b> | 412.09 (2/1/2006 – Rev. 10)                | 2 |
| 1                            | Identifier: 3<br>Revision:<br>Page: 1 of 2 | 4 |
|                              |  | 5 |

1. *Procedure Title.* The procedure title is written in uppercase and is both vertically and horizontally centered in the table cell.
2. *Header Revision.* Periodically, the header form is revised. Whenever you revise a procedure, make sure you are working with the current revision of the form. Check the revision level using the Forms Index.
3. *Identifier Number.* Each procedure has a unique identifier. The identifier number can wrap to the next line if needed. Do not modify the header format to make long identifier numbers fit on one line. The identifier number must be typed in each header in the procedure. When an identifier number wraps to a second line, make sure that “Revision” and “Page” line up with their respective information.
4. *Procedure Revision.* Each time a procedure is revised, a new sequential revision number is assigned and typed in the header. When a procedure is being processed (new, revised), the word “DRAFT” must be on the same line with the revision number. Examples include “1/DRAFT,” “1/DRAFT A,” “DRAFT/1,” “Draft 1,” and “1 Draft A.”
5. *Page Numbering.* Page numbers (X of Y) displayed in the header are consecutive through the whole procedure, including appendix pages which are numbered consecutively with the body of the procedure.

Page numbers are generated using the software. If the page numbers do not appear to accumulate properly, press Ctrl+End and then Ctrl+Home. This will force the software to recount the total number of pages in the procedure.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 21 of 104 |
|------------------------------------|--|

Example 7-4. Document Management information that appears only on the first page of the procedure.

|   |                |         |   |                         |   |
|---|----------------|---------|---|-------------------------|---|
| 1 | Applicability: | Type: 2 | For Additional Info:<br><a href="http://EDMS">http://EDMS</a> | Effective Date:         | 3 |
|   | Manual: 4      |         | USE TYPE  | Change Number:          | 6 |
|   |                | 5       |   | Entire document revised | 7 |

1. **Applicability.** The applicability information is typically one of the following:
  - Function or discipline (Industrial Hygiene)
  - Organization (CFA Utilities)
  - Project, facility, or program (Foreign Research Reactor Fuel)
  - Site area (RWMC).
 Replace the word “Applicability” with the actual information.
2. **Type of Procedure.** For TPRs this is “Technical Procedure.” Replace the word “Type” with “Technical Procedure.”
3. **Effective Date.** The effective date is formatted MM/DD/YY or MM/DD/YYYY and is the date that the TPR is placed into official use. Document Management will enter the effective date when the procedure is officially released.
4. **Manual.** If the procedure is part of a manual system, then type in the manual number (if specified), and title. If the procedure is not part of a manual system, then delete the word “Manual.”
5. **Use Type.** For TPRs it is “Use Type 1” or “Use Type 2.” Use types are determined using the criteria specified in MCP-2985, “Chapter XVI—Operations Procedures.”
6. **Change Number.** A unique number used to track document creations and revisions. Change numbers are assigned electronically when completing Form 412.11, “Document Management Document Revision Form (DRF).”
7. **Entire document revised.** Use only if the document has gone through a major rewrite or when the changes are so numerous that identifying them individually with redline and strikethrough would be confusing for the reader (see MCP-135). Mark the statement with a sidebar in the left margin.

### 7.3 Front Matter Page Formats

Front matter elements may be used in TPRs. Front matter includes, in the order they appear, a cover page and table of contents page. A contents page is optional. A cover page is optional for TPRs that are a part of a manual system, but if a contents page is used, a cover page is required. A cover page is required for stand-alone procedures that are not a part of a manual system.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 22 of 104 |
|------------------------------------|--|

### 7.3.1 Cover Page

If a TPR has a cover page, it must be the current revision of Form 412.14, “ICP Controlled Document Cover,” which can be downloaded from the Forms Index. Figure 7-1 illustrates the cover page.

Enough information must be included on the cover page to clearly identify the procedure and to allow the procedure user to verify that the procedure is appropriate for the intended task. Enter the document identifier (TPR-NNNN) and the revision number in the upper-right corner. If the document is a draft, the word “DRAFT” should precede or follow the revision number.

Next, replace the bracketed phrase [Document Type] with “Technical Procedure” (without quotation marks). To make this change, select “[Document Type]” but do not select the paragraph mark. Then type “Technical Procedure” (again, no quotation marks). The font and point size are predefined in the form. Select “[Subcontract No.]” and delete. The “[Project No.]” entry may be used, if necessary, or deleted (for most TPRs, it is deleted). Then scroll down to the line with the bracketed word [Title], and select this. Again include the brackets in the selection, but not the paragraph mark.

Replace the brackets and word with the actual TPR title. See Section 8.1, “TPR Titles,” for guidance.

**NOTE 1:** *When the cursor is moved to the Selection Bar (to the left of the text area), the cursor changes from the text I-beam to an arrow that points up and to the right. Clicking the primary mouse button will select the entire line, including the paragraph mark. To avoid this, place the I-beam at the left of the left bracket, hold down the primary mouse button, and drag the cursor to the right of the right bracket, but do not drag it over the paragraph mark. Then, with the text selected, typing the required entry will not change the page length nor the type attributes.*

**NOTE 2:** *The paragraph mark is a nonprinting character that looks like: ¶. Appearance varies depending on the font in use; the paragraph mark shown here is Times New Roman. If you cannot see paragraph marks on your monitor as you work with Word documents, open the Tools menu on the Word menu bar, select Options, and then the View tab. Various nonprinting characters are listed, each with a check box to its left. Select the characters you want to be displayed—for this purpose, at least Paragraph Marks—and click on Okay. You will then be able to see the characters you have selected onscreen, but they will not print.*

On the page following the cover page, whether it is the contents page or the first page of procedure text, use Form 412.09 page header.

|   |   |
|---|---|
| <p><b>TECHNICAL PROCEDURE WRITING</b></p> | <p>Identifier: STD-9<br/>Revision*: 7<br/>Page: 23 of 104</p> |
|---|---|

Document ID: xxx  
Revision ID: xx  
Effective Date: xxx

**Document Type**

Subcontract No. (Delete for all but construction specifications)  
Project No. (Optional – Delete if not needed)

**Document Title**

**Idaho  
Cleanup  
Project**

The Idaho Cleanup Project is operated for the  
U.S. Department of Energy by CH2M ♦ WG Idaho, LLC

Figure 7-1. Form 412.14, “ICP Controlled Document Cover” (reduced to fit).

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 24 of 104 |
|------------------------------------|--|

**7.3.2 Contents Page**

A table of contents page may be included if the TPR is long (more than 10 pages) or has many section headings in the instructions section. Figure 7-2 for an example of a contents page.

|   |  |   |                              |
|---|--|---|------------------------------|
| <b>Idaho Cleanup Project</b>  |  | 412.09 (2/1/2006 – Rev. 10)                                   |                              |
| <b>FLUORESCENT LAMP CRUSHING OPERATION<br/>INSIDE MULTICRAFT SHOP</b> |  | Identifier: TPR-5588  | Revision: 2                  |
|   |  | Page: 1 of 20   |                              |
| CFA Utilities   | Technical Procedure                                    | For Additional Info:<br><a href="http://EDMS">http://EDMS</a> | Effective Date: 11/26/05     |
|   |  | <b>USE TYPE 3</b>   | Change Number: <u>109333</u> |
| <b>CONTENTS</b>   |  |   |                              |
| 1.  | INTRODUCTION .....                                     |   | 2                            |
|   | 1.1 Purpose .....                                      |   | 2                            |
|   | 1.2 Scope and Applicability.....                       |   | 2                            |
| 2.  | PRECAUTIONS AND LIMITATIONS .....                      |   | 2                            |
| 3.  | PREREQUISITES .....                                    |   | 3                            |
| 4.  | INSTRUCTIONS .....                                     |   | 5                            |
|   | 4.1 Preparations for Crushing Fluorescent Lamps .....  |   | 5                            |
|   | 4.2 Fluorescent Lamp Disposer Operation .....          |   | 8                            |
| 5.  | RECORDS .....  |   | 14                           |
| 6.  | REFERENCES .....                                       |   | 15                           |
| 7.  | APPENDIXES .....                                       |   | 15                           |
|   | Appendix A, Recommended Management of Spent Tubes..... |   | 16                           |
|   | Appendix B, Procedure Basis .....                      |   | 18                           |

Figure 7-2. Sample of optional contents page (reduced to fit).

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 25 of 104

## 8. DEVELOPING TPR SECTIONS

### 8.1 TPR Titles

Giving a TPR an appropriate title is normally an early step in procedure development. The title of a TPR—or any other procedure—should be concise and clear, and should describe the process, activity, or system with which the TPR is concerned. A TPR title should allow the user to be sure that he or she is selecting the appropriate procedure. For instance, there could be many TPRs with the generic title, “Analyzing Utility Water Chemistry.” Users benefit from more specific titles. Adding a building or system name can tell the user he or she has the correct document: “Analyzing Utility Water Chemistry—INTEC-606.”

### 8.2 Purpose Statement

The purpose statement is Section 1.1 in TPRs. The purpose statement gives a short description of why the process itself is performed (see Example 8-1). To write this statement, ask what the process accomplishes that makes it worth doing, then write the answer to that question. Avoid purpose statements that repeat the procedure title or the headings in the table of contents.

---

Example 8-1. Purpose statement.

---

#### 1.1 Purpose

Self-contained breathing apparatus (SCBA) are inspected and used to protect workers from radiological and nonradiological contamination.

---

### 8.3 Scope and Applicability Statements

Scope and applicability statements are Section 1.2 in TPRs. The scope statement identifies the range of activities in the process. It states the procedure start point or the triggering events that make use of the procedure necessary, and the procedure end point or final condition. If necessary, the scope may also address the procedure limits—what the procedure does not cover.

The applicability statement identifies personnel, circumstances, or topics to which the procedure actions apply. The applicability statement may define the various disciplines required to perform parts of the procedure, if necessary. It may also identify any topics to which the procedure does not apply, if the user would normally assume that the procedure does apply to those topics. Sample TPR scope and applicability statements are shown in Example 8-2.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 26 of 104 |
|------------------------------------|--|

Example 8-2. Scope and applicability statements.

## 1.2 Scope and Applicability

This procedure directs routine, periodic inspections of MSA Custom 4500 MMR self-contained breathing apparatus (SCBA). SCBAs maintained for use are inspected at least once each month and after each use in accordance with this procedure.

This procedure applies to all Idaho Cleanup Project (ICP) personnel required to perform monthly inspections on SCBAs.

## 8.4 Precautions and Limitations

In TPRs, precautions and limitations (P&Ls):

- Precautions alert procedure users to actions and conditions that represent potential danger to workers or the public, or possible damage to the environment or equipment
- Limitations define boundaries that are not to be exceeded.
- P&Ls present conditions that apply generally to the entire procedure, or that occur at more than one point in the procedure.

Limit the number of precautions and limitations so that the procedure user can remember them while performing the procedure. If a precaution or limitation pertains to a single point in the TPR—a step or a closely related sequence of steps—place it in a warning or caution box just prior to the relevant step or step sequence. See Section 8.19, “Warnings and Cautions.” P&Ls that affect an entire procedure or that occur at more than one point in the procedure belong in the P&Ls section, because these P&Ls cannot be effectively implemented by specific steps.

P&L steps may be presented in the P&L section by order of occurrence, severity of consequences, or any other appropriate criteria. However, steps specified in the P&L section may be performed in any sequence since they generally apply to the entire procedure, or multiple procedure steps, and do not direct the performance or completion of specific actions, tasks, or conditions like steps in Section 3, “Prerequisites,” and Section 4, “Instructions.” The latter sections are performed in sequence, unless otherwise specified.

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 27 of 104

**8.4.1 Identifying and Writing P&Ls**

P&Ls are derived from system or installation technical specifications or environmental requirements limits, design document limits, related TPRs, limits stated in approved vendor documents, and operating experience. P&Ls are often made more restrictive than the limits in associated requirements to allow a margin between exceeding a P&L and violating a requirement.

Consider the following possible hazards, as appropriate:

- Potential exposure of personnel or the environment to:
  - Radiation or contamination
  - High-temperature or high-pressure fluids
  - Hazardous substances
  - Electrical shocks
  - Excessive noise
  - Confined space issues
  - Falls
  - Moving equipment or parts of equipment
  - Fire.
- The protection of equipment and material from:
  - Inadvertent, incorrect, or omitted actions that may cause facility shutdown
  - Inadvertent, incorrect, or omitted actions that may result in limiting conditions of operations as defined in technical or operating safety requirements
  - Limitations specified in approved vendor materials
  - Limitations specified in applicable design documents
  - Alarms affecting facility availability that may occur or are expected to occur as a result of performing the procedure
  - Mechanical or electrical bypasses (lifted leads, inhibits, jumpers, or fuse removals) that are performed as a part of the procedure
  - Electrical and mechanical interlocks involved in performing the procedure

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 28 of 104 |
|------------------------------------|--|

- Actions resulting in emergency response or automatic incident response
- Undesirable consequences of violating each stated precaution or limitation.

To write precautions or limitations for the P&Ls section:

1. Write statements that inform users of hazardous conditions and their potential effects.
2. Include only precautions or limitations that affect the whole TPR or that occur at more than one point and cannot be implemented effectively in a step.
3. Do not state generic precautions that are part of a job description or are inherent in the task.
4. Do not include any P&Ls that the procedure user cannot control by using the procedure.

#### **8.4.2 Formatting the P&Ls Section**

1. To format the P&Ls section, apply the “Heading 1” style to the section heading, then apply the “Heading 2-step” style to each of the precautions and limitations (see Example 8-3). This will result in:
  - A. Twelve points of spacing below the section heading
  - B. Each P&L number (2.1) indented to align under the first letter of the section heading
  - C. The P&Ls numbered in sequence (2.1, 2.2, 2.3, . . .)
2. Organize the P&Ls by order of occurrence, severity of consequences, or any other appropriate criteria.
3. The language used for P&Ls is prescriptive (“A certified operator must be present...”; “A radiation survey is required...”). In Example 8-3, note that “must” is used in a few statements. This can be an effective way to add emphasis to P&Ls, which specify the safety envelope—and implement the requirements—within which the procedure process has to be performed. Do not use “shall” in the P&Ls section. Procedures do not specify requirements; they provide directions for implementing requirements.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 29 of 104 |
|------------------------------------|--|

Example 8-3. Precaution and limitation statements.

## 2. PRECAUTIONS AND LIMITATIONS

- 2.1 No other fuel handling operations in INTEC-666 storage pools may be performed concurrently with this procedure.
- 2.2 To avoid automatic steam shutdown, the bulk solution evaporator temperature must not exceed 226°F (108°C), as indicated on T-WL-129-1, -2, and -3.
- 2.3 A certified operator must be present during final boildown and may not be absent more than 2 consecutive hours at all other times when the PEW evaporator is operating.
- 2.4 Walking on or around rail cars or other uneven surfaces could result in tripping or falling hazards. Fall protection requirements specified on Form 442.34, “Fall Hazard Prevention Analysis,” will be implemented to protect personnel.

## 8.5 Prerequisites Section

The prerequisites section identifies actions that must be completed by the user and requirements that must be met before beginning the process directed by the procedure. Steps in the prerequisites section are performed in sequence, unless otherwise specified.

### 8.5.1 Identifying Prerequisites

Actions and conditions located in Section 3, “Prerequisites,” are those that could cause unacceptable delays or disrupt flow in procedure performance if they were placed elsewhere in the procedure. Actions and conditions that will not cause delay or disrupt performance flow, but must be completed before performing a task, may be written as the first few action steps in Section 4, “Instructions,” or written as preparatory steps placed at the point of need at the Section 4 action step.

1. Include the following information in the prerequisites section, as applicable:
  - Planning and coordination
  - Performance documents (other documents required to perform the procedure, such as drawings, approved vendor manuals, and other procedures that may be referenced in the base procedure)
  - Special tools, equipment, parts, and supplies
  - Field preparations

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 30 of 104 |
|------------------------------------|--|

- Approvals and notifications
  - Training, functional qualification level (category or class), or certification required for inspectors or other procedure performers if program-specific mandates require that information
  - Other procedures, if any, that must be performed before starting this procedure.
2. Vary the prerequisite sequence if needed (see Section 8.9, “Nonsequential Action Steps”); otherwise, the sequence should be determined by the sequence of the actions to be performed. For example, an approval might be needed before a field preparation.
  3. Include provisions for recording data, sign-offs, and remarks, as needed.
  4. Include only those prerequisites that apply to performing the procedure.
  5. The language used for prerequisites in Section 3 may be either prescriptive (“Personnel must be trained and qualified . . .”) or imperative (“Verify personnel are trained and qualified . . .” as used in the instructions section). Either prescriptive or imperative language is acceptable, but avoid using both styles in the same prerequisites section. “Must” may be used when prescriptive language is used to state prerequisites. Do not use “shall.” Procedures do not specify requirements; they provide directions that implement requirements.

Prerequisites presented in Section 4, “Instructions,” are written using imperative language.

### **8.5.2 Formatting the Prerequisites Section**

When the prerequisites are identified and arranged in a logical sequence, format them as follows:

1. If no second-order section headings are used within the prerequisites section, apply the style “Heading 2-step” to number the first prerequisite 3.1 and align it under “Prerequisites” in the section heading. See Example 8-4.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 31 of 104 |
|------------------------------------|--|

---

Example 8-4. Format of prerequisites section without second-order section headings.

---

### **3. PREREQUISITES**

- 3.1 Obtain information from control room supervision regarding the maximum time that the opacity analyzer will be allowed to be out of service to comply with specific operating requirements.
- 3.2 Check the previous quarter's Procedure Data Sheet comments for any outstanding actions and any repair or replacement parts that must be obtained.
- 3.3 Notify shift supervision and control room supervision prior to performing the quarterly check and maintenance.
- 3.4 Obtain the following tools and supplies:
  - A. Flashlight
  - B. Inspection mirror
  - C. Normal assortment of screwdrivers and wrenches
  - D. Environmental Model 400 Opacity Analyzer (see Altech Technical Manual, Chapter 8, Sections 5 and 6).

- 
2. If second-order section headings are used to organize the prerequisites, apply style "Heading 2" to align the second-order headings under the "Prerequisites" heading. Apply "Heading 3-step" to the prerequisites so they are suitably indented. See Example 8-5.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 32 of 104 |
|------------------------------------|--|

---

Example 8-5. Format of prerequisites section with second-order section headings.

---

### **3. PREREQUISITES**

#### **3.1 Training**

3.1.1 Personnel assigned to perform leakage testing must be certified as Level II or Level III Leak Test Examiners (LTEs).

3.1.2 The following training requirements must be met:

- A. Compressed Gas
- B. Back Injury Prevention
- C. Radiological Worker II.

#### **3.2 Performance Documents**

3.2.1 The following documents will be required during the performance of this procedure:

- A. Form 442.01, “Safe Work Permit”
- B. Operating instructions for the General Electric Ferret Leak Detector (Type H-25)
- C. Operating instructions for Yokogawa Type LS-20B Leak Standard.

#### **3.3. Special Tools, Equipment, Parts, and Supplies**

3.3.1 The following equipment must be obtained:

- A. General Electric Ferret Leak Detector, Type H-25
  - B. Yokogawa Leak Standard, Type LS-20B
  - C. Refrigerant Recovery Technologies Inc., Refrigerant Recovery Unit, Model RRU30.
-

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 33 of 104 |
|------------------------------------|--|

## 8.6 Instructions Section Elements

The instructions section directs users through process performance. It is important for the instructions to be clear, concise, and complete—as supplemented by users’ expected level of knowledge. It is also important that procedures be written so users can readily distinguish between the instructions and other procedure components. Certain principles are basic to writing good instructions. These principles are presented in this section, which provides detail about the way material in a TPR instructions section should be presented.

The TPR instructions section consists of numbered steps organized in sequence, with descending levels of subordination. The steps must be performed in sequence, unless otherwise specified. The instructions section may also include section headings, warnings, cautions, notes, tables, and figures as needed to accomplish the procedure goals.

### 8.6.1 Procedure Step Numbering

Legal style numbering is used for TPR section headings and steps, in accordance with the following principles:

1. TPR primary section headings are numbered in order using a single digit followed by a period.
2. Steps, substeps, and second- and third-order section headings under each primary section heading are numbered using the appropriate heading digit, followed by a period, then the specific step or section heading number. Example 8-6 shows first-, second-, and third-level procedure step and substep numbering. Example 8-7 shows first-, second-, and third-order section heading numbering, and step numbering.

---

Example 8-6. First-, second-, and third-level procedure step and substep numbering, alignment, and indentation.

---

## 4. INSTRUCTIONS

- 4.1 First-level step
    - 4.1.1 Second-level substep
      - 4.1.1.1 Third-level substep
      - 4.1.2.3 Third-level substep
    - 4.1.2 Second-level substep
-

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 34 of 104 |
|------------------------------------|--|

---

Example 8-7. First-, second-, and third-order section heading numbering, alignment, and indentation.

---

**4. INSTRUCTIONS** (first-order section heading)

**4.1 Obtaining Approval Signatures** (second-order section heading)

**4.1.1 Obtaining QA Signatures** (third-order section heading)

4.1.1.1 Request QA Engineer...

4.1.1.2 Obtain QA Manager...

---

3. No period is used following the last digit of a section heading or step number.
4. Each descending number level is indented to align under the first text character of the preceding section heading or step.
5. If second- or third-order section headings are used, write the headings as descriptive titles as shown in Example 8-7. Indent second- and third-order section headings to position them as if they were second- or third-level steps. Type each heading using upper- and lowercase text and boldface type.
6. The numbering, position, and font formats shown in Example 8-6 and Example 8-7 are built into the appropriate TEM-5 styles.

**8.6.2 Sign-offs**

If the person performing a procedure step is required to sign or initial to attest that the step was performed, provide a sign-off line at the left margin for signature or initials. The line is aligned flush on the left margin, 1 in. from the edge of the paper, regardless of the step level. The associated procedure step number starts at its normal location, indented under the first text character of the next higher level step or section heading. See Section 8.6.2.3 for instructions to create sign-off lines.

Signature and date lines included in procedures to record approval, notification, or verification signatures (see Example 8-8) are considered sign-offs. Checkoff boxes may also be used for sign-offs. A combination of sign-off lines, signature lines, and checkoff boxes may be used in the same Use Type 1 technical procedure.

**8.6.2.1 Use Type 1 and Type 2 Technical Procedures**

**Use Type 1 Technical Procedures.** Technical procedures determined to be Use Type 1 (see MCP-2985) include sign-offs that are signed or initialed as the steps are performed.

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 35 of 104

Some organizations may require sign-offs for all instructional steps specified in the procedure; other organizations may require sign-offs only for certain designated steps in the procedure. Either method is acceptable. Regardless, sign-offs should be provided to decrease the probability of error for steps (a) critical to the safety of personnel, equipment, and the environment, and (b) where any deviation from the step-by-step instructional sequence would adversely impact the expected outcome of the work being performed.

Procedure writers, reviewers, and document owners should consider whether the placement of sign-offs in procedures is effective and efficient. The skill level, experience, and training of procedure performers, frequency of performance, complexity of the task, and the significance of the consequences of procedural error should be considered when determining to use or not use sign-offs in technical procedures.

---

Example 8-8. Signature and date lines.

---

3.5.1 SS: Authorize work.

\_\_\_\_\_

Shift Supervisor

\_\_\_\_\_

Date

4.1.3 Manager, ISFSI or designee: Sign and date below to accept responsibility for TMI-2 fuel shipment in accordance with transfer of authority letter WWG-06-99.

\_\_\_\_\_

Manager, ISFSI or Designee

\_\_\_\_\_

Date

---

**Use Type 2 Technical Procedures.** Technical procedures designated as Use Type 2 (see MCP-2985) do not contain sign-offs that are signed or initialed as the steps are performed.

Use Type 2 procedures may include data recording steps where the data is recorded at the step (see Example 8-41 in Section 8.15), in an appendix to the procedure, or on a separate data sheet or form.

### 8.6.2.2 Upper- and Lower-Level Step Sign-offs

When a step includes lower-level steps or substeps (see Example 8-9 and Example 8-10), careful consideration is required to determine the proper placement of sign-offs when sign-offs are used.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 36 of 104 |
|------------------------------------|--|

When sign-offs are used for upper- and lower-level steps:

1. Sign-offs for each of the substeps of an upper-level step are required when the substeps must be performed in sequence (see Example 8-9). When substeps are signed or initialed, a sign-off for the upper-level step is unnecessary, but may be used.
2. One sign-off may be used at the upper-level step with none at the lower-level steps when substeps are performed concurrently or in any sequence (see Example 8-10). This guidance is intended for use when the number of substeps can be easily tracked by the procedure user (see Example 8-10).
3. When it may be difficult for the procedure user to track the completion of several or more substeps being performed nonsequentially, consider using a sign-off for each substep to make sure no substeps are skipped. A sign-off for the upper-level step is optional when sign-offs are used for substeps.

When substeps are to be performed concurrently or nonsequentially, place a note before the substeps that states the steps may be performed concurrently or in any sequence (see Example 8-10).

---

Example 8-9. Upper- and lower-level step sign-offs—sign-offs are placed at substeps when the substeps must be performed in sequence.

---

- |  |       |  |
|--|-------|--|
|  | 4.6   | <u>EO</u> : Raise transfer trailer hydraulic vertical jacks.                               |
|  | 4.6.1 | Start transfer trailer diesel engine.  |
|  | 4.6.2 | Loosen and raise locking collar on each of the four vertical jacks until the collar stops. |
|  | 4.6.3 | Back off each locking collar 1/4 in.   |
|  | 4.6.4 | Raise four vertical jacks until each jack stops.   |
|  | 4.6.5 | Turn off diesel engine.  |
-

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 37 of 104 |
|------------------------------------|--|

Example 8-10. Upper- and lower-level step sign-offs—sign-off is placed at the upper-level step in this example with two substeps that may be performed in any sequence.

- 4.5    WHEN cask cavity has completed a minimum of 30 minutes of pressurization at 15 psig,  
THEN perform the following steps:

**NOTE:**    *Steps 4.5.1 and 4.5.2 may be performed in any sequence.*

- 4.5.1    Check for leakage from cask drain port by moving probe of leakage detector around the surfaces of plugged port.
- 4.5.2    Check for leakage from vent/test port by placing probe of leakage detector inside vent/test port.

### 8.6.2.3 Creating Sign-off Lines

To produce consistent sign-off lines:

- If the Drawing toolbar is not already displayed, display it:  
  
View ⇒ Toolbars ⇒ Drawing
- Select the diagonal line icon, usually located near the left side of the Drawing toolbar, and the cursor changes to a  sign.
- Draw the line where it is needed by dragging the mouse—hold the primary mouse button down while moving the mouse. When you release the mouse button, line drawing ends and the cursor changes back to the text “I-beam” cursor.
- With the line still selected [boxes (“handles”) will be visible on each side of the line], move the cursor over the line until the cursor looks like this: .
- Click on the line with the secondary mouse button, usually the right button, and select Format AutoShape—the last entry on the fly-out menu.
- On the Colors and Lines tab, make sure the line color is set to black and the line style is solid. The default weight, 0.75 point, is fine. On the Size tab, set the width to 0.45 in. On the Position tab, use the following settings:

Position on page:

|            |                                   |      |  |
|------------|-----------------------------------|------|--|
| Horizontal | <input type="text" value="0"/>    | From | <input type="text" value="Column"/>    |
| Vertical   | <input type="text" value="0.15"/> | From | <input type="text" value="Paragraph"/> |

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9

Revision\*: 7

Page: 38 of 104

7. Check the Lock anchor box.
8. Select the OK button.
9. Deselect the line: Position the mouse in the document text area and press and release the primary mouse button.

Once a line has been created, it is easy to copy and paste:

1. Select the line and copy it (Ctrl+C, the Copy button on the toolbar, or the Copy command on the Edit menu).
2. Press and release the primary mouse button to deselect the line. Until the line is deselected, any arrow key movements will cause the line to move.
3. Move the text cursor to the left-hand side of the first text character of the paragraph that requires a sign-off line.
4. Paste the line into the procedure (Ctrl+V, the Paste button on the toolbar, or the Paste command on the Edit menu).
5. Repeat Steps 3 and 4 for each sign-off line needed in the procedure.

### 8.6.3 Performer Designation

The method used to designate who—by personnel title or job function—performs which steps in a procedure depends on the number of people performing actions within the procedure. Three methods are used:

1. If one category of procedure user performs all the steps of the procedure, or a section or sections of the procedure, a note that identifies the job title or function of the worker performing the procedure may be placed before the first affected action step, section or sections.
2. If one category of procedure user, such as qualified operators for a particular system, is readily identifiable from header information (such as the procedure-issuing organization, or other obvious restricting factors), or from the applicability statement, no performer designation is required.
3. If several performers with different job titles or functions perform procedure actions, identify the performer by job title or function in the step he or she must perform (see Example 8-11). If each performer completes several steps in a series, then develop a structure in which each upper-level step identifies the performer of the substeps following it (see Example 8-12).

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 39 of 104 |
|------------------------------------|--|

4. A combination of the three methods described in Items 1, 2, or 3 may be used in the same procedure.

---

Example 8-11. Designating performers for individual steps when several performers with different job functions perform procedure steps.

---

- 4.2.7 OP: Attach crane hook to approved rigging and cask per Form 433.34 (Lift Plan No. PBF-19).
- 4.2.8 PIC: Verify Form 433.34A has been completed.
- 4.2.9 OP: Lift cask and decon cask bottom as directed by RCT.
- 4.2.10 RCT: Survey cask bottom.
- 4.2.11 OP: **IF** survey results are greater than 5,000 dpm/100 cm<sup>2</sup> beta-gamma or 100 dpm/100 cm<sup>2</sup> alpha, **THEN** decon cask in laydown area as directed by RCT.
-

**TECHNICAL PROCEDURE WRITING**Identifier: STD-9  
Revision\*: 7  
Page: 40 of 104

Example 8-12. Designating a performer for a series of substeps completed by the same performer. The upper-level step identifies the performer of the substeps.

- 
- 4.1 Radiological Control Technician: Perform daily status and performance check.
- 4.1.1 Obtain  $\geq 200$  dpm alpha ( $\alpha$ ) and  $\geq 5000$  dpm beta ( $\beta$ ) sources.
- 4.1.2 Enter the source check function under the calibration menu.
- 4.1.2.1 Place the  $\alpha$  source on any one of the detectors and allow the PCM-2 to perform a count.
- 4.1.2.2 Place the  $\beta$  source on any one of the detectors and allow the PCM-2 to perform a count.
- NOTE:** *At the end of the normal count in Step 4.1.2.2, the instrument should alarm on the detectors that the sources are on at least 95% of the time based on alarm rate on successive performance checks.*
- 4.1.3 Record on Form 1 whether the instrument alarmed.
- 4.1.4 Repeat Steps 4.1.2.1 through 4.1.3 eight more times to test the remaining eight detectors, until all nine detectors are tested.
- 4.1.5 IF the instrument met the condition stated in the note preceding Step 4.1.3 all nine times,  
THEN mark PASS on Form 1.
- 4.1.6 IF the instrument did NOT meet the condition stated in the note preceding Step 4.1.3 all nine times,  
THEN mark FAIL on Form 1 and notify supervision.
- 4.2 Instrument Mechanic: Perform calibration preliminaries.
- 4.2.1 Access the computer by pressing ESCAPE and entering the password when prompted.
- 4.2.2 Print calibration report and mark as “As Found.”
- 

If there are many performers or frequent changes between performers, designating a performer responsible for each step improves performer clarity. This is recommended, but not required. Procedure writers, reviewers, and document owners should consider the skill level, experience, and training of procedure performers, frequency of performance,

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 41 of 104

complexity of the task, and the significance of the consequences of procedural error when making this determination.

To designate a performer for a single step, place the performer title or job function at the start of the step, underlined, followed by a colon, which is not underlined (see Example 8-11). Use one space after the colon. To designate a performer for a series of substeps under one upper-level step, place the performer title or job function at the start of the upper-level step, underlined, followed by a colon and one space (see Example 8-12).

Changing performers at the substep level specified under an upper-level step (see Example 8-13) requires close attention to maintain proper subordination and step integrity. If possible, structure the steps to avoid changing performers within a substep series. However, if several performers are required to perform a series of substeps, identify the appropriate performer of each substep (see Example 8-13). The performer designation at the upper-level step may be specified collectively as all the performers of the substeps (see Example 8-13). Also, the performer designated at the upper-level step may be a job function (facility supervision, TAN Operations) or individual (Technical Leader) who directs the overall completion of the activity (see Example 8-14).

Designate a performer in the first action step under each section heading if there is more than one performer in the procedure (see Example 8-15).

---

Example 8-13. Identification of each performer when several individuals perform a series of substeps. In this example, all the performers of the substeps are shown as performers of the upper-level step.

---

4.6.2 OP and PIC: IF cask is in laydown area,  
THEN perform the following steps:

4.6.2.1 OP: Attach crane hook to cask rigging as specified in Lift Plan No. PBF-19.

4.6.2.2 PIC: Verify Form 433.34A has been completed.

4.6.2.3 OP: Lift cask from canal.

---

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 42 of 104 |
|------------------------------------|--|

Example 8-14. Identification of each performer when several individuals perform a series of substeps. In this example, the performer specified at the upper-level step is the individual (Technical Leader) directing the activity.

- 
- 4.6.3     TL: IF cask is positioned on transport trailer,  
            THEN direct cask movement to laydown area.
- 4.6.3.1    OP: Attach crane hook to cask rigging as specified in Lift  
            Plan No. PBF-19.
- 4.6.3.2    PIC: Verify Form 433.34A has been completed.
- 4.6.3.3    OP: Lift cask from trailer and move to laydown area.
- 

Example 8-15. Designating a performer in the first step following each section heading when there are multiple procedure performers.

---

#### **4.1     Preparations for Crushing Fluorescent Lamps**

- 4.1.1     Crusher Operator: Position the used fluorescent lamps near crusher  
            port.
- 4.1.2     Drum Changer: Tap drum to determine level of crushed fluorescent  
            lamps.
- 4.1.3     Crusher Operator: Actuate crusher.

#### **4.2     Fluorescent Lamp Disposer Shutdown**

- 4.2.1     Crusher Operator: Allow crusher to run for 2 minutes after the last  
            lamp is crushed to draw any remaining mercury vapor or dust into  
            the filter.
- 

If a title or job function is commonly abbreviated, or if all personnel normally associated with the procedure use a company-approved shortened version of a specific title or job function, the abbreviation or shortened title can be used to designate the performer (for example: QA for Quality Assurance Inspector or EO for Equipment Operator). Whether the title is abbreviated or written out, choose one style and be consistent throughout the procedure.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 43 of 104 |
|------------------------------------|--|

## 8.7 General Procedure Step Writing Standards

The basic action step is an imperative sentence—a command to perform a specific action. An action step answers the question, “What is to be done?” Other procedure elements, including warnings, cautions, and notes, which are discussed later in this standard, add precision to action steps. Steps are presented in the sequence in which they are to be performed, unless another sequence is clearly specified. If the steps may be performed in any order, see Section 8.9, “Nonsequential Action Steps,” for additional information. Limit the subordinate levels of steps to two, if possible. Plan the procedure step sequence carefully before starting to write.

The following procedure writing standards apply to all procedure steps:

1. Include only one action for each action step. Exception: See Item 19 in this list.
2. Start each basic action step with a singular, present-tense action verb, such as “start” or “stop,” “open” or “close,” “fill” or “drain.” (Exception: See Section 8.8, “Conditional Action Steps.”) If necessary, a crucial adverb, such as “slowly,” “carefully,” or “quickly,” may precede the verb.

Many requirements documents express required actions by using declarative sentences that include the words “shall,” “will,” “should,” and “must.” As an example, consider the following statement: “The contractor shall develop and implement an activity-specific comprehensive emergency management program based on a graded approach.” Procedure steps based on the principles given in this manual do not use these words to express required actions. Instead, procedure steps use commands—imperative sentences. Exceptions: (a) “shall” may be used in the procedure basis table to state basis requirements (see STD-7), (2) “must” may be used to state precautions and limitations (see Section 8.4.2), and (3) “must” may be used when prescriptive language is used to state prerequisites (see Section 8.5.1).

3. Follow the verb with a direct object (see Example 8-16). Add appropriate modifiers or supportive information, as needed.

---

Example 8-16. Imperative sentence structure used for action steps.

---

| Action verb | Direct object        | Supportive information |
|-------------|----------------------|------------------------|
| Hold        | the fluorescent lamp | on its side.           |

---

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 44 of 104 |
|------------------------------------|--|

4. Use the simplest words that convey the correct meaning.
5. Place emphasis on the main action or objective of the action step by stating the action or objective before stating exactly how to achieve the action or objective. In Example 8-17, if the sentence were inverted (“Set HS-NCC-234 to on . . .”), the main objective (“start P-NCC-234 . . .”) would be hidden at the end of the instruction. Such an inverted structure is inappropriate for TPR instructions. Exception: See Section 8.8, “Conditional Action Steps.”

---

Example 8-17. State the action or objective of the step followed by the means to achieve the action or objective.

---

4.5.2 Start P-NCC-234 by setting HS-NCC-234 to ON.

---

6. Avoid ambiguous words. Examples include adverbs, such as “almost,” “approximately,” “near,” and “far,” and adjectives, such as “responsible.” Problems with adverbs such as the ones listed should be obvious: What is “near” to one person may be “far” to another. Adjectives, such as “responsible,” cannot always be avoided. However, if a person is “responsible,” it needs to be clear what he or she is responsible for and the limits of the responsibility.
7. Do not use Latin words and abbreviations:
  - Use “for example” instead of “e.g.”
  - Use “that is” instead of “i.e.”
  - Use “such as” to introduce an incomplete list instead of using “etc.”
8. “Ensure” versus “verify.” Use “ensure” to confirm that an activity has occurred or condition exists in conformance with specified requirements—by action if necessary. Use “verify” to confirm, substantiate, or assure (see proper usage of “assure” in STD-7029) that a specific activity has occurred or that a stated condition exists—no action by the performer to complete the activity or satisfy the condition is expected. Example 8-18 illustrates the use of “ensure” and “verify.”

When ensure requires follow-up action, an additional instruction step may need to be written to complete the activity or satisfy the condition. Usually, however, the follow-up action is implied and no additional step is required because the follow-up action is obvious to the performer (see Step 4.4 of Example 8-18). Section 8.15, “Action Steps Containing Verifications, Checks, Notifications, and Data Recording,” provides additional information on the use of “ensure” and “verify.”

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 45 of 104 |
|------------------------------------|--|

---

Example 8-18. “Ensure” versus “verify.”

---

- 4.4 JS: Ensure leakage detector has been calibrated within 2 hours of conducting the leakage check performed in Step 4.5. *[Comment: If the leakage detector has not been calibrated within 2 hours of the leakage check, the Job Supervisor is expected to schedule a certified Leak Test Examiner to calibrate the detector.]*
- 4.9 Verify that TPR-7079, “LET&D - Startup,” has been completed. *[Comment: If TPR-7079 has not been completed, no action to perform TPR-7079 is required by the procedure user; project or facility management will be notified for resolution.]*
- 

9. “In accordance with” versus “per.”

“In accordance with” means general or overall conformance or compliance with requirements is expected, as in “Sign and date FRM-147 to accept responsibility for the fuel shipment in accordance with transfer of authority letter WWWG-06-99.” *[Comment: Compliance with all the agreements outlined in the transfer of authority letter is expected upon signing the form.];* or “Schedule an ultrasonic examiner who has been trained and certified in accordance with MCP-535, “Inspection and NDE Personnel Certification.” *[Comment: Compliance with all the applicable training and certification requirements of MCP-535 is expected.]*

“Per,” as a referencing instruction, means the completion of specific, required actions is expected, such as the performance of a list of actions or step-by-step procedure sequence, or the completion of an entire procedure, as in “Verify that startup operations have been completed per TPR-7079, “LET&D - Startup.” *[Comment: Completion of the startup procedure is expected prior to conducting LET&D equipment operations under the current procedure.];* or “Calibrate the leakage detector per Steps 4.6.1 through 4.6.10.” *[Comment: Completion of a step-by-step procedure sequence by the procedure performer is expected to calibrate the detector.]*

When the use of “per” directs the procedure performer to depart from the current location in the base procedure, to perform a task elsewhere in the base procedure or in another procedure, instructions for the performer to return (referencing instructions) or not return (branching instructions) to the base procedure are not provided, as in “Calibrate the torque wrench per MCP-2487.” Using “per” without proper referencing or branching instructions in the base procedure may cause confusion for the procedure user and result in procedural error. To avoid possible procedural error, use the branching and referencing instructions specified in Sections 8.18.3 and 8.18.4, respectively, in lieu of “per” (see Example 8-19) when the use of “per” directs the performer to depart from the current location in

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 46 of 104 |
|------------------------------------|--|

the base procedure. “Per” may be used as a general referencing instruction (see Section 8.18.7) when the referencing instructions provided in the step (where to go, what to do, where to return) are obvious to the procedure user, as in “Ensure preoperational checks per Steps 4.1.1 through 4.1.8 have been completed and signed off.”

---

Example 8-19. Proper referencing instructions in lieu of “per” when “per” directs the performer to depart from the current location in the base procedure to perform a task.

---

*[Not recommended—Step 4.8 uses “per” to direct the procedure user to depart from the base procedure without proper referencing instructions (where to go, what to do, and where to return)]*

4.8 Stop condensate feed per TPR-7077, “LET&D – Preparation for Startup.”

4.9 Place controller D-WLW-171-2 in MANUAL at 0%.

*[Recommended—Step 4.8 rewritten using proper referencing instructions (where to go, what to do, and where to return)]*

4.8 GO TO TPR-7077, “LET&D – Preparation for Startup,” and stop condensate feed;  
THEN RETURN TO Step 4.9.

4.9 Place controller D-WLW-171-2 in MANUAL at 0%.

- 
10. Generally, avoid the term “as necessary” in TPRs.
  11. Avoid the overuse of acronyms and initialisms in action steps. If you use an acronym or initialism, make sure it (a) is easily understood by procedure users, and (b) has a unique meaning for procedure users. Also, use acronyms that are listed in the database on the *Acronyms and Abbreviations* Web page (<http://webhome4/acronym/>). If it is necessary to use an acronym not included in the database, follow the instructions on the Web page to add the acronym to the database. Once the request has been submitted, the acronym may be used.
  12. Include articles (a, an, the) that refer to general items (“Verify that the cask lid bolts...”; “Open the door.”), but omit articles when referring to specific items (“Torque bolt No. 9 to...”; “Open door DW-9.”).
  13. Underline and use uppercase letters to emphasize words in action steps (for example, NOT, ONE). Use emphasized words sparingly—overuse will negate the purpose of bringing information to the attention of the procedure user.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 47 of 104 |
|------------------------------------|--|

14. Use consistent and correct terminology, grammar, and punctuation. For example, do not use the verbs “decrease” and “lower” in the same TPR if both words are used to mean the same action.
15. Specify instrument indications as a range ( “from 0.03 to 0.04 mV”), with an optimum point defined (“from 0.03 to 0.04 mV [0.035 mV optimum]”), if necessary. This avoids making the user perform mental calculations, as would be necessary if the indication were specified with a tolerance (“0.035 mV, ± 0.005 mV”).
16. Use arabic numbers and abbreviate units of measure (4 L, 12 g, 1,500 V, 4 gal, 7 kg), except time (1 hour, 7 years, 9 minutes). With the exception of in. for inch(es), do not place a period at the end of unit abbreviations (lb, ft, oz); do not use “s” plurals: 78 kg, not 78 kgs; 4 lb, not 4 lbs. Avoid unnecessary repetition of unit abbreviations: between 20 and 50°C, not between 20°C and 50°C.

When one number, without a unit abbreviation, is followed by a number with a unit abbreviation, spell out the first number (“Obtain twelve, 1/2-in. tiedown chains.”).

If a number is not included with a unit of measure, spell out the unit: “Record length in feet.” not “Record length in ft.”

17. Specify limit values, when necessary, clearly (“0.035 mV or less....0.035 mV or greater”).
18. Cite the document designation and title of a reference (TPR-7444, “ILTSF Vault Monitoring,” Form 434.14, “Pre-Job Briefing Checklist”) when the document is first mentioned in the procedure. Use the designation only (TPR-7444, Form 434.14) for subsequent identification of the document, unless it is necessary to cite both the designation and title for clarity, for example, (a) to avoid confusion among documents with similar designations or titles, or (b) to aid new performers who are specified after the first mention of the document.
19. If steps are so closely related that they constitute one overall action, they can be combined into one instruction (see Example 8-20).

---

Example 8-20. Three closely related action verbs combined in a single action step.

---

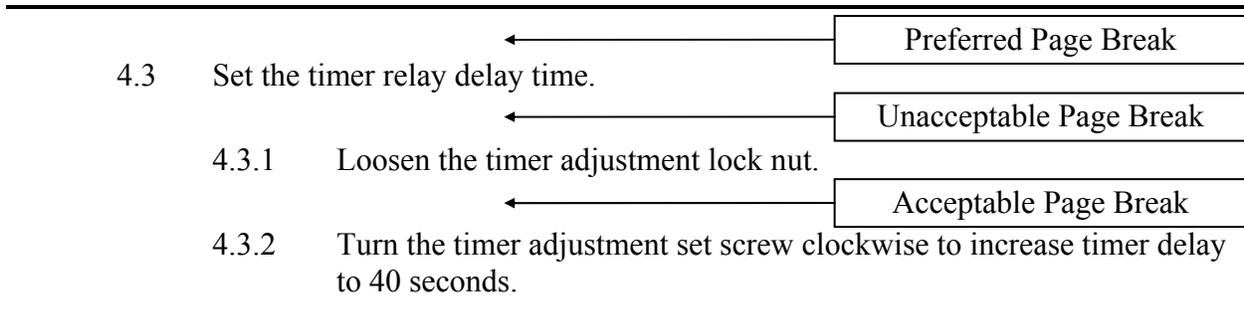
4.4.1 Sign, date, and transmit the completed form to Records Management.

---

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>48</b> of 104 |
|------------------------------------|---|

20. Limit the subordinate levels of steps to two, if possible.
21. If three or more items are listed in a step, use the list format. See Section 8.16, “Lists.” If a step contains a two-item list, ordinary sentence structure is generally correct. Use the list format for a two-item list if special emphasis is needed or if the list items are long and complex.
22. Organize procedure steps in the sequence of performance, unless otherwise stated in the procedure. (See Section 8.9, “Nonsequential Action Steps,” for additional information.)
23. Place procedure steps on the same page on which they are started—do not break or separate the individual lines of a step across two pages.
24. Do not allow a page break to separate an upper-level step from its substeps or from a list of items. If some of the substeps or list items must be separated from the main step by a page break, keep at least one substep or list item on the same page as the main step. See Example 8-21.

Example 8-21. Proper page breaks.



25. When an upper-level step is used to introduce a substep series, state the direct action of the upper-level step as a complete thought using the imperative sentence structure, not as a sentence fragment. Sentence fragments result when a sentence is missing a subject, verb, or main clause. In Example 8-22, writing Step 4.5.1 as “Recirculation Pump P-NCC-234.” would be a sentence fragment that has no verb; therefore, it gives no context to the reader. Do not use “as follows” at the end of the upper-level step.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 49 of 104 |
|------------------------------------|--|

Example 8-22. Imperative sentence structure for upper-level action step that introduces a series of substeps.

- 
- 4.5.1 Start recirculation pump P-NCC-234.
    - 4.5.1.1 Set breaker CWP-123 to ON.
    - 4.5.1.2 Open cooling water valve CWV-NCC-123-3.
- 

- 26. Identify equipment precisely as it is identified in the facility.
- 27. If equipment is not labeled, or if field identification differs from that given in drawings, specifications, or nomenclature lists, notify the facility engineer.
- 28. Incorporate supportive or modifying information into action steps as necessary—but sparingly.
- 29. Avoid using descriptive language that provides the procedure user unnecessary information.

## 8.8 Conditional Action Steps

Conditional action steps are those steps in which a decision is based upon the occurrence or existence of a condition or a combination of conditions. Conditional action steps are extremely important in procedures because they structure the decisions required of the procedure user.

TPR conditional action steps use the following conditional logic operator terms:

- IF or WHEN to present the condition to the user
- THEN to present the action
- OR or AND to present more complex conditions or actions
- NOT to negate the condition.

Do not use other words, such as “except,” “unless,” “but,” “only,” “before,” “after,” or “while” to present conditional information.

1. Emphasize conditional logic terms in TPRs by using uppercase letters and underlining them. In addition, except for NOT, start each new conditional term on a new line (see Example 8-23).

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 50 of 104

2. Describe the condition first and then the action to be taken if that condition applies (see Example 8-23). State the action to be taken on a new line.

---

Example 8-23. Format for conditional action steps. IF presents the condition; THEN presents the action to be performed if the condition is satisfied.

---

4.3.6 IF the plug piece is NOT clean,  
THEN wipe the cone base off with an alcohol-moistened cotton swab.

---

3. If two conditions are required and both conditions must be met, place the conditional term AND at the start of the second condition. Begin a new line for the second condition, and begin a new line with THEN and the action, as shown in Example 8-24.
4. If two conditions are involved and one or both conditions must be met before the action is taken, place the conditional term OR at the start of the second condition. Begin a new line for the second condition, and begin a new line with THEN and the action, as shown in Example 8-25.
5. If three or more conditions are described, consider using a list or a decision table. A list is shown in Example 8-26; a decision table is shown in Example 8-27 (see Item 6).

---

Example 8-24. Format for conditional action steps using the logic term AND when two conditions must be satisfied prior to performing the action.

---

4.3.2 IF tank level is below 4,000 gal  
AND discharge flow rate is greater than inlet flow rate,  
THEN close CWS-HMOV-290, ECW pump discharge valve.

---

---

Example 8-25. Format for conditional action step using the logic term OR when one or both conditions must be satisfied prior to performing the action.

---

4.3.2 IF tank level is below 4,000 gal  
OR discharge flow rate is greater than inlet flow rate,  
THEN close CWS-HMOV-290, ECW pump discharge valve.

---

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 51 of 104 |
|------------------------------------|--|

Example 8-26. Format for conditional action step using a list to present three or more conditions that must be satisfied prior to performing the action.

4.5.6 IF all of the following conditions exist,

- A. Condition 1
- B. Condition 2
- C. Condition 3

THEN open CWS-HMOV-290, ECW pump discharge valve.

Example 8-27. Format for conditional action step using a decision table to present multiple conditions and actions to be performed for each condition.

4.1.2 IF ANY of the following conditions occur,  
THEN select the appropriate response from the table:

| Condition  | Response   |
|--|--|
| Line pressure exceeds 300 psig, and flow rate is less than 200 gpm, <u>AND</u> pump alarm indicator HPL-321 is lit | Set switch PPS-14 to OFF.  |
| Line pressure exceeds 300 psig, <u>OR</u> flow rate is less than 200 gpm   | Set pump switch HS-WL-123 to OFF.                                  |
| Line pressure exceeds 300 psig, <u>AND</u> flow rate is less than 200 gpm  | Set pump switch HS-WL-123 to OFF, and open inlet valve HSV-WL-123. |

6. If the conditions that may occur are complex and the logic is likely to cause confusion, consider using a decision table to direct the appropriate response (see Example 8-27).
7. If two subjects apply to the same predicate (for example, “IF temperature and pressure are stable, . . .”) or one subject takes two predicates (for example, “IF level is stable or falling, . . .”), use the unemphasized conjunctions “and” or “or” rather than the emphasized logic terms. See Example 8-28.

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 52 of 104

8. 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 positively. For example, “IF the valve is open . . .” is usually preferable to “IF the valve is NOT closed . . .” In some cases, however, it is important to emphasize the specific event or condition to be avoided. In such cases, use of the conditional logic term NOT is appropriate and efficient. See Example 8-29.

---

Example 8-28. Using “and” as an unemphasized conjunction rather than emphasized logic term in a conditional action step.

---

- 4.1.5     WHEN cooling water pump and pump discharge pressure have stabilized,  
            THEN close bypass isolation valve CWS-V-3351-1.
- 

---

Example 8-29. Format for a conditional action step illustrating the use of the logic term NOT to emphasize an event or condition to be avoided.

---

- 4.6.2     IF the backwash flow rate is NOT 141 gpm,  
            THEN adjust the multiport wash valve to obtain the correct rate.
- 

9. Avoid using AND and OR in the same conditional statement because the resulting logic is difficult to understand. Combining both conditions into a single statement will produce a confusing instruction:

IF condition A  
OR condition B  
AND condition C,  
THEN open valve D.

This ambiguous statement can be incorrectly interpreted as having two meanings:

- IF A OR (B and C)
- IF (A OR B) and C.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 53 of 104 |
|------------------------------------|--|

## 8.9 Nonsequential Action Steps

Procedure users perform the action steps in the sequence presented unless specifically directed to perform action steps in another order. When the objectives of the action steps will be met regardless of the sequence in which they are performed, then:

1. Sequence the action steps according to usability criteria, such as according to equipment or control board layout, to reduce opportunities for error.
2. If an action step series can be performed nonsequentially, place a note before the first step of the step of the nonsequential sequence. Specify the first and last steps of the series of step that may be performed out of sequence (see Example 8-30).
3. Consider providing a checkoff box or sign-off line for every action in a series of nonsequential action steps to reduce the possibility that a user may skip required actions (see Example 8-30).

---

Example 8-30. Nonsequential action step series preceded by a note specifying the steps of the series. Checkoff boxes or sign-off lines may be used to ensure no steps are skipped.

---

**NOTE:** *Steps 5.2.1 through 5.2.4 may be completed in any order.*

- 5.2.1 Ensure all data has been recorded on FRM-5525, “Test Data Sheet.”
  - 5.2.2 Sign and date FRM-5525.
  - 5.2.3 Attach FRM-5526, “Passed,” sticker, or FRM-5527, “Failed,” sticker, as appropriate, to each circuit breaker tested.
  - 5.2.4 Submit additional comments, as needed, on FRM-5547, “INTEC Maintenance Service Bulletin.”
- 

## 8.10 Equally Acceptable Alternative Action Steps

Equally acceptable alternative action steps are used when it is beneficial for users to be provided with more than one option. It is important, however, to ensure that only one alternative is performed.

1. If each alternate action is to be performed under a different set of circumstances, write a single conditional step for each action instead of one alternate action step (see Example 8-31).

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 54 of 104 |
|------------------------------------|--|

Example 8-31. Alternative action steps with a single condition for each equally acceptable action.

- 
- 4.6     IF HVAC is in AUTO,  
          THEN maintain cell vacuum by adjusting PDIC-WL-123 to  
          12 in. WC.
- 4.7     IF HVAC is in MANUAL,  
          THEN maintain cell vacuum by adjusting MVD-WL-123 to 50%  
          open.
- 

2.     If the level of detail can be simplified without confusing the user, which would increase the likelihood of error, write the instruction as an action step that identifies the result without specifying the possible alternative actions. For example, “Maintain cell vacuum at 12 in. WC.”
  3.     If there are no definable criteria for selecting one action over another, but the alternate actions should be included to achieve the proper level of detail and flexibility, present the actions as substeps separated by a logic operator. See Example 8-32.
  4.     Consider providing a sign-off (see Section 8.6.2, “Sign-offs”) at the left margin by every action in a series of alternative action steps so the user can either check or sign by each item to make sure that action steps are not omitted and that redundant actions are not performed. See Example 8-32.
  5.     Specify that users initial or check off only the action step(s) actually performed. See Example 8-32.
- 

Example 8-32. Format used for equally acceptable alternative action steps. Note the alignment of “OR.”

- 
- 4.8     Perform ONE of the following actions (initial only the action taken).
- \_\_\_\_\_ 4.8.1     Set switch S-7 to ON.
- OR
- \_\_\_\_\_ 4.8.2     Set switch S-9 to ON.
-

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9

Revision\*: 7

Page: 55 of 104

**8.11 Time-Dependent Action Steps**

Some steps contain actions that impose time requirements on the user by specifying the duration of actions or a specific period of time within which actions must be completed.

1. Alert the user by placing a note before the action steps to be timed. See Example 8-33.
2. Begin the action steps with instructions for the user to record critical time information, and provide the user with a place to record this information (see Example 8-33). Typically, this information will be the time that “starts the clock,” and the time by which some action must be completed.
3. Tell the user what actions to take if the time-dependent action step is not performed within the specified time. See Example 8-33.
4. A note identifying time-dependent actions and instructions to record the time information is not required when the time requirement is inherent in the action step and misunderstanding is unlikely. See Example 8-34.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 56 of 104 |
|------------------------------------|--|

Example 8-33. Format for time-dependent action steps.

**NOTE:** *The following step starts a time-limited sequence. Steps 4.3.2 through 4.3.5 are to be completed within 20 minutes.*

4.3.1 EO: Calculate the time by which Step 4.3.5 is to be completed by performing the following steps:

4.3.1.1 Record the time that Step 4.3.2 is to be started. \_\_\_\_\_

4.3.1.2 Add 20 minutes. + 20 minutes

4.3.1.3 Record the time that Step 4.3.5 is to be completed. Completed

4.3.2 EO: Place the incident action switch to TEST.

4.3.3 Independent Verifier: Verify the amber ALARM TEST light on the AIA graphic panel is LIT.

4.3.4 EO: Place the incident action switch to OFF.

4.3.5 EO: Push the RESET pushbutton on the AIA logic tester and record the time. \_\_\_\_\_  
Time

4.3.6 EO: IF the time recorded in Step 4.3.5 is later than the time recorded in Step 4.3.1.3, THEN repeat Steps 4.3.1 through 4.3.5.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 57 of 104 |
|------------------------------------|--|

Example 8-34. Time-dependent action step with time requirement specified in the step. No note identifying the time requirement is needed.

- 
- |       |  |               |
|-------|--|---------------|
| 4.3.1 | <u>EO</u> : Track time required to start the generator after pushing the start button in Step 4.3.2. |               |
| 4.3.2 | <u>EO</u> : Push the generator start button.   |               |
| 4.3.3 | <u>EO</u> : Record time required to start the generator.   | _____         |
|       |  | Time to start |
| 4.3.4 | <u>Witnessing Verifier</u> : Verify that the generator started within 12 seconds.                    | _____         |
- 

## 8.12 Concurrent Action Steps

Concurrent action steps contain actions that must be performed at the same time. For example, parameters may have to be monitored or checked while the user accomplishes another action, or two users in different locations may have to execute actions simultaneously.

1. If concurrent action steps are to be performed by one person, write one action step that states the overall action and the need to perform subordinate actions concurrently. The substeps provide specific concurrent actions to be performed (see Example 8-35). Users may be alerted that the actions are to be performed concurrently by providing the instructions in the step itself (see Example 8-35) or by placing a note before the first concurrent step that states the steps are to be performed concurrently. The note must identify each step or range of steps being performed concurrently by step number.

---

Example 8-35. Format for concurrent action steps performed by one person.

---

- |       |   |  |
|-------|---|--|
| 4.4   | Adjust offgas temperature by performing Steps 4.4.1 and 4.4.2 concurrently. |  |
| 4.4.1 | Monitor TI-WL-123 for a temperature of 275 to 300°F.                        |  |
| 4.4.2 | Adjust F-NCC-123 to 30 to 40 gpm (35 gpm optimum).                          |  |
-

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 58 of 104 |
|------------------------------------|--|

2. If concurrent action steps are to be performed by more than one person, place a note or step before the first concurrent action step (see Example 8-36). Unless these elements are covered explicitly in the action step statements, the note should identify:
  - Concurrent action steps
  - Personnel needed to perform each concurrent action step
  - Locations where the action steps are performed
  - Means of communication between locations.

---

Example 8-36. Format for concurrent action steps performed by more than one person.

---

4.2 Adjust offgas temperature.

**NOTE:** *Steps 4.2.1 and 4.2.2 are performed concurrently by two operators.*

4.2.1 Operator 1: Monitor TI-WL-123 in CPP-604 for a temperature of 275 to 300°F while maintaining telephone contact with Operator 2.

4.2.2 Operator 2: Adjust F-NCC-123 in CPP-663 to 30 to 40 gpm (35 gpm optimum) while maintaining telephone contact with Operator 1.

---

### 8.13 Continuous Action Steps

Continuous action steps are conditional action steps where the conditions they describe must be monitored throughout an activity. For example, a user may need to monitor a gauge and take a specific action if the gauge, at any point during the procedure, indicates a reading above or below a specific level. See Example 8-37.

1. Remind the user to perform the continuing activity at appropriate intervals if significant time has elapsed—such as several hours—or if the activity requires coordination of several individual tasks.
2. Format continuous action steps as conditional action steps, and state the portion of the procedure during which they are applicable.
3. Notify the user when continuous action steps are to be discontinued. See Example 8-38.

**TECHNICAL PROCEDURE WRITING**Identifier: STD-9  
Revision\*: 7  
Page: 59 of 104

Example 8-37. Format for continuous action steps.

- 
- 4.5.7     IF at any time while performing Steps 4.5.9 through 4.5.17 fuel oil pump pressure decreases below 75 psi, THEN shut down the boiler by setting the boiler ignition switch to OFF.
- 

Example 8-38. Notification that continuous action steps have been discontinued.

- 
- 4.8.8     Discontinue monitoring fuel oil pump pressure.
- 

## 8.14 Repeated Action Steps

Repeated action steps are simple action steps that must be performed more than once during procedure performance:

1. If an action step must be repeated an indefinite number of times to achieve an objective, specify that the action step is to be repeated until the expected result is achieved. If sign-offs are required in the TPR, provide only a single sign-off for this action step, regardless of how many times the action step is performed, because the user signs or initials the step only when the specified result is achieved. See Example 8-39.

Example 8-39. Format for repeated action steps.

- 
- \_\_\_\_\_     4.6.8     Vary input signal until switch SW-1-7 trips.
- 

2. If it is important to know how many times the sequence is repeated, provide a space to record the total number of repetitions.
3. If an action must be performed repeatedly at timed intervals, place instructions in the procedure and provide suitable space to record the times that the action step is performed.
4. If an action step is to be performed periodically throughout an activity, but not at specific timed intervals, place reminders as action steps at appropriate points in the procedure instructions section.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 60 of 104 |
|------------------------------------|--|

5. If a large group of repetitive actions is required and becomes cumbersome, address the actions in steps that reference a table or a list, usually in an appendix (for example, a large group of repetitive actions is a series of valve alignments).
6. Notify the user when repeated action steps are to be discontinued.

### **8.15 Action Steps Containing Verifications, Checks, Notifications, and Data Recording**

These four types of steps have many similarities, but each serves a unique purpose:

1. Verification steps provide assurance that a specific activity has occurred or that a stated condition exists. These steps usually start with “verify” or “ensure,” as shown in Steps 3.4, 4.6, 4.9, and 4.15 of Example 8-40. (See Section 8.7, Item 8 for the proper use of “verify” and “ensure.”) Verification steps may be performed by the procedure performer or independently verified by someone other than the procedure performer. The latter is called independent verification; “verify” is used to introduce independent verification steps (see Step 4.9 in Example 8-40 and Step 4.3.3 in Example 8-33).

Verification steps may or may not require written documentation of completion, such as a sign-off line, checkoff box, or signature and date line, depending upon the importance of the step to safety, the expected outcome of the work being performed, the complexity of the task, and the significance of the consequences of procedural error.

2. Checkoff steps begin with “check” and call for a comparison with stated requirements (see Steps 4.8.2 and 4.8.3 in Example 8-40).
3. Notification steps require reporting when given criteria are met.
4. Data recording steps direct the user to record desired data.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 61 of 104 |
|------------------------------------|--|

---

**Example 8-40. Verification steps.**

---

3.4 JS: Verify tools, instruments, or equipment used in the performance of this procedure that require calibration are issued and controlled in accordance with MCP-2487, “Control of Inspection M&TE.”

4.6 JS: Verify that sustaining wind speed is less than 25 mph.

\_\_\_\_\_ 4.9 QA: Verify 12 cask lid bolts have been torqued from 20 to 30 ft · lb.

4.15 JS: Ensure HS-WL-535-1 is closed.

**NOTE:** *“Check” (see below) is used to compare requirements. Step 4.8.2 checks the pressure reading of the filter and a follow-up step (Step 4.8.3) presents the required system pressure for comparison and the action to take if the requirement is not met.*

4.8.2 Check HEPA filter F-SFE-124 differential pressure on PDI-SFE-124.

4.8.3 IF differential pressure on PDI-SFE-124 is greater than 4.5 in. of water, THEN notify TL.

---

When writing steps that require verifications, checks, notifications, and data recording:

1. When using “ensure,” follow-up actions may be required by the procedure performer to make sure the condition exists or the activity is completed. This may require writing a follow-up instruction step to complete the activity or satisfy the condition. Usually, however, the follow-up action is implied and no additional instruction steps are required because the follow-up activity is obvious to the performer (see Step 4.15 in Example 8-40 and Step 4.4 in Example 8-18).

When using “verify,” no action by the procedure performer to satisfy the condition or complete the activity is expected.

“Check,” which is used to compare requirements, usually requires a follow-up instruction step(s) because the requirement being checked needs to be specified to make the comparison (see Steps 4.8.2 and 4.8.3 in Example 8-40).

2. Provide sign-off lines, checkoff boxes, or signature and date lines, for verification and checkoff steps to document the completion of the steps, when necessary, depending upon the importance of the step to safety, the expected outcome of the work being performed, the complexity of the task, and the significance of the consequences of procedural error.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 62 of 104 |
|------------------------------------|--|

3. Provide sign-off lines, checkoff boxes, or signature and date lines for notification steps, when necessary, based on facility or program requirements.
4. Provide blank lines or tables for entering recorded data, either in the procedure at the affected step, in space provided in an appendix to the procedure, or on a separate data sheet or form. When using blank lines to record data at the affected step, position the lines to the right of the associated step for data entry. Example 8-41 combines data recording with calculations; the right text margin has been modified to allow space for the user to record data and perform calculations.
5. Include labeled lines in data recording steps, as necessary, for users to record required information. See Example 8-41.

---

Example 8-41. Format for data recording step with calculations.

---

|         |  |                     |
|---------|--|---------------------|
| 4.3.1   | <u>EO</u> : Calculate the time by which Step 4.3.5 is to be completed by performing the following steps: |                     |
| 4.3.1.1 | Record the time that Step 4.3.2 is to be started.  | _____               |
| 4.3.1.2 | Add 20 minutes.  | <u>+ 20 minutes</u> |
| 4.3.1.3 | Record the time that Step 4.3.5 is to be completed.  | _____ Complete by   |

---

6. In a data recording step, use the same units of measure that users will read from the instrumentation, and if there is an acceptable range for a parameter, include the acceptable range rather than a point value. For example: “Adjust pump pressure to between 70 and 80 psig (75 psig optimum).”

### 8.16 Lists

List items are objects, thoughts, items to consider, parameters, or other material related to an instruction. Lists do not present instructions or actions; lists do not specify requirements. Lists are written and formatted as follows:

1. Set off each list item with an uppercase letter and a period (A., B., C., . . .).
2. Apply the appropriate TEM-5 style (“List A1,” “List A2,” “List A3,” etc.) to format list items under any step level.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 63 of 104 |
|------------------------------------|--|

3. List item spacing is set at 12 points in all of the TEM-5 list styles, and should be left at 12 points. Exception: If all the items in the list are one line each, single spacing may be used.
4. In procedures, list items are always considered part of the step in which they occur, so the introductory phrase or sentence ends with a colon—not a period—to indicate that the listed items are a continuation of the step. Do not use “as follows” before the colon.
5. Individual list items do not have punctuation at the end of the item, but the last item ends with a period to end the list and the step.
6. In list items, capitalize for the first word and all proper nouns as shown in Example 8-42.

---

Example 8-42. List item format.

---

3.4.4 Obtain the following tools:

- A. Crescent wrench (10 in.)
- B. Pliers
- C. Phillips screwdriver (No. 2)
- D. Open-end wrench (17 mm).

---

Example 8-42 shows proper capitalization, indention, and line spacing for a list. Note, however, that because each list item is less than a line long, it is acceptable to use single spacing instead of double spacing between the items (see Item 3).

## 8.17 Hold Points

Hold points are procedure steps at which the user must wait for another person to do something or for some other event to occur. Specific direction on the use of hold points, as appropriate, is contained in requirements documents such as PRD-183, “Radiological Control Manual.” Explicit hold points are designated by using a descriptive phrase, such as “**RADIOLOGICAL HOLD,**” “**RCT HOLD,**” or “**QA HOLD,**” that indicates the type of hold involved. The phrase is typed in bold, uppercase letters immediately before the step that must be completed before proceeding with the procedure (see Example 8-43). The first letter of the phrase is aligned with the first number of the associated step. A TPR that uses explicit hold steps might also incorporate sign-offs to document that the hold point requirements were met (see Example 8-43).

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 64 of 104 |
|------------------------------------|--|

Example 8-43. Format for explicit hold point designation prior to an action step.

### QA HOLD

- \_\_\_\_\_ 4.1.1 QA: Inspect all valve connections for proper seal and water-tight integrity.
- \_\_\_\_\_ 4.1.2 EO: Open valve and adjust regulator to establish 140 psig at inlet pressure gauge.

Either explicit or implicit hold points may be used. Since each procedure step is assumed to have been completed before the next step is performed, the result attained using a hold point designation can be achieved by structuring and writing procedure steps to use implicit hold points that stress completion of the prior step before proceeding with the procedure, as shown in Example 8-44.

Example 8-44. Format for an implicit hold point.

- 4.1.1 QA: Inspect all valve connections for proper seal and water-tight integrity.
- 4.1.2 EO: WHEN QA inspector has approved valve installation, THEN open valve and adjust regulator to establish 140 psig at the inlet pressure gauge.

## 8.18 Referencing and Branching

To perform a task, sometimes users must reference or branch to another section of the procedure they are using (base procedure), to an appendix of the procedure, or to another procedure. Referencing and branching have much in common, but there is a major difference between the two activities: referencing returns the procedure user to or near the original position in the base procedure; branching does not return the user to the base procedure (see following table).

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 65 of 104 |
|------------------------------------|--|

| Activity    | Effect on User   |  |
|-------------|--|--|
|             | Initial  | Final  |
| Referencing | References another portion of the base procedure or a specific location in another procedure, accompanied by an instruction to return to or near the originating step when that activity is completed. | Returns the procedure user to (or near) the original position in the base procedure. |
| Branching   | Directs the procedure user to other action steps or sections within the base procedure or to another procedure.  | Does not return the procedure user to the original position in the base procedure.   |

**8.18.1 Referencing and Branching Criteria**

Referencing and branching make procedures more concise, enhance consistency, and simplify procedure maintenance. But these techniques are complex and, can be confusing to procedure users. Confusion could increase the potential for error, with accompanying safety or administrative consequences.

Referencing or branching may be appropriate when:

1. The information is crucial to activity performance.
2. It is not practical to incorporate the information into the base procedure because:
  - The material consists of a large group of steps or a long table, such as three or more steps with substeps, or a half page or more of text
  - Incorporating the material into the base procedure would result in a needlessly long or confusing procedure
  - The material is repeated frequently.

Before including referencing or branching in a TPR, be sure the intended users can readily comprehend and use the referenced or branched material in conjunction with the base procedure. Also, ensure that the accuracy and completeness of records generated or received during procedure performance will not be degraded by referencing or branching.

If you are considering the use of referencing or branching in a TPR, ask the following questions:

1. Can action steps readily be incorporated rather than referenced or branched to?

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 66 of 104 |
|------------------------------------|--|

2. Will referencing or branching decrease user comprehension and ease of use?
3. Will users be directed to small, isolated sections, rather than to whole procedures or appendixes?

If the answer to all these questions is no, then referencing or branching may be a useful technique.

### 8.18.2 Referencing and Branching Considerations

Referencing and branching steps direct one overall action—a departure from the current action sequence to perform actions directed elsewhere. Like a main step with several substeps, however, referencing and branching steps contain several subordinate actions that must be performed to accomplish the overall action. The user must know where to go, what to do, and whether or not to return to the current action sequence. In a referencing or branching step, the subordinate actions are not formatted as substeps; they are incorporated into the main step to make sure the user is aware not only of where to go, but of what to do, and of whether or not to resume performing the original action sequence.

If you are writing a referencing or branching step, be careful to direct the user to the correct point elsewhere in the same procedure or to the correct other procedure. Incorrect referencing or branching instructions may force the procedure user into an endless loop or send the user to an inappropriate destination that may not result in the expected outcome.

### 8.18.3 Branching

A branching step must identify three specific elements:

- Departure point
- Destination
- Action is to be performed at the destination.

At the departure point, emphasis must be placed on the user being directed to another portion of the same procedure, or to another procedure, and that he or she is not expected to return to the sequence of steps that initiated the branch.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 67 of 104 |
|------------------------------------|--|

In a branching step, the notice of departure, the destination, and the action to be performed once the destination is reached are all stated in one step. To use branching (see Example 8-45):

1. Type “GO TO” as the branching action verb phrase, followed by the specific location—a step number or a section number and title if the branch is to another location in the same procedure, or the document identifier and title if the branch is to a different procedure—and the action to be performed. Note that there is no punctuation after the action statement.
2. On the following line, type “WITHOUT RETURNING TO this step.”

---

Example 8-45. Branching step format.

---

- 4.1.6 GO TO Step 4.1.16 and fill the 40-mL sample bottles from PLV-WLO-600-3  
WITHOUT RETURNING TO this step.
- 4.5.1 GO TO TPR-439, “HEPA Filter System Testing,” and remove all HEPA filters  
WITHOUT RETURNING TO this step.
- 

#### 8.18.4 Referencing

A referencing step identifies the following elements:

- Departure point
- Destination
- Action to be performed at the destination
- Return point.

A referencing step directs the user to a destination or location in the same or base procedure, or to another procedure or document; specifies the action to be performed; and instructs the user to return at or near the originating step in base procedure.

When the reference is to a specific location in the base procedure, or to a specific point in another document, with a subsequent return at or near the starting point in the base procedure, it is important to provide unambiguous instructions to the procedure user. To write a referencing step (see Example 8-46):

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 68 of 104 |
|------------------------------------|--|

1. Type “GO TO” as the referencing action verb phrase, followed by the step number or document identifier and title, and the activity to be performed, followed by a semicolon.
2. On the next line, type “THEN RETURN TO” followed by the step number designated as the reentry point.

---

Example 8-46. Referencing step format.

---

- 4.1.2 GO TO Step 4.11 and fill the 40-mL bottles from PLV-WLO-600-3;  
THEN RETURN TO Step 4.1.3.
- 4.5.1 GO TO TPR-439, “HEPA Filter System Testing,” and remove the  
filter;  
THEN RETURN TO Step 4.5.2.
- 

### 8.18.5 Complex Situations Involving Branching and Referencing

Directing procedure users to make choices based on whether a particular condition or situation exists, or will exist, may require steps that use some combination of conditional statements with logic operators (see Section 8.8, “Conditional Action Steps”), referencing, and branching. These steps may be placed at the end of the referenced material or prior to the return point in the base procedure, which is normally the preferred method. Example 8-47 illustrates complex referencing steps; Example 8-48 illustrates complex referencing and branching steps.

In particularly complex situations, with a number of possible conditions, use a routing table as discussed in Section 8.18.6.

---

Example 8-47. Complex referencing steps using conditional step statements.

---

- 4.2.1 IF the flow rate indicated on FI-WL-123 falls below 95 gpm,  
GO TO Step 4.7 and increase and stabilize flow rate;  
THEN RETURN TO Step 4.2.4.
- 4.2.2 IF the pressure displayed on PI-WL-123 equals or exceeds 60 psig,  
GO TO Step 4.8 and reduce the pressure;  
THEN RETURN TO Step 4.2.4.
- 4.2.3 IF pressure displayed on PI-WL-123 equals or exceeds 60 psig  
AND the flow rate indicated on F-WL-123 falls below 95 gpm,  
GO TO Step 4.12 and stabilize pressure and flow rate;  
THEN RETURN TO Step 4.2.4.
-

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 69 of 104 |
|------------------------------------|--|

---

Example 8-48. Referencing step (4.4.1), complex referencing step (4.4.2.1), and complex branching step (4.4.2.2).

---

- 4.4.1 GO TO TPR-438, “Offgas Filter System Testing,” and test F-NCC-123;  
THEN RETURN TO Step 4.4.2.
  - 4.4.2 Respond to filter testing results.
    - 4.4.2.1 IF F-NCC-123 is to be replaced,  
GO TO TPR-439, “Offgas Filter Replacement,” and  
replace the filter;  
THEN RETURN TO Step 4.5.
    - 4.4.2.2 IF F-NCC-123 is NOT to be replaced,  
GO TO Step 4.5 and start the offgas system  
WITHOUT RETURNING TO this step.
- 

### 8.18.6 Routing Tables

A routing table is a convenient referencing and branching tool that presents complex referencing and branching instructions in tabular format. This helps procedure users easily determine what actions need to be performed in response, for example, to a condition or desired condition.

Routing tables are not intended for use in procedures that must be performed from start to finish in sequence. Routing tables allow procedure sections to be performed out of sequence or skipped entirely by (a) directing the user to perform certain sections and steps in a procedure relevant to a current condition or desired condition, or (b) directing the user to skip procedure sections and steps that are not relevant (see Example 8-49). Routing tables also function as an organizational tool that serves as a convenient reference for the user to determine what sections or steps need to be performed (see Example 8-50).

A routing table is introduced with a step that directs the performance of a section, step, or another stand-alone procedure based upon, for example, a system condition, desired condition, or expected outcome. As with referencing and branching steps, provide the user with accurate and clear directions in both the introductory step and the table to avoid confusion.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 70 of 104 |
|------------------------------------|--|

Example 8-49. Routing table used to direct the performance of procedure steps based upon current and desired system conditions; steps that are not relevant to the current and desired condition are not performed.

- 4.1 GO TO the appropriate steps from the following table, based on current system condition and desired system condition, and perform those steps;  
THEN RETURN TO this step, unless otherwise directed.

| Current Condition                        | Desired Condition          | Procedure Step(s)   |
|--|----------------------------|---|
| Cold shutdown<br>(unknown configuration) | Ready for startup          | Perform Steps 4.3.1 through 4.4.15 to complete preoperational checks. |
| Shutdown<br>(preoperation completed)     | Normal operation           | Perform Steps 4.8.1 through 4.11.20 to start system.                  |
| Normal operation                         | Continued normal operation | Perform Steps 4.12.1 through 4.14.10 for normal operations.           |
| Normal operation                         | Shutdown                   | Perform Steps 4.15.1 through 4.15.12 to shutdown system.              |
| Shutdown                                 | Maintain shutdown status   | Exit this procedure.  |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 71 of 104 |
|------------------------------------|--|

Example 8-50. Routing table used to direct the performance of procedure sections based upon an existing condition. This table serves as a convenient tool for the user to determine which sections are to be performed to respond to a condition.

- 4.2 IF any of the following conditions exist,  
GO TO the associated section(s) and respond as directed.

| Condition   | Response   |
|---|--|
| Condensate collection tank reaches 2,000 gal              | Perform Sections 4.3 and 4.4 to sample tank contents;<br>THEN RETURN TO this step.               |
| Condensate collection tank reaches 4,000 gal              | Perform Section 4.5 to switch condensate tanks;<br>THEN RETURN TO this step.                     |
| Condensate collection tank contents to be pumped to LET&D | Perform Sections 4.6 and 4.7 to pump condensate to LET&D;<br>THEN RETURN TO this step.           |
| Condensate collection tank contents require recycle       | Perform Section 4.8 to recycle condensate to VES-WL-133;<br>THEN RETURN TO this step.            |
| Condensate collection system requires shutdown            | Perform Section 4.9 to shut down condensate collection system<br>WITHOUT RETURNING TO this step. |

### 8.18.7 General Referencing Instructions

Some action steps that reference, for example, another document, procedure, section, step, step series, appendix, figure, or form, do not require the detailed referencing instructions specified in Section 8.18.4 (GO TO... THEN RETURN TO...). For these steps, the referencing instructions provided in the action step (where to go, what to do, where to return to) are obvious to the procedure user.

For example, “Record data on Form 444.14...” or “Verify Quality Inspector (QI) is certified as a Level II or III Leakage Test Examiner in accordance with MCP-535...” are sufficient referencing instructions. In these examples, placekeeping in the procedure is not disrupted. Users will not lose track of where they stopped in the procedure to fill out the form, to check the QI’s credentials, or where to return to in the base procedure after the form is completed or credentials are verified. Example 8-51 shows action steps where referencing instructions are obvious and the detailed referencing criteria (GO TO... THEN RETURN TO...) specified in Section 8.18.4 are unnecessary.

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 72 of 104

General references may be introduced using terms, such as (a) “in accordance with,” for referencing where general compliance or conformance with requirements is expected (see Section 8.7, Item 9), (b) “per,” where the completion of specific, required actions is required (see Section 8.7, Item 9), and (c) “see,” for information or guidance referencing purposes. When “see” is used to introduce a reference, place the reference in parentheses at the end of the step.

“Per” may be used as a general referencing instruction when the referencing instructions provided in the step (where to go, what to do, where to return to) are obvious to the procedure user as in Steps 4.3 and 4.7 of Example 8-51. The use of “per” as a referencing instruction in technical procedures should be avoided when “per” directs the procedure performer to depart from the current location in the base procedure to perform another task, as in, “Switch condensate feed tank per TPR-7086.” This step directs the procedure user to depart from the base procedure to obtain a different tank feed source without providing instructions on where to return to in the base procedure. The referencing instructions specified in Section 8.18.4 should be used to specify a return point in the base procedure (see Example 8-19) to avoid any confusion as to what is expected of the procedure user.

When writing action steps that use the referencing types shown in Example 8-51, procedure owners and writers must determine whether these types of references are sufficient and clear for the procedure user to understand what is required. If there is any potential for procedural error or doubt that the procedure user may misinterpret what action is required, the detailed branching and referencing instructions specified in Sections 8.18.3 and 8.18.4, respectively, must be used.

---

Example 8-51. General referencing instructions. These steps do not require detailed referencing instructions specified in Section 8.18.4 (GO TO...THEN RETURN TO...) because the referencing instruction stated in the action step is obvious to the procedure user.

---

- 3.4 Verify that calibrated instruments have been issued and controlled in accordance with MCP-2487, “Control of Inspection M&TE.”
  - 4.6 Rig crane to RH-LLW 55-ton bearing pad assembly (see Figure A-2).
  - 4.3 Ensure preoperational checks per Steps 4.2.1 through 4.2.4 have been completed and signed off.
  - 4.7 Attach crane hook to approved rigging and cask per Form 433.34 (Lift Plan No. PBF-19).
  - 4.9 Record relief pressure of valve on FRM-147.
-

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 73 of 104 |
|------------------------------------|--|

## 8.19 Warnings and Cautions

Warnings and cautions alert the procedure user to potentially undesirable actions or events that create hazards for personnel or equipment, or that produce highly undesirable results. Warning and cautions consist of (a) conditions, design limitations, practices, and processes that must be followed to avoid loss of life, personal injury, health hazards, or damage to equipment, or (b) conditions to avoid in order to prevent unnecessary waste of resources or work loss.

Warnings alert users to potential hazards to people that could result in injury or death.

Cautions alert users to potential hazards resulting in damage to products or equipment, or resulting in undesirable process outcomes.

### 8.19.1 Identifying Warnings and Cautions

To identify situations and conditions that may require a warning or caution in a TPR, the following activities may be necessary:

1. Analyzing procedure actions with technical specialists to identify potentially hazardous actions.
2. Analyzing documents cited in the procedure basis for potential hazards to personnel, the environment, or equipment.
3. Determining which potential hazards should not be addressed in the procedure, and coordinating with the responsible manager and cognizant personnel, such as support, engineering, or safety personnel, to ensure those hazards are addressed where appropriate. Hazards that should not be addressed in the procedure include those that the procedure user cannot control by using the procedure.

Warnings and cautions identify hazards and state potential consequences (see Example 8-52 and Example 8-53). Only a procedure instruction—an action step—can direct the user accomplish something to prevent the consequences. The step(s) following a warning or caution should always tell the user how to avoid the consequences identified in the warning or caution (see Example 8-52 and Example 8-53).

### 8.19.2 Developing Warnings and Cautions

To develop useful warnings and cautions:

1. Analyze potential hazards with system or equipment technical specialists to determine warnings or cautions that need to be included.
2. Identify any points in the procedure where warning or caution statements are necessary.

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 74 of 104

3. If the danger is present during the entire TPR, place the warning or caution information in the P&L section, formatted according to the instructions in Section 8.4.2, “Formatting the P&Ls Section.” If appropriate, repeat the information given in the P&Ls section as a warning or caution at the affected step or steps in Section 4. Such repetition is warranted if the risk is unusually high, or if the procedure directs an activity that will be continued through shift change.
4. Ensure that warnings and cautions provide:
  - A description of the hazardous condition
  - The consequences of failing to heed the warning or caution
  - Critical time considerations, if there are any.
5. Use the step immediately following a warning or caution to tell the user how to avoid the consequences identified in the warning or caution.

---

Example 8-52. A warning that identifies the hazard and states the potential consequences to the procedure performer followed by a step that tells the performer how to avoid the consequences.

---

**WARNING**

**The heater element may cause severe burns if touched.**

- 4.4.1 Touch only the rubber hose to avoid burns.
  - 4.4.2 Feel the rubber hose downstream of the heater element to check the detector side and reflector side opacity blower heaters for operation.
-

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 75 of 104

Example 8-53. A caution that states the hazard and consequences of the hazard to equipment followed by steps that tell the performer how to avoid the consequences.

**CAUTION**

**Binding causing damage to the cask and impact limiter may occur when the impact limiter is removed from the cask.**

- 4.6.7 IF binding occurs during the performance Step 4.6.8, THEN stop and readjust rigging or trolley on gantry crane to relieve binding.
- 4.6.8 Lift impact limiter slowly from cask.

6. If warnings and cautions occur at the same point in a procedure, list warnings first, then cautions.
7. Include only one topic in each warning or caution.
8. Write warnings and cautions as short, concise statements rather than as commands to distinguish them from action steps.
9. Do not embed an action step in a warning or caution. For example, do not rewrite the instruction, “Do not close the valve,” as the caution statement, “Shutting the valve could result in damage to the cooling system.” Note, however, that in most circumstances, both a correctly phrased warning or caution and an action step are appropriate to minimize risks to personnel or equipment.
10. Do not include requirements in warnings and cautions.

### 8.19.3 Formatting Warnings and Cautions

Warnings and cautions are elements included in the TEM-5 styles. The complete warning or caution requires use of two styles: either “Warning Head” and “Warning Body” or “Caution Head” and “Caution Body,” whichever is appropriate.

Both “Warning Head” and “Caution Head” styles establish the box (using the appropriate line thickness) required around warnings and cautions. Once “Warning Head” or “Caution Head” is applied to a paragraph, type in the word “WARNING” or the word

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9  
Revision\*: 7  
Page: 76 of 104

“CAUTION,” as appropriate. After applying the appropriate style, press the enter (or return) key. Either “Warning Body” or “Caution Body” style, depending on the previous style, will automatically be applied to the next paragraph. Write the warning or caution statement.

1. Warning and caution text is sentence structure, all boldface (see Example 8-52, Example 8-53, and Example 8-54).
2. Position warnings and cautions so they are complete on one page and appear immediately before and on the same page as the action step(s) to which they apply.
3. Include only one topic in each warning or caution.
4. When more than one warning or caution exists before an action step, number the warnings or cautions (WARNING 1, WARNING 2, or CAUTION 1, CAUTION 2, and so on), and place all warnings or cautions in one box instead of using a separate box for each warning or caution (see Example 8-55).
5. Do not mix warnings and cautions in a single box.
6. Format multiple warning or caution headings, text, and box lines in the same way as single warnings or cautions. Leave one blank line between each pair of warnings or cautions located inside a single box (see Example 8-55).

---

Example 8-54. The warning shown in this example illustrates the format used for warnings and cautions. They are formatted the same (bold font, uppercase warning or caution title), except for the width of the box border.

---

- 4.5.8      **Raise canister slowly from transfer car and wrap with sleeving as it is raised.**

**WARNING**

**Failure to insert hole cover over transfer car insert hole as soon as canister is raised out of transfer car adapter plate may result in personal injury.**

- 4.5.9      **Insert hole cover as canister clears hole in plate (PLT-SF-903).**
-

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 77 of 104 |
|------------------------------------|--|

Example 8-55. Format for multiple, numbered warnings in one warning box.

- 4.1.8 Heavy Equipment Operator: Rig to the RH-LLW 55-ton bearing pad assembly with weather cover/radiation shield plug as shown in Appendix A, Figure A-2.

**WARNING 1**

**When lifting the RWMC RH-LLW bearing pad assembly with weather cover/radiation shield plug, approaching within 6 ft of the outer edge of the assembly may result in injury unless the assembly has been lowered to within approximately 2 ft of a vault opening.**

**WARNING 2**

**Exposure to radiation fields greater than 400 mrem/hr may result in personal injury or illness.**

- 4.1.9 Stay at least 6 ft from the RH-LLW bearing pad assembly with weather cover/radiation shield plug until the assembly has been lowered to within approximately 2 ft of a vault opening.
- 4.1.10 RCT: Verify that the radiation field is below the acceptable limit before approaching the open vault.
- 4.1.11 Lift the RH-LLW 55-ton bearing pad assembly with weather cover/radiation shield plug and place plug as directed by the Operations Specialist.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 78 of 104 |
|------------------------------------|--|

## 8.20 Notes

Notes call attention to important supplemental information. Use notes to present information that assists the user in making decisions or improving task performance.

**NOTE:** *TPRs use the note format discussed in this section to present supplemental information to the procedure user. The placement of notes before and after steps ensures that the notes are highly visible to the user. As such, footnotes are not used in procedures, except at the end of tables.*

1. Position notes so they are complete on one page and appear immediately before or immediately after, but always on the same page as the action step(s) to which they apply. Whether the note is before or after the step to which it applies, make sure the note is not separated from the step by a page break.
2. If warnings and cautions occur at the same place as notes in a TPR, list warnings first, then cautions, then notes.
3. Write notes as short, concise statements rather than as commands or requirements, to distinguish them from action steps.
4. Do not include instructions or requirements in notes. Embedded actions and requirements should be removed from notes and be written as action steps (see Example 8-56).

---

Example 8-56. Note containing an embedded action step (hidden command) and rewritten to remove the embedded action.

---

*[Wrong—note contains embedded action step (hidden command)]*

**NOTE:** *A timed duration starts when fluid collection begins. Time is measured and fluid is collected from the end of the test hose (at the floor drain) into a graduated cylinder.*

*[Correct—note rewritten to remove the embedded action step]*

**NOTE:** *A timed duration starts when fluid collection begins in Step 4.3.12.*

4.3.12 Collect fluid from the end of the test hose (at the floor drain) into a graduated cylinder.

---

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 79 of 104 |
|------------------------------------|--|

5. Include only one topic in each note.
6. Number the notes if more than one note precedes an action step. See Example 8-57.

---

Example 8-57. Numbered notes.

---

**NOTE 1:** *Performing the following step closes generator breaker G-1 and starts diesel DL-1.*

**NOTE 2:** *Performing the following step begins a time measurement starting at the initiation signal.*

---

7. Avoid overusing notes.
8. Because notes may be placed before or after associated steps depending on context, it is helpful to the procedure user to either (a) introduce the note with words, such as “In the following [or preceding] step, . . .”; “In Step 4.10.1...”; “The measurement in Step 4.2.12...”, or (b) insert an additional blank line to separate the note from the step if it is not associated with. In other words, if the note precedes the associated step, place two blank lines (24 points) before the note, if the note follows the associated step, place two blank lines (24 points) after the note (see Example 8-58). Combining both techniques is also acceptable. If the steps before and after the note are at different levels of subordination, simply aligning the note properly will indicate the associated step.

---

Example 8-58. Format for a note that precedes the associated action step. Example shows two blank lines before the note.

---

4.10.3 WHEN the selected pump has run for 10 minutes,  
THEN check the selected pump’s pressure indicator (PI-WB-1,  
-WC-1, -WD-1, or -WE-1) for vacuum increase.

**NOTE:** *Vacuum is shown in inches of mercury on the gauge connected to the pump strainer lid.*

4.10.4 IF the pressure indicator shows a vacuum increase,  
GO TO Step 4.10.7  
WITHOUT RETURNING TO this step.

---

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>80</b> of 104 |
|------------------------------------|---|

9. Apply TEM-5 styles “Note Heading 1” through “Note Heading 6” to automatically align notes with any step or section heading level. These styles include appropriate hanging indents and tab settings.
10. To format the text of a note, apply the appropriate TEM-5 “Note heading 1” through “Note Heading 6” style to align the note with the associated step or section heading level. Type the word **NOTE:** and a colon in boldface uppercase letters, tab once, then write the note text in italics.

## 8.21 Forms

It is inefficient to include copies of company-controlled forms in procedures, such as in an appendix (see Section 9.1, “Contents”), because each time a form is revised, the procedure must also be revised. In addition, forms are readily accessible as separate documents using the Forms Index on Lotus Notes or EDMS Forms on the EDMS Web site. To manage forms in procedure steps (a) refer to the form by number, (b) include the form title only at the first mention of form in the procedure, and (c) instruct the user to complete or record data results on the form (see Example 8-59).

---

Example 8-59. Citing and managing forms in procedures.

---

- 4.7 Measure concrete temperature.
    - 4.7.1 Place thermometer in sample of concrete and allow temperature to stabilize (minimum of 2 minutes) before reading.
    - 4.7.2 Record results on Form 432.23, “Concrete Placement Inspection Report.”
- 

## 8.22 Procedure Close-out Actions

Actions needed to close out the activity, including testing, restoration, and compiling results, should be placed at the end of Section 4, “Instructions.” Close-out activities must be performed to complete procedure performance.

### 8.22.1 Testing

If equipment operability has been affected while performing a procedure and operability has to be verified before returning the equipment to service, include action steps that specify these tests.

### 8.22.2 Restoration

Provide action steps to specify and record the return of all affected structures, systems, or equipment to the desired configuration.

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>81</b> of 104 |
|------------------------------------|---|

1. Include instructions for:
  - A. Required restoration adjustments, storage, or maintenance of laboratory and process equipment
  - B. The return of tools and equipment
  - C. The proper disposal or storage of consumables, such as test samples or chemicals not used in the process.
2. Provide space for recording that appropriate personnel were notified that the system has been returned to service.
3. Include provisions for close out of any permits, such as confined space entry permits, that were required to perform the procedure.
4. Provide for verification of appropriate restoration action steps.

### **8.22.3 Results**

Provide action steps to specify and record results.

1. Provide instructions to summarize the results of the procedure, including:
  - A. Equipment or system-condition lists
  - B. Date and time of activity start and completion
  - C. Participants
  - D. Reasons for the test.
2. Provide instructions to state whether problems or delays were encountered, corrective action(s) were performed, and authorization signatures were obtained.
3. Provide instructions to state whether acceptance criteria were satisfied, a nonconformance report was initiated, and/or a limited condition for operation was exceeded.
4. Provide instructions to review the entire procedure for completion and to review and approve related test results.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 82 of 104 |
|------------------------------------|--|

## 8.23 Records

Records generated or received as a result of performing a procedure are maintained to document completion of procedural tasks. Post-task analyses of the procedure require that the conditions of performance and the personnel involved are clearly recorded so lessons can be learned if adverse consequences occurred when the procedure was performed.

1. Identify records generated or received as result of performing the procedure by listing the records in Section 5, “Records” (see Example 8-60).
2. Add the following note after the records list (see Example 8-60):

**NOTE:** *The Records Schedule Matrix, located on the intranet at [http://edms.inel.gov/docs/matrix/mtx\\_menu.html](http://edms.inel.gov/docs/matrix/mtx_menu.html), and the applicable facility, organization, program, or project records management plan and record types list provide current information on uniform file codes, disposition authorities, and retention periods for these records.*

---

Example 8-60. List of records generated or received during the performance of a procedure and note explaining records management requirements.

---

## 5. RECORDS

Consumable copies of this procedure

Form 434.14, “Pre-Job Briefing Checklist”

Form 441.49, “INEEL Radiation Work Permit”

MFC to RWMC waste shipment transfer letter

**NOTE:** *The Records Schedule Matrix, located on the intranet at [http://edms.inel.gov/docs/matrix/mtx\\_menu.html](http://edms.inel.gov/docs/matrix/mtx_menu.html), and the applicable facility, organization, program, or project records management plan and record types list provide current information on uniform file codes, disposition authorities, and retention periods for these records.*

---

3. If records generated or received during the performance of the procedure must be stored elsewhere, other than the records storage location of the unit performing the procedure, include a step(s) in the instructions section of the procedure directing the user to send the records to the appropriate storage location.
4. If no records are generated or received during the performance of the procedure, write the word “None” under the Section 5 heading.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 83 of 104 |
|------------------------------------|--|

## 8.24 Definitions, Acronyms, and Initialisms

### 8.24.1 Definitions

No formal definitions list is used in a TPR because training prior to procedure use should ensure that each procedure user is familiar with all terms used in the procedure. But if definition or clarification is necessary, either incorporate a definition in the step or paragraph in which the term first appears, or define the term in a note immediately before its first use.

### 8.24.2 Handling Acronyms and Initialisms

An acronyms and initialisms list is not used in TPRs because the trained, qualified individuals performing TPRs should be familiar with the acronyms and initialisms associated with the task and used in the procedure.

If an acronym or initialism is used in a TPR to represent a particular phrase:

1. Spell out the entire phrase at the first use, then give the acronym or initialism in parentheses (see Example 8-61).

---

Example 8-61. Format for specifying acronyms and initialisms.

---

4.2.2 Contact the Fire Alarm Center (FAC) at 6-2212.

---

2. Use the acronym or initialism without parentheses thereafter.
3. If a procedure provides instructions for a collection of related activities performed by different individuals, repeat the first use of the entire phrase followed by the acronym or initialism in parentheses each time a different procedure user is first introduced to the phrase.

If, because of training and experience, all expected users of a TPR are familiar with an acronym, it is unnecessary to spell out the acronym at first use. For example, there is no need to explain to reactor operators at the Advanced Test Reactor that ATR is the acronym for Advanced Test Reactor. Unless the TPR has a small, well-trained group of users, however, spell out the acronym on first use, as discussed above.

## 8.25 References

1. List any documents that may be of value to the procedure user.
2. List the document designation and title only (TPR-6964, “Small Cask Handling”) or title only, if there is no document designation.

**TECHNICAL PROCEDURE WRITING**

Identifier: STD-9

Revision\*: 7

Page: **84** of 104

Because procedures are prepared, updated, and performed using the most current performance and source requirement documents, revision levels, effective dates, and other bibliographic information are not cited. Exceptions to this practice may be necessary. For example, the revision level of a document may need to be cited for legal or contractual purposes.

3. When citing a reference, format the reference in accordance with the style for the document type (company-controlled document, manual, report, public law, industrial and governmental codes and regulation, etc.) specified for numbered references in STD-7028 (see Example 8-62).

For illustrative purposes, the document type is identified in brackets for each reference in Example 8-62. Do not list the document type of references cited in Section 6 of TPRs.

4. Do not number the items in the list.
5. List references alphanumerically. Documents that start with numerals precede documents that start with words, acronyms, or initialisms. List numeric entries in ascending order (10 CFR 61, “Title of Document”; 10 CFR 830, “Title”; 33 CFR 215, “Title”; 33 USC 1251, “Title”). Alphabetize words and letters using the letter-by-letter dictionary method; ignore spaces and punctuation marks, such as hyphens and virgules (“/”).
6. List source documents specified in the procedure basis table (see STD-7). Use the document designation, abbreviation, or short form of the title (see STD-7029), as applicable, for subsequent citations in the basis table which is located in the last appendix of a procedure.

**TECHNICAL PROCEDURE WRITING**Identifier: STD-9  
Revision\*: 7  
Page: 85 of 104

---

Example 8-62. List of references.

---

**6. REFERENCES**

10 CFR 61, “Licensing Requirements for Land Disposal of Radioactive Wastes”  
*[federal regulation—see Note below]*

10 CFR 830, “Nuclear Safety Management” *[federal regulation]*

ANSI/ANS 3.5-1981, “Nuclear Power Plant Simulators for Use in Operator Training”  
*[industrial standard]*

DOE O 435.1, “Radioactive Waste Management” *[DOE directive]*

EDF-1425, “Airflow Studies in WMF-631 and WMF-633” *[company-controlled document (CCD)]*

*Field Sampling Plan for Monitoring Type B Probes for the Operable Unit 7-13/14 Integrated Probing Project, INEEL/EXT-2000-01435 [report]*

Form 434.14, “Pre-Job Briefing Checklist” *[CCD]*

IDAPA 16.01.17, “Wastewater Land Application Permits” *[Idaho code]*

JSA-1048, “Tank Farm Wash and Cleaning” *[CCD]*

*Manual 14A - Safety and Health - Occupational Safety and Fire Protection [manual]*

MCP-2704, “Heat and Cold Stress” *[CCD]*

PLN-1550, “Fuel Movement Plan for the Receipt of University of Illinois TRIGA SNF to the Irradiated Fuel Storage Facility” *[CCD]*

PRD-80, “Explosives Safety” *[CCD]*

STD-7006, “Marking Methods for Equipment, Components, and Materials” *[CCD]*

TPR-6896, “Draining the Corrosive Waste Sump and Secondary Coolant System to PER-706” *[CCD]*

TSR-172, “Technical Safety Requirements for the Hot Cell Examination Facility (HFEF)-6 Cask” *[CCD]*

**NOTE:** *The document type shown in brackets after each reference is for illustrative purposes only. Document types are not listed with the references cited in Section 6 of TPRs.*

---

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>86</b> of 104 |
|------------------------------------|---|

## 8.26 Appendixes Section

In this section, identify procedure appendixes by listing them as shown in Example 8-63. Designate appendixes alphabetically in the order of mention in the body of the procedure. Place the procedure basis table in the last appendix of the procedure (see Example 8-63).

Use appendixes sparingly to provide additional information that assists performance. Where one main procedure may branch to numerous subroutines, or where supplementary instructions may clarify the main procedure, imperative instructions in appendixes may be appropriate. For example, TPR-4970, “Radiographic Examination,” provides instructions for performing industrial film radiographic examination and criteria for determining acceptability. This TPR has numerous appendixes containing subroutines that support the overall goal of the procedure.

Since appendixes may contain supplemental information, guidance, and instructions, steps in Section 4 must specify the performance expectations of these appendixes. For example: Is it for information only? Is it guidance that may or may not be followed? Does it contain supplementary instructions that must be performed?

---

Example 8-63. Format for listing appendixes.

---

## 7. APPENDIXES

Appendix A, LET&D Facility HVAC Preoperational Checklist

Appendix B, Required PPE List

Appendix C, Procedure Basis

---

All appendixes are listed in the appendixes section. To list appendixes:

1. Apply the TEM-5 “H1 body text” style to format appendix entries under the section heading. Applying the “H1 body text” style will leave one blank line below the section heading.
2. Type the word “Appendix,” followed by a space, an uppercase letter, a comma, another space, and then the appendix title. The “A” in “Appendix” aligns under the “A” in the section heading “Appendixes” (see Example 8-63).
3. If there are no appendixes, type “None” in place of the first appendix designator.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 87 of 104 |
|------------------------------------|--|

## 9. CONTENT AND FORMAT OF APPENDIXES

These content and format standards apply to all appendixes included in any TPR.

### 9.1 Content

Appendixes contain information that applies directly to the procedure. Appendixes vary in format to fit the information being presented. Appendix pages may be formatted as landscape pages if the material can be presented more effectively using that page orientation.

Appendixes may contain information, such as:

- Tables
- Figures
- Checklists
- Examples
- Flow charts
- Ancillary instructions or subroutines used in conjunction with the main procedure
- Procedure basis which is placed in the last appendix of the procedure.

Some appendixes may themselves contain supplemental instructions or subroutines (see Section 9.2.5, “Generating Appendixes,” for recommended appendix formats). This can be a very efficient, concise way to present material if, for example, the procedure branches to appendixes that provide detail on specific situations and processes associated with the base procedure. Appendix instructional information can also be a practical way to tell how to apply acceptance criteria, fill out a form, or accomplish other activities that are necessary to complete the main process, but that may not be appropriate to incorporate into the instructions section.

Since appendixes may contain supplemental information, guidance, and instructions, steps in Section 4 must specify the performance expectations of these appendixes. For example: Is it for information only? Is it guidance that may or may not be followed? Does it contain supplementary instructions that must be performed?

It is inefficient to include company-controlled forms in procedures because each time the form is revised, the procedure must also be revised (see Section 8.21, “Forms”). If a form must be included in an appendix, perhaps because the form is not available electronically as a company-controlled form, identify the form as an example and to include a notice that the form shown in the appendix may not be the current revision.

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>88</b> of 104 |
|------------------------------------|---|

## 9.2 Format

### 9.2.1 Appendix Header

Every page of the TPR, except the optional cover page, uses Form 412.09, “ICP Controlled Document Header,” as the page header (see Section 7.2.5, “TPR Header Information”). This includes appendix pages (see Example 9-1).

### 9.2.2 Appendix Designator and Title

Display the appendix designator and title centered at the top of the first page; use boldface, initial uppercase and lowercase letters for the designator (“Appendix B”) and title (“Procedure Basis”). The appendix designator and title appear on the first page only (see Example 9-1).

---

Example 9-1. Format for the appendix designator and title located at the top of the first page of the appendix.

---

|   |  |
|---|--|
| <b>TRUPACT-157 PAYLOAD ASSEMBLY<br/>OPERATIONS AT TAN</b> | Identifier: TPR-6233<br>Revision: 1<br>Page: <b>25</b> of 26 |
|---|--|

### Appendix B

### Procedure Basis

---

### 9.2.3 Appendix Page Numbering

Individual page numbers shown in the appendix page header (Form 412.09) are numbered consecutively with the main body of the procedure. The header shows the page number along with the total number of pages (see Example 9-1). Page numbers are generated automatically using Form 412.09.

|                                    |   |
|------------------------------------|---|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>89</b> of 104 |
|------------------------------------|---|

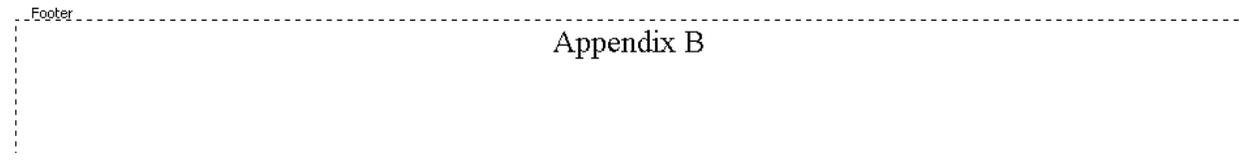
#### 9.2.4 Appendix Footer

An appendix designator also appears on every page of the appendix centered in a footer using uppercase and lowercase letters, regular font (no boldface). See Example 9-2.

---

Example 9-2. Appendix footer. The appendix designator appears at the bottom of each page of the appendix.

---



#### 9.2.5 Generating Appendixes

1. On the first page only, center the appendix designator in boldface upper- and lowercase letters (for example, “**Appendix B**”) at the top of the page on the first line outside of the header. Center the appendix title (for example, “**Figures**”) one line (12 points) below the appendix designator. The appendix designator and title are boldface, initial uppercase and lowercase letters (see Example 9-1).
2. Inside the appendix footer, center the appendix designator (for example, “Appendix B”) on the first line of the footer (see Example 9-2). Use initial uppercase and lowercase letters, regular font (no boldface).
3. Margins are the same as for the rest of the procedure and are preformatted in the header.
4. If numbered items are necessary in an appendix, use single arabic numbers (see Example 9-3) followed by a period and a tab, with continuing lines wrapping under the first word of the item. (Letters may also be used to mark list items [see Item 7].) See the following example.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 90 of 104 |
|------------------------------------|--|

Example 9-3. Format for numbered items in appendixes.

---

## Appendix E

### SPING-2 Description

The Eberline SPING-2 stack monitor is a self-contained microprocessor-based radiation detection system used to monitor for radioactive particulates, iodines, and noble gases in air. It consists of a central control terminal, and (at present) one field unit. The air sample intake is passed, successively:

1. Through a filter paper, on which any particulates are deposited
  2. Through an activated charcoal cartridge, which traps the iodines
  3. Into a gas chamber
  4. Then through a pump, from which it is exhausted back to the stack.
- 
5. If an ancillary instruction or subroutine to the main body procedure is included in an appendix, the following format is recommended:
    - Use the title of the ancillary instruction or subroutine as the title of the appendix (12-point Times New Roman, bold, upper- and lowercase style)
    - If no section heading titles are used, number first-level action steps of the routine with an arabic one, two, three,... followed by a period (1., 2., 3.,...) (see Example 9-4); number substeps using the indentation, alignment, and numbering specified for procedure steps (see Example 9-4 and Section 8.6.1, "Procedure Step Numbering").
    - If first-order (1.), second-order (1.1), and third-order (1.1.1) section headings are used, format the headings, regardless of numbered order, using 12-point Times New Roman, bold, upper- and lowercase style (see Example 9-4); number action steps under section headings using the indentation, alignment, and numbering specified for procedure steps in Section 8.6.1.

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 91 of 104 |
|------------------------------------|--|

Example 9-4. Subordinate numbering and indentation in appendixes for steps and section headings.

- 
1. First-level step (or **1. First-Order Section Heading**)
    - 1.1 Second-level step (or **1.1 Second-Order Section Heading**)
      - 1.1.1 Third-level step (or **1.1.1. Third-Order Section Heading**)
  2. First-level step (or **2. First-Order Section Heading**)
    - 2.1 Second-level step (or **2.1 Second-Order Section Heading**)
  3. First-level step (or **3. First-Order Section Heading**)
- 
6. Identify figures and tables with the appendix letter, followed by a hyphen, then an arabic number in sequence within the appendix, for example, A-2, A-3, and so on. Do not use an appendix letter designation with numbered list items, steps, or section heading numbers.
  7. If letters are used for list items in an appendix, format the list items in accordance with Section 8.16, “Lists.”

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 92 of 104 |
|------------------------------------|--|

## Appendix A

### TPR Style Sheet

| Item                     | Format   |
|--------------------------|--|
| Acronyms and initialisms | Write out the term at first use in text and show the acronym or initialism in parentheses. Use the acronym or initialism thereafter.   |
| Appendixes               | <ul style="list-style-type: none"> <li>• See this appendix page as an example.</li> <li>• Display the appendix designator and title centered at the top of the first page; use boldface, initial uppercase and lowercase letters for appendix designator and title. The appendix designator and title appear on the first page only. Format as: <p style="text-align: center;"><b>Appendix B</b></p> <p style="text-align: center;"><b>Figures</b></p> </li> <li>• Use consecutive page numbering in the header (X of Y numbering style).</li> <li>• Display the appendix designator centered in the appendix footer (see bottom of this page); use initial uppercase and lowercase letters, regular font. Format as: <p style="text-align: center;">Appendix B</p> </li> <li>• Include additional information to help users perform the procedure, or subroutines used in conjunction with the base procedure.</li> <li>• Use legal numbering and STD-9 list format.</li> <li>• Use of procedure language (action step) is acceptable.</li> <li>• Avoid including examples of forms; if included, identify the form as an example and add a statement that the form may not be current.</li> <li>• Include appendix letter designation with figures and tables (Figure A-1, Table A-1).</li> <li>• Place the procedure basis table in an appendix as the last appendix of the procedure.</li> </ul> |
| Basis                    | See <i>Procedure basis</i>   |
| Basis documents          | See STD-7, "Procedure Basis Development"   |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 93 of 104 |
|------------------------------------|--|

| Item              | Format   |
|-------------------|--|
| Branching         | <ul style="list-style-type: none"> <li>• Directs the user to another location in the base procedure or to another procedure to perform an activity, but does not return the user to the step sequence that originated the branch.</li> <li>• Introduce the branching instruction with “GO TO.”</li> <li>• In the “GO TO” instruction, give: <ul style="list-style-type: none"> <li>- The notice of departure</li> <li>- The destination</li> <li>- The action the user must perform at the destination.</li> </ul> </li> <li>• On the line following the preceding information, type “WITHOUT RETURNING TO this step.”</li> </ul> <p><i>Example:</i></p> <p>4.5.1 GO TO TPR-439, “HEPA Filter System Testing,” and remove all HEPA filters<br/>WITHOUT RETURNING TO this step.</p> |
| Cautions          | See <i>Warnings and cautions</i>   |
| Concurrent steps  | <ul style="list-style-type: none"> <li>• Steps that contain actions performed at the same time.</li> <li>• If one person is performing the concurrent action, write one upper-level step that directs the overall concurrent action with lower-level steps that specify the concurrent actions to be performed.</li> <li>• If two or more persons are performing the concurrent action, place a note or step before the first concurrent step to flag the concurrent action. Unless specified in the action step, the note should include: <ul style="list-style-type: none"> <li>- Steps involved</li> <li>- Personnel involved</li> <li>- Locations where steps are performed</li> <li>- Means of communication between locations.</li> </ul> </li> </ul>                        |
| Conditional steps | <ul style="list-style-type: none"> <li>• If a step is conditional, state the condition first, then the action.</li> <li>• Use uppercase, underlined conditional logic operators—such as <u>IF . . . THEN</u> (see <i>Logic operators</i>).</li> <li>• Start each conditional logic term on a new line.</li> </ul>  |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 94 of 104 |
|------------------------------------|--|

| Item  | Format  |
|---|---|
| Continuous steps                                      | <ul style="list-style-type: none"> <li>• Conditional action steps where the condition is monitored throughout the activity.</li> <li>• Conditional step usually formatted with <u>IF</u> . . . <u>THEN</u> logic operators.</li> <li>• Step includes starting and stopping activity parameters.</li> </ul>  |
| Contents page   | See <i>Front matter</i>   |
| Cover page  | See <i>Front matter</i>   |
| Data recording (verifications, checks, notifications) | <ul style="list-style-type: none"> <li>• Verification = corrective action taken by the procedure performer, if necessary, when using “ensure”; no action is required by the performer when using “verify.”</li> <li>• Check = corrective action taken by the procedure performer, if necessary.</li> <li>• Notification = report to a designated person that specified criteria have been met.</li> <li>• Data recording blanks, if used, are placed at the right margin, labeled.</li> </ul>   |
| Definitions   | No formal definition list in TPRs. Training is usually expected to eliminate the need for definitions. If needed, incorporate definitions into steps or place a note immediately before the first use of the word or phrase being defined.  |
| Equally acceptable steps                              | <ul style="list-style-type: none"> <li>• Equally acceptable alternate steps are indicated four ways:                             <ul style="list-style-type: none"> <li>- Step that identifies the result without specifying possible alternative actions</li> <li>- Separate steps using conditional step logic operators</li> <li>- Lower-level steps using <u>OR</u> between them</li> <li>- List items where the step indicates performance of one of the activities.</li> </ul> </li> <li>• If sign-off blocks are used, specify that only those actions that are performed are to be signed off.</li> </ul> |
| Footnotes   | <ul style="list-style-type: none"> <li>• Do not use footnotes in TPRs, except in tables. See <i>Notes</i></li> </ul>  |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 95 of 104 |
|------------------------------------|--|

| Item         | Format   |
|--------------|--|
| Fonts        | The following font attributes are set within the appropriate styles: <ul style="list-style-type: none"> <li>• Times New Roman, 14-point, uppercase bold for primary procedure section (first-order) headings</li> <li>• Times New Roman 12-point, bold, upper- and lowercase for second- and third-order, etc. section headings</li> <li>• Times New Roman 12 point for text.</li> </ul>   |
| Forms        | Identify forms in the following manner:<br><p style="text-align: center;">Use Form 414.03, “Quality Inspection Report,” . . .</p> Forms are available on the company intranet or Lotus Notes. Avoid including copies of forms in procedures to minimize the need for procedure revision. If a form must be used, such as a form that is not available electronically as a company-controlled form, identify it as an example and include a note that the form shown may not be the latest revision.  |
| Front matter | <ul style="list-style-type: none"> <li>• Front matter consists of cover page and contents page.</li> <li>• Contents page is optional for TPRs.</li> <li>• Cover page is optional for TPRs that are a part of a manual system, but required if a contents page is used.</li> <li>• Cover page is required for stand-alone procedures that are not a part of a manual system.</li> <li>• Use Form 412.14, “ICP Controlled Document Cover,” for the cover page.</li> </ul>  |
| Hold points  | Two possible methods—explicit hold points and implicit hold points: <ul style="list-style-type: none"> <li>• An explicit hold point is specified with a phrase, such as “QA HOLD” on the line preceding the actual step; boldface, and aligned with the step number.</li> <li>• An implicit hold point is stated as a conditional step following the task to be checked [WHEN the QA inspector has approved the weld, THEN . . . (condition + verb + object).]</li> <li>• In TPRs, implicit hold points are generally sufficient for all but highly critical or potentially dangerous activities.</li> </ul> |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 96 of 104 |
|------------------------------------|--|

| Item                   | Format  |
|------------------------|---|
| Identifying performers | <ul style="list-style-type: none"> <li>• Identify and underline performers, follow with a colon and one space.<br/><i>Example: (one performer)</i><br/>4.1.3     <u>Performer</u>: Instruction.<br/><i>Example: (multiple performers)</i><br/>4.1.3     <u>Performer 1 and Performer 2</u>: Instruction.<br/><i>Or</i><br/>4.1.3     <u>Performer 1</u>: Instruction.<br/>4.1.4     <u>Performer 2</u>: Instruction.</li> <li>• If one performer completes a long series of steps, format the series as substeps of an upper-level step and identify the performer in the upper-level step.</li> <li>• If there are many performers or frequent performer changes, identifying the performer at the beginning of each step adds clarification.</li> <li>• To the greatest possible extent, use personnel titles or job functions, not organizational names, as performers.</li> </ul> |
| Instructions           | <p>The instructions section (Section 4) includes many elements. See Acronyms, Definitions, Conditional steps, Data recording (verifications, checks, notifications), List items, Nonsequential steps, Notes, Steps, Tables, Warnings and cautions, and Word use and terminology in this style sheet.</p>  |
| List items             | <p>Use lists to make series easier to read and to aid placekeeping. Do not hide instructions, requirements, or warnings and cautions in lists.</p> <ul style="list-style-type: none"> <li>• Use a colon to introduce the list</li> <li>• Use uppercase letters and period to mark each item (A., B., C.)</li> <li>• Capitalize initial letter and all proper nouns</li> <li>• Do not use punctuation at the end of each item (unless it is a complete sentence), but use a period at the end of the last item in the list.</li> </ul>   |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 97 of 104 |
|------------------------------------|--|

| Item                   | Format  |
|------------------------|---|
| Logic operators        | <p><u>IF</u>, <u>WHEN</u>, <u>THEN</u>, <u>OR</u>, <u>AND</u>, <u>NOT</u></p> <ul style="list-style-type: none"> <li>• Logic operators are used only in conditional steps.</li> <li>• <u>IF</u> or <u>WHEN</u> presents the condition.</li> <li>• <u>THEN</u> directs the activity.</li> <li>• <u>AND</u> presents multiple conditions all of which are required to initiate the action.</li> <li>• <u>NOT</u> negates the condition.</li> <li>• <u>OR</u> presents multiple conditions of which only one is required to initiate the action.</li> </ul>  |
| Margins, justification | <ul style="list-style-type: none"> <li>• Left, right, bottom = 1 in. The bottom margin may be decreased to 0.5 in. to improve page breaks.</li> <li>• Top = 0.5 in.</li> <li>• All text is left justified. Exception: see <i>Warnings and cautions</i>.</li> <li>• Form 412.09, “ICP Controlled Document Header,” and TEM-5 have preset margins.</li> </ul>   |
| Nonsequential steps    | <ul style="list-style-type: none"> <li>• Use a preceding note to identify nonsequential steps.</li> <li>• Consider using checkoff boxes or sign-off lines to reduce the potential for skipping a step.</li> </ul>   |
| Notes                  | <ul style="list-style-type: none"> <li>• Do not put actions, implied actions, or requirements in notes.</li> <li>• Place notes before or after applicable material as appropriate, but always on same page as the associated step(s).</li> <li>• If warnings and cautions occur at the same point, display warnings first, then cautions, then notes.</li> <li>• Apply appropriate style (“Note Heading 1” through “Note Heading 6”) to align <b>NOTE:</b> flush with first number of the step</li> <li>• Use boldface uppercase letters for <b>NOTE:</b> and follow with a tab.</li> <li>• Italicize note text to differentiate from instructions and from warnings and cautions.</li> <li>• Continuing note lines wrap under first word of note text.</li> <li>• Use notes sparingly to provide supporting information to assist users in performing the process.</li> <li>• Cover only one topic in a note.</li> </ul> |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 98 of 104 |
|------------------------------------|--|

| Item                       | Format   |
|----------------------------|--|
|                            | <ul style="list-style-type: none"> <li>• Since a note can be entered before or after its associated step, make sure the user knows which step the note is associated with by placing an extra blank line between the note and the step with which it is not associated, giving a verbal cue, such as <i>In the next step . . .</i>, or citing the step number in the note “...in Step 4.4.5.” If the steps above and below the note are at different levels of subordination, align the note and step to indicate the note association.</li> <li>• If more than one note is entered at the same location, number the notes sequentially.</li> <li>• Do not use footnotes in TPRs, except in tables.</li> </ul>                                       |
| Numbering system (outline) | Use legal numbering to show subordination:<br><b>4. PRIMARY HEADING</b><br>4.1 Step or <b>Section Heading</b> (bold only if heading)<br>4.1.1 Step or <b>Section Heading</b> (bold only if heading)<br>4.1.1.1 Step  |
| Performers                 | See <i>Identifying performers</i>  |
| Procedure basis            | <ul style="list-style-type: none"> <li>• Include in the procedure as the last appendix.</li> <li>• See STD-7, “Procedure Basis Development,” for more information.</li> </ul>  |
| Procedure language         | <ol style="list-style-type: none"> <li>1. Write the step as an action (subject [sometimes understood], verb, direct object, and supporting information):<br/><br/>                         <u>Subject</u> + <u>Verb</u> + <u>Direct Object</u><br/>                         [Operator] + Take + measurements.<br/>                         <u>SS:</u> + Hold + briefing.</li> <li>2. Write one action for each step, unless the steps are so closely related they form one activity:<br/><br/>                         “Sign, date, and transmit the completed form to Records Management.”</li> <li>3. Emphasize the main activity, not how it is done:<br/><br/>                         ”Start P-NCC-234 by setting HS-NCC-234 to ON.”</li> </ol> |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: 99 of 104 |
|------------------------------------|--|

| Item              | Format  |
|-------------------|---|
|                   | <ol style="list-style-type: none"> <li>4. Avoid ambiguous words, such as “almost,” “approximately,” “near,” and “far.”</li> <li>5. Identify equipment precisely as it is identified in the facility.</li> <li>6. Do not split a step across a page.</li> <li>7. Keep at least one substep or list item on the page with the main step for steps that continue on the next page.</li> </ol>  |
| Procedure outline | <ol style="list-style-type: none"> <li><b>1. INTRODUCTION</b> <ol style="list-style-type: none"> <li><b>1.1 Purpose</b></li> <li><b>1.2 Scope and Applicability</b></li> </ol> </li> <li><b>2. PRECAUTIONS AND LIMITATIONS</b></li> <li><b>3. PREREQUISITES</b></li> <li><b>4. INSTRUCTIONS</b></li> <li><b>5. RECORDS</b></li> <li><b>6. REFERENCES</b></li> <li><b>7. APPENDIXES</b></li> </ol> <p>Include <u>ALL</u> section headings of the outline; use “None” under sections that do not contain information.</p> |
| Records           | <ul style="list-style-type: none"> <li>• List records generated or received as a result of performing the procedure.</li> <li>• Include a note that explains records management requirements.</li> </ul>  |
| References        | <ul style="list-style-type: none"> <li>• Section 6 in TPRs.</li> <li>• Cite documents that may be of value to the procedure user.</li> <li>• Include source documents specified in the procedure basis.</li> </ul>  |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>100</b> of 104 |
|------------------------------------|--|

| Item        | Format  |
|-------------|---|
| Referencing | <ul style="list-style-type: none"> <li>• Referencing directs user to another location in the main procedure or to another procedure, and then returns the user to the originating action step sequence.</li> <li>• Introduce the referencing instruction with “GO TO.”</li> <li>• In the “GO TO” instruction give:                             <ul style="list-style-type: none"> <li>- The notice of departure</li> <li>- The destination</li> <li>- The action the user must perform at the destination.</li> </ul> </li> <li>• On the line following the “GO TO” instruction, type “THEN RETURN TO Step ...” to direct the user to return to, or near, the originating step.</li> </ul> <p><i>Example:</i></p> <p style="margin-left: 40px;">4.4.3 GO TO Step 4.1.4 and run the disposer 2 to 3 minutes to draw any mercury vapor or dust into the filter;<br/>THEN RETURN TO Step 4.4.4.</p> <ul style="list-style-type: none"> <li>• General referencing instructions do not require “GO TO...THEN RETURN TO...” instructions because referencing instruction is obvious to the procedure user (for example, “Complete Form 580.12, ‘Property Pass Authorization—Removal.’”). General references may also be introduced with terms, such as “see,” “per,” and “in accordance with.” When “see” is used to introduce a reference, place the reference in parentheses at the end of the step.</li> </ul> |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>101</b> of 104 |
|------------------------------------|--|

| Item                       | Format   |
|----------------------------|--|
| Referencing<br>(continued) | <p><i>Examples:</i></p> <p>4.2.1 Log gas cylinder serial numbers on inventory list (see Appendix A).</p> <p>3.5.8 Verify the calibration schedule of the torque wrench as current in accordance with MCP-2487, “Control of Inspection M&amp;TE.”</p> <ul style="list-style-type: none"> <li>• The use of “per” in technical procedures should be avoided when “per” directs of the procedure user to depart from the current location in the base procedure to perform a task, as in “Calibrate the leakage detector per TPR-6254.” Referencing or branching instructions should be used instead. “Per” may be used as a general referencing instruction when the referencing instructions provided in the step (where to go, what to do, where to return to) are obvious to the procedure user, as in “Ensure preoperational checks per Steps 4.1.1 through 4.1.8 have been completed and signed off.”</li> </ul> |
| Repeated steps             | <ul style="list-style-type: none"> <li>• Repeated steps are repeated until a specific event occurs or may be repeated a specific number of times.</li> <li>• If step is repeated until a specific event occurs, include one sign-off for the entire activity.</li> <li>• If step is repeated a specific number of times, include sign-offs for each time the activity is completed.</li> <li>• Include time indicators, reminders, and when the activity is over.</li> </ul>   |
| Routing table              | <ul style="list-style-type: none"> <li>• Directs the procedure user in performing complex tasks when referencing and branching are too difficult to follow.</li> <li>• Routes user to a location in the procedure.</li> <li>• Provides an outline of activities covered in the procedure.</li> </ul>   |
| Shall                      | See <i>Word use and terminology</i>  |
| Sign-off                   | <ul style="list-style-type: none"> <li>• Sign-off line or checkoff box provided at the left margin before the step number.</li> </ul>  |
| Steps                      | See <i>Procedure language</i>  |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>102</b> of 104 |
|------------------------------------|--|

| Item                  | Format  |
|-----------------------|---|
| Tables                | Formatted in accordance with STD-7028, “Format and Style for Technical Reports and Other Publications,” except (a) lines are added around each table cell, (b) font size is 12 point (smaller sizes [minimum of 10 point] may be used to fit a table on the same page), (c) cells are left blank in lieu of an em dash (—) to indicate no information is available for the cell, and (d) the continued table label, for tables continued on the next page, is not used in TPRs.   |
| Templates and styles  | <ol style="list-style-type: none"> <li>1. Template (TEM)-5 controls overall TPR appearance.</li> <li>2. Template applies to whole document.</li> <li>3. Styles are part of the template.</li> <li>4. Specific styles can be applied to different TPR elements to automatically format them to meet STD-9 requirements.</li> <li>5. Using the template and applying the styles saves time and effort over manual TPR formatting.</li> </ol>  |
| Terminology           | See <i>Word use and terminology</i>   |
| Time-dependent steps  | <ul style="list-style-type: none"> <li>• Use a note to indicate the start of a time-dependent sequence.</li> <li>• Use the first step in the sequence to calculate time, if necessary.</li> </ul>   |
| Warnings and cautions | <ul style="list-style-type: none"> <li>• Format by applying appropriate TEM-5 styles (“Warning Head” and “Warning Body” or “Caution Head” and “Caution Body”).</li> <li>• Warning box uses 4.5-point rule: Caution box uses 1.0-point rule.</li> <li>• Warnings for potential harm to people; cautions for potential harm to equipment.                             <ul style="list-style-type: none"> <li>- Use cause-effect format.</li> <li>- Do not put instructions or requirements in warnings or cautions.</li> </ul> </li> <li>• If multiple warnings or cautions are entered at the same location, number them sequentially and place them in the same box.</li> <li>• Do not mix warnings and cautions in one box.</li> </ul> |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>103</b> of 104 |
|------------------------------------|--|

| Item                     | Format   |
|--------------------------|--|
| Word use and terminology | <ul style="list-style-type: none"> <li>• Avoid jargon.</li> <li>• Use standard terms with their standard meanings as much as possible.</li> <li>• Use modifiers with standard terms used with special or limited meaning.</li> <li>• “Must” may be used in the P&amp;Ls section, and prerequisites section when using prescriptive language.</li> <li>• Do not use “shall” in TPRs, except “shall” may be used in the procedure basis table. Procedures do not specify requirements; they provide directions for tasks that implement requirements.</li> <li>• Avoid ambiguous words, such as “appropriate,” “near,” and “responsible.” Use specific, concrete terms wherever possible.</li> </ul> |

|                                    |  |
|------------------------------------|--|
| <b>TECHNICAL PROCEDURE WRITING</b> | Identifier: STD-9<br>Revision*: 7<br>Page: <b>104</b> of 104 |
|------------------------------------|--|

## **Appendix B**

### **Example Technical Procedure**

#### **TPR-7080, LET&D – Normal Operations**

**(10 Pages)**

The following technical procedure is shown in its entirety as a stand-alone document. The header and appendix footers displayed on the following pages are those of the example procedure.

The example procedure presented here in STD 9 is for illustrative purposes only; it is not approved for use.

|                                      |  |
|--------------------------------------|--|
| <b>LET&amp;D – NORMAL OPERATIONS</b> | Identifier: TPR-7080<br>Revision: 3/DRAFT B<br>Page: 1 of 10 |
|--------------------------------------|--|

|       |                     |   |                 |
|-------|---------------------|---|-----------------|
| INTEC | Technical Procedure | For Additional Info:<br><a href="http://EDMS">http://EDMS</a> | Effective Date: |
|-------|---------------------|---|-----------------|

USE TYPE 1

Change Number: 98036

Entire document revised

## 1. INTRODUCTION

### 1.1 Purpose

The Liquid Effluent Treatment and Disposal (LET&D) system is operated to remove hazardous constituents from PEW evaporator overhead solution.

### 1.2 Scope and Applicability

This procedure begins when TPR-7079, “LET&D – Startup,” has been completed. When LET&D normal operations are complete, this procedure hands off to TPR-7081, “Process Shutdown.”

This procedure is applicable to Waste Processing personnel.

## 2. PRECAUTIONS AND LIMITATIONS

**NOTE:** *The maximum allowable feed limit may be reduced per FRM-4085, “LET&D Feed Sheet.”*

### 2.1 Fractionator feed limits must not exceed:

- A. 4.6 gpm minimum (276 gph)
- B. 9.17 gpm maximum (550 gph)
- C. 6.2 gpm maximum for total-reflux operation (372 gph).

|                                      |  |
|--------------------------------------|--|
| <b>LET&amp;D – NORMAL OPERATIONS</b> | Identifier: TPR-7080<br>Revision: 3/DRAFT B<br>Page: 2 of 10 |
|--------------------------------------|--|

- 2.2 Process limit parameters must be maintained within the following limits:

**Fractionator FRAC-WLK-171**

| Instrument   | Function               | LO Limit      | HI Limit  |
|--------------|------------------------|---------------|-----------|
| L-WLK-171-1  | Frac. liquid level     | 18 in. WC     | 36 in. WC |
| P-WLK-171-3  | Fractionator vacuum    | 0 in. WC vac. | N/A       |
| PD-WLK-171-4 | Frac. vessel DP        | N/A           | 30 in. WC |
| T-WLK-171-19 | Frac. tray temperature | N/A           | 265°F     |
| L-WLK-199-1  | Separator level        | N/A           | 10 in. WC |

**Off-Gas Train**

| Instrument   | Function                    | LO Limit    | HI Limit |
|--------------|-----------------------------|-------------|----------|
| PD-WLR-177-1 | POG filter DP               | 0.01 in. WC | 3 in. WC |
| T-WLR-177-4  | POG filter skin temperature | 225°F       | N/A      |

**3. PREREQUISITES**

- 3.1 Ensure preoperational checks have been completed per TPR-7077, “LET&D - Preparation for Startup.”
- 3.2 Verify that TPR-7079, “LET&D - Startup,” has been completed.
- 3.3 Ensure that leak detector MS-WLK-399-15 is operating prior to and during transfers between INTEC-1618 and INTEC-604.

**4. INSTRUCTIONS**

- 4.1 Record operating status readings on FRM-4052, “LET&D Monitoring.”

|                                      |  |
|--------------------------------------|--|
| <b>LET&amp;D – NORMAL OPERATIONS</b> | Identifier: TPR-7080<br>Revision: 3/DRAFT B<br>Page: 3 of 10 |
|--------------------------------------|--|

4.2 GO TO the appropriate section or procedure specified in the following table based on current system condition, and perform that section or procedure;  
 THEN RETURN TO this step, unless otherwise directed:

| Current Condition  | Desired Condition                                     | Response   |
|--|---|--|
| Fractionator feed rate requires adjustment                       | Feed rate adjusted                                    | Perform Section 4.3.   |
| Condensate feed tank is empty and continued operation is desired | Continued operation using a different feed source     | GO TO TPR-7086, “LET&D – Transfers,” and switch condensate tanks;<br>THEN RETURN TO this procedure.<br><br><u>OR</u><br><br>Use demineralized water as feed by performing Section 4.4.<br><br><u>OR</u><br><br>Place fractionator in total reflux by performing Section 4.5. |
| Fractionator needs to return to condensate feed                  | Operating fractionator on condensate feed             | Change from demineralized-water feed to condensate feed by performing Section 4.6.<br><br><u>OR</u><br><br>Change from total reflux to condensate feed by performing Section 4.7.  |
| Level in bottoms tank VES-WLL-195 reaches 25 in. or 200 gal      | Bottoms tank emptied                                  | Perform Section 4.8.   |
| Fractionator sp gr reaches approximately 1.23                    | Fractionator bottoms density controlled at 1.23 sp gr | Perform Section 4.9.   |
| Fractionator needs to be shut down                               | Fractionator shut down                                | GO TO TPR-7081, “LET&D – Shutdown,” and shut down fractionator WITHOUT RETURNING TO this procedure.  |
| Fractionator shut down   | Maintain shutdown status                              | Exit this procedure.   |

**LET&D – NORMAL OPERATIONS**

Identifier: TPR-7080  
Revision: 3/DRAFT B  
Page: 4 of 10

**4.3 Adjusting Fractionator Feed Rate**

- 4.3.1 Adjust feed rate less than or equal to 1.0 gpm every 30 minutes or longer (using feed controller F-WLK-171-27).
- 4.3.2 Adjust feed reflux ratio as feed rate changes (using reflux ratio controller FF-WLK-397-2).

| Feed Range (gpm) | Reflux Ratio | Reflux Flow (gpm) |
|------------------|--------------|-------------------|
| 4.6–5.0          | 1.42–1.60    | 6.5–8.0           |
| 5.1–5.8          | 1.20–1.49    | 6.1–8.6           |
| 5.9–6.7          | 0.98–1.25    | 5.8–8.4           |
| 6.8–7.1          | 0.91–1.04    | 6.2–7.4           |
| 7.2–7.5          | 0.82–0.96    | 5.9–7.2           |
| 7.6–7.9          | 0.76–0.90    | 5.8–7.1           |
| 8.0–8.3          | 0.72–0.84    | 5.8–7.0           |
| 8.4–8.8          | 0.65–0.78    | 5.5–6.9           |
| 8.9–9.17         | 0.61–0.72    | 5.4–6.6           |

**4.4 Using Demineralized Water as Fractionator Feed**

- 4.4.1 GO TO TPR-7086, “LET&D – Transfers,” and stop condensate feed; THEN RETURN TO Step 4.4.2.
- 4.4.2 IF all of the following conditions exist,
- A. Shift supervision requests closing fractionator density valve
  - B. Fractionator feed rate is below 6 gpm
  - C. Fractionator liquid level is between 20 and 22 in. WC
- THEN place D-WLK-171-2 in MANUAL at 0%.
- 4.4.3 Adjust PSV-WL-14 and PSV-WL-18 to maintain feed tank level between 8 and 20 in. WC (as indicated on L-WLK-197-2).

**LET&D – NORMAL OPERATIONS**

Identifier: TPR-7080  
Revision: 3/DRAFT B  
Page: 5 of 10

**4.5 Placing Fractionator in Total Reflux**

- \_\_\_\_\_ 4.5.1 IF condensate feed needs to be stopped  
AND shift supervision authorizes switching to total reflux,  
GO TO TPR-7086, “LET&D – Transfers,” and stop condensate feed;  
THEN RETURN TO Step 4.5.2.
- \_\_\_\_\_ 4.5.2 Fill VES-WLK-197 to 18 to 22 in. WC with demineralized water using  
PSV-WL-14 and PSV-WL-18.
- \_\_\_\_\_ 4.5.3 Place density controller D-WLK-171-2 in MANUAL at 0%.

**CAUTION**

**Failure to open the cooling water control valve at this point could result in thermal stress to fractionator components.**

- \_\_\_\_\_ 4.5.4 Place condenser cooling water control valve F-WLK-397-1 in  
MANUAL at 100% open.
- \_\_\_\_\_ 4.5.5 Place fractionator feed control valve F-WLK-171-27 in MANUAL at  
0%.
- \_\_\_\_\_ 4.5.6 RCT: Survey filter banks.
- \_\_\_\_\_ 4.5.7 WHEN RCT survey is complete,  
THEN record the filter bank radiation reading. \_\_\_\_\_ mrem/hr
- \_\_\_\_\_ 4.5.8 Adjust preheat air to filter banks by opening H-WLR-395-5 in 25%  
increments every 30 to 40 seconds.
- \_\_\_\_\_ 4.5.9 Place fractionator level controller L-WLK-171-1 in MANUAL.
- \_\_\_\_\_ 4.5.10 Supervision: Notify Utilities of reduced steam usage.

**LET&D – NORMAL OPERATIONS**

Identifier: TPR-7080  
Revision: 3/DRAFT B  
Page: 6 of 10

**WARNING**

**If the plug is not installed at valve LSV-WLQ-416, steam may cause injury to operations personnel.**

———— 4.5.11 Ensure plug is installed at LSV-WLQ-416 (using ladder).

**NOTE:** *Steps 4.5.12 and 4.5.13 are performed concurrently by two operators.*

———— 4.5.12 Operator 1: Place reboiler steam control valve F-WLK-399-1 in MANUAL and slowly adjust to 3.5 klb/hr.

———— 4.5.13 Operator 2: Place FRAC-WLK-171 pressure controller P-WLK-171-3 in MANUAL at 50% open.

———— 4.5.14 Maintain at least 25 in. WC level in fractionator (as indicated on L-WLK-171-1) by adjusting fractionator feed control valve F-WLK-171-27 in MANUAL.

**4.6 Returning Fractionator to Condensate Feed From Demineralized Water Feed**

4.6.1 Close PSV-WL-14 and PSV-WL-18 by setting HS-WLL-43 to OFF.

4.6.2 Ensure that D-WLK-171-2 is in AUTO and set at 1.23.

4.6.3 GO TO TPR-7086, “LET&D – Transfers,” and start condensate feed WITHOUT RETURNING TO this step.

**4.7 Returning Fractionator to Condensate Feed From Total Reflux**

4.7.1 GO TO TPR-7086, “LET&D – Transfers,” and restart condensate feed; THEN RETURN TO Step 4.7.2.

4.7.2 Place fractionator pressure controller P-WLK-171-3 in AUTO and ensure set point is 20 in. WC vacuum.

**LET&D – NORMAL OPERATIONS**

Identifier: TPR-7080  
Revision: 3/DRAFT B  
Page: 7 of 10

**NOTE:** *Valve HAV-WLO-34 is normally open.*

4.7.3 Position the following valves:

| Valve  | Position |
|--|----------|
| HSV-WLO-312 <sup>a</sup>                             | CLOSED   |
| HAV-WLO-33   | OPEN     |
| HAV-WLO-34   | OPEN     |
| a. Leather gloves needed due to thermally hot valve. |          |

4.7.4 IF feed controller F-WLK-171-27 is NOT in AUTO,  
THEN place feed controller F-WLK-171-27 in AUTO and ensure set point is 4.6 gpm.

4.7.5 Place level controller L-WLK-171-1 in AUTO and ensure set point is 25 in. WC.

4.7.6 IF fractionator level and temperature are within the parameters listed in Step 2.2,  
THEN place steam controller F-WLK-399-1 in AUTO/CASCADE.

4.7.7 Start cooling water by performing Steps 4.7.7.1 and 4.7.7.2 concurrently.

4.7.7.1 Place reflux ratio controller FF-WLK-397-2 in AUTO/RATIO and adjust to 1.6.

4.7.7.2 Place cooling water controller F-WLK-397-1 in AUTO/CASCADE.

4.7.8 IF preheat air is in AUTO,  
THEN set preheat air valve H-WLR-395-5 to 0%.

4.7.9 IF preheat air is in MANUAL,  
THEN set preheat air valve H-WLR-395-5 to 100%.

**RCT HOLD**

4.7.10 RCT: Survey preheat-air enclosure.

4.7.11 Place fractionator density valve D-WLK-171-2 in AUTO at 1.23.

|                                      |  |
|--------------------------------------|--|
| <b>LET&amp;D – NORMAL OPERATIONS</b> | Identifier: TPR-7080<br>Revision: 3/DRAFT B<br>Page: 8 of 10 |
|--------------------------------------|--|

#### 4.8 Transferring Bottoms Tank Solution

- 4.8.1 WHEN bottoms tank reaches a level of 25 in. (that is, 200 gal)  
OR shift supervision requests bottoms tank transfer,  
THEN perform the following steps:
- 4.8.1.1 Close D-WLK-171-2 and adjust fractionator feed control valve F-WLK-171-27 in MANUAL.
- 4.8.1.2 IF directed by shift supervision to sample bottoms tank,  
GO TO TPR-7085, “LET&D – Sampling,” and sample bottoms tank;  
THEN RETURN TO Step 4.8.1.3.
- 4.8.1.3 Transfer bottoms tank solution as specified in TPR-7086,  
“LET&D – Transfers.”
- 4.8.1.4 Place D-WLK-171-2 in AUTO at 1.23.

#### 4.9 Controlling Fractionator Bottoms Density

**NOTE:** *Steps 4.9.1 through 4.9.3 may be performed in any order.*

- \_\_\_\_\_ 4.9.1 IF controlling density in MANUAL,  
THEN place density controller D-WLK-171-2 in MANUAL at 70% open.
- \_\_\_\_\_ 4.9.2 WHEN density reaches a sp gr of 1.2  
AND fractionator level decreases to 18 in. WC (as indicated on L-WLK-171-1),  
THEN set D-WLK-171-2 at 0%.
- \_\_\_\_\_ 4.9.3 Place D-WLK-171-2 in AUTO at 1.23.

### 5. RECORDS

Consumable copies of this procedure

FRM-4052, “LET&D Processing Monitoring”

**NOTE:** *The Records Schedule Matrix, located on the intranet at [http://edms.inel.gov/docs/matrix/mtx\\_menu.html](http://edms.inel.gov/docs/matrix/mtx_menu.html), and the applicable facility, organization, program, or project records management plan and record types list provide current information on uniform file codes, disposition authorities, and retention periods for these records.*

|                                      |  |
|--------------------------------------|--|
| <b>LET&amp;D – NORMAL OPERATIONS</b> | Identifier: TPR-7080<br>Revision: 3/DRAFT B<br>Page: 9 of 10 |
|--------------------------------------|--|

## 6. REFERENCES

40 CFR 265.193, “Containment and Detection of Releases”

Drawing No. 356596, “CPP-1618 Liquid Effluent Treatment and Disposal Facility P&ID”

Drawing No. 356597, “CPP-1618 Liquid Effluent Treatment and Disposal Facility Utility Flow Diagram”

JSA-714, “LET&D – Normal Operations”

SAR-107, “Safety Analysis Report for the Tank Farm Facilities”

## 7. APPENDIXES

Appendix A, Procedure Basis

|                                      |  |
|--------------------------------------|--|
| <b>LET&amp;D – NORMAL OPERATIONS</b> | Identifier: TPR-7080<br>Revision: 3/DRAFT B<br>Page: <b>10</b> of 10 |
|--------------------------------------|--|

## Appendix A

### Procedure Basis

| Step   | Basis  | Source         | Citation                         |
|--------|--|----------------|----------------------------------|
| 3.3    | Leak detection is required for transfers between INTEC-1618 and INTEC-604 due to RCRA secondary containment requirements.  | 40 CFR 265.193 | (b), (c)                         |
|        | All waste transfers involving the Tank Farm shall be monitored. Monitoring shall include verification of expected changes in the receiving and sending tank levels and leak detection indications during the transfer. | SAR-107        | Chapter 3,<br>p. 3-33,<br>Item 6 |
| 4.1    | FRM-4052 is used to monitor for RCRA secondary containment.  | 40 CFR 265.193 | (b), (c)                         |
| 4.5.11 | A ladder must be used to check the plug at overhead valve LSV-WLQ-416.   | JSA-714        | 3a                               |
| 4.7.3  | Leather gloves are required because of a thermally hot valve (HSV-WLO-312).  | JSA-714        | 4b                               |