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Kewaunee Nuclear Power Plant	Title: Procedure Writer's Guide
GENERAL NUCLEAR PROCEDURE	Date **SEP 1 4 1993** | Page 1 of 79
Prepared By _L. M. Meyer_ Reviewed By _Michael A. Parsons_	Approved By _M. Mueller_

Nuclear Safety Related	☐ Yes ☒ No	PORC Review Required	☐ Yes ☒ No	SRO Approval of Temporary Changes Required	☐ Yes ☒ No

TABLE OF CONTENTS

INTRODUCTION

Reason For A Writer's Guide

A writer's guide is a tool to help create documents which conform to certain standards of consistency and organization. Well written procedures improve user comprehension, reduce errors and help us to complete our tasks more professionally.

The purpose of this document is to provide suggested guidance to help KNPP procedure writers produce instructions and supporting graphics that are technically accurate, concise, consistent, and easy to perform.

The guide covers the following topics:

- *Procedure Format*: how to format procedures in a consistent manner
- *Procedure Instructions*: how to format instructions in a consistent manner
- *Procedure Graphics*: how to supplement instructions with graphics
- *Writing Mechanics*: how to write.

Basics Of Procedure Writing

Procedure writing is a form of technical writing. Technical writing possesses a certain mystique, which is unfortunate. Technical writing is writing about technical subjects, not writing to sound technical. This simple fact confuses many writers. Make technical writing as uncomplicated as any other kind of writing.

We want our readers to understand the information we are sharing. Our readers want to grasp that information. Helping our readers understand our information is our goal. Achieving our goal is possible. Here are a few suggestions and reminders toward accomplishing this goal at KNPP.

1. Technical writing is the same as any other writing. The subject is technical, not the writing.

2. Identify and understand the audience you write for. Your reader possesses certain trade skills. Recognize what those skills are, yet write for the uninformed reader. Provide as much information as possible without degrading or insulting.

3. Clarity is your most important objective.

4. Keep thoughts separate. Write simply, candidly and logically.

5. Use only one thought per sentence.

6. Be accurate, concise and consistent. Instruct and teach your reader.

7. Be objective.

8. Use an active voice and the present tense for instructions. Talk to your reader.

9. Remember to explain acronyms, abbreviations and jargon.

10. Avoid cluttering the page. Cramming several instructions into one step opens the door for confusion.

11. Write from the positive viewpoint, avoiding the negative viewpoint.

12. Outlines and lists are useful. Use them.

13. Read out loud if you are stumped. Hearing what you wrote often helps.

14. Be humble and allow your associates and supervisors to do their jobs. When you stop to listen and learn, your writing improves and your reader understands what you are trying to explain.

15. Resist wordiness. Impress your reader by how well they understand your procedure, not by how much you know.

16. Rewrite, proofread. Rewrite, proofread. Rewrite, proofread...

17. Writing is similar to other skills, so practice, practice, practice!

18. Remember your mission: to help people understand complex material.

PROCEDURE FORMAT

Page size

Use a standard 8½″ ×11″ inch page size.

Margins

Use the following page margin guidelines:

- Left   1″
- Right   ½″ to 1″
- Top   ¼″ to 1″
- Bottom   ½″ to 1″

Write with all text flushed on the left margins and ragged on the right margin.

Spacing

Use single spacing within each step or paragraph. Use double spacing to separate steps and to prevent overlooking information.

Typography

Use proportional-width fonts. Use a 12 point serif font, CG Times Roman. A 12 point sans serif font, Universal, may be used for headers if desired. Because of size and space requirements, some data tables might require 8, 9, or 10 point type.

Where possible, use actual typographic characters and symbols. For example, use true quotation marks (" ") and an inch symbol (″) rather than the keyboard quotation mark ("). Another example is using a true minus sign (−) instead of a hyphen (-).

KNPP header blocks

All procedures use standard KNPP header blocks to provide procedure information. The header block on the procedure cover page provides the following information:

a.   Company and procedure type.

b.   Procedure number and revision number.

c. Procedure title.

d. Date approved or revised.

e. Page number (style is Page __ of __).

f. Review & approval blocks.

g. Review information (safety related, PORC review, SRO approval).

The header on all remaining pages of the procedure provides the following information:

a. Company and procedure type.

b. Procedure number and revision number.

c. Procedure title.

d. Date approved or revised.

e. Page number (style is Page __ of __).

Use a 12 point serif font, CG Times Roman for all header information. A 12 point sans serif font, Universal, may be used for block titles if desired. The three blocks providing review information on the cover page may use 10 point type.

Procedure organization

Follow the directions of the appropriate Nuclear Administrative Directive (NAD) to organize procedures. The References section of this guide contains a list of relevant directives.

Date performed line

When required, place the following line on every page of the PROCEDURE section, at the top of the instructions:

DATE PERFORMED _____

PROCEDURE INSTRUCTIONS

There are many examples provided in this guide. Most of them will incorporate the structure and formatting principles recommended or required by this guide. Some, however, do not strictly conform. Some examples using numbered steps might not be double spaced, for example. This is simply to preserve space within this guide.

Instruction Format

Parallel structure
Parallel structure means we use the same presentation structure within each level: major headings, major tasks, steps, and so on. Parallel structure helps a user read more quickly and comprehend more accurately. When all steps are in parallel, there are no surprises, and a user reads a step once because each step is where it belongs. For example,

Major section headings

1.0 PURPOSE
2.0 REFERENCES
3.0 PREREQUISITES

Major tasks

4.1   A FW Bypass Control Loop Test
4.2   B FW Bypass Control Loop Test
4.5   Control Valve Signal Converters

.
.
.

4.10   Restoration

The following steps are in parallel because they are all instructions. A conditional step in such a sequence is in parallel because the step is written as a command.

4.1   At 35024, remove the instrument cover.
4.2   IF necessary, THEN grease the cover threads.
4.3   At 35024, terminal board 1, remove field wire FWH-X.
4.4   At 35024, terminal board 1 terminal 2 (+) and 2 (-), connect a current calibrator.

Our procedures use a single column, multi-tier format. Number all sections and steps using a paragraph numbering style (also called legal numbering style).

Avoid excessive indentation. Use a full paragraph indent and begin each instruction on the same line as the step number. Begin each succeeding step number directly under the first letter of the previous instruction. Two examples are:

1.0 SECTION
  1.1   Sub section or task
    1.1.1 Instruction
      1.1.1.1   Sub instruction

  OR

2.0 SECTION
  2.1   Sub section or task
    2.1.1 Instruction
      a.   Sub instruction
      b.
      c.

Step structure
Step structure affects reading comprehension. Short, concise steps are preferable to paragraph-style instructions because

1.   Short steps enhance user accuracy and efficiency.

2.   A user can more quickly locate his or her place in a sequence after being interrupted.

3.   Procedures written in short steps are easier for the writer and reviewer to edit, review, and revise.

Sentence structure
The preferred method is

  LOCATION | ACTION | DEVICE.

For example,

  In RR-108, at TP/PT-429, install a precision readout meter.

Delete the location if it is understood from the context of the procedure or is unnecessary.

Step content

Use the following guidelines to provide accurate and consistent instructions:

1. Use an active voice and the present tense. The command style of an instruction provides this.

2. Limit each step to one action. Avoid combining unrelated actions into a compound sentence. For example,

    THIS:
    > 1.1   At LT-461, remove the cover.
    > 1.2   Adjust output to 4 madc (3.92 to 4.08 madc).

    NOT THIS:
    > 1.1   Remove cover from Steam Generator Level Transmitter LT-461 and adjust output to 4 madc (3.92 to 4.08 madc).

3. Avoid complex sentences with two or more subordinate clauses. Rewrite as several shorter, simpler steps. For example,

    THIS:
    > 6.2.1   Close the High Side Block Valve.
    > 6.2.2   Open the Bypass Valve.
    > 6.2.3   Close the Low Side Block Valve.

    NOT THIS:
    > 6.2.1   Close High Side Block Valve, open Instrument Bypass Valve, and close Low Side Block Valve.

4. Show all instructions. For example,

    THIS:
    > 7.4   Clean work area and store unused or reusable materials properly.
    > 7.5   Notify Job Supervisor to
    > 7.5.1   Verify step 7.4.
    > 7.5.2   Sign Form 1.

    NOT THIS:
    > 7.4   Clean the work area.
    > 7.5   Unused or reusable materials properly stored (Job Supervisor to sign Form 1).

5. State only the expected results dependent on the intent of the procedure. For example,

Venting a pressure indicator results in an indication of 0 psig.

Stating this in the procedure is unnecessary.

6. Split steps concluding in complex results into action and verification steps. For example,

4.1 Place bistable output switch PC-468A to TEST (UP).
4.2 Verify the following annunciators are ON:

4.2.1 ...
4.2.2 ...
4.2.3 ...

7. If an expected alarm or specific condition requires a prompt action, and if failure to perform the action has undesirable consequences, provide the user with the setpoint to perform the action.

8. To help a user when resetting or restoring an alarm or trip, list the expected results immediately following the resetting or restoration.

9. Help a user understand a step by describing any system response times associated with step performance.

10. Specify any waiting periods a system response requires. If possible, however, avoid using time to start user actions. Relate user actions to plant parameters.

11. When the expected system response might adversely affect instrument indications, use a **NOTE:** to describe the conditions that might cause instrument error.

12. State any required backup readings when additional confirmation of system response is necessary.

Level of detail
There are many factors determining the level of detail needed in an instruction. User knowledge and skill level, the complexity of the task, the task frequency and the consequences of error could all determine the word detail. Examples shown below illustrate the various levels.

Level of Detail	Example
1. Gross	Isolate letdown line.
2. Low	Isolate letdown line by closing valves CV-31134 and CV-31135.
3. Medium	Using the controls on the Waste Disposal Panel, isolate letdown line by closing valves CV-31134 and CV-31135.

4. High

        Isolate letdown line as follows:

- Close valve CV-31134
- Close valve CV-31135
- Rotate both knobs clockwise until stopped.

5. Fine

Using Figure 4, isolate letdown line as follows:

- Go to Waste Disposal Panel.
- Close valve CV-31134 by rotating knob clockwise to full stop.
- At Waste Disposal Panel, verify lamp indicator for CV-31134 is GREEN.
- Close valve CV-31135 by rotating knob clockwise to full stop.
- At Waste Disposal Panel, verify lamp indicator for CV-31135 is GREEN.

Step sequencing

Write procedures using sequential step performance unless required otherwise.

1. When practical, begin new task sections at the top of a page.

2. Avoid writing the last step of a section at the top of a page or the first step of a section at the bottom of a page. If necessary, write at least two steps at the top or the bottom of the page. This helps prevent a user missing steps.

3. A user occasionally uses other steps, pages, or sections within a procedure or other procedures. After performing the referenced instruction, return a user to the initial step or procedure, unless a user is required to perform both sections or procedures concurrently.

4. If altering the sequential performance of a procedure is necessary, use the following practices, as applicable:

   a. When referencing another step, an attachment, or another procedure, use words such as

      Refer to...
      Using Procedure 301, "Nuclear Steam Supply System",...
      ...according to Attachment 1
      ...per Technical Specifications.

   b. When branching to another procedure, use the words "go to." When forward referencing in a procedure splits into optional paths, use the words "go to" or "Continue in this procedure at..."

   c. Include the procedure number, title, and section number (if applicable).

   d. When branching backward in a procedure, use the words "return to."

   e. When branching, do not direct the user to the middle of a sequence of steps. Verify the procedure section the user is being branched to supports the required steps as a separate task.

5. When expecting a user to perform steps outside the body of the specific procedure or in an altered sequence, consider the following guidelines:

   a. If possible without increasing the length of the procedure, repeat instructions rather than referencing them.

   b. If instructions involve restoration tasks, provide the step-by-step description. Do not instruct a user to perform previous steps in reverse order.

   c. Verify references return a user to the correct step after performing the referenced instructions.

   d. Review reference instructions for endless loops.

   e. Include any relevant information in a **NOTE:**.

Recurrent Steps

Recurrent steps require a user to repeatedly perform an action. For these steps, state the specific terms. For example,

1. When or how often to perform an action.

2. Conditions no longer requiring an action. For example,

> Monitor tank level every 25 to 30 minutes until level reaches 47 ft.

3. If performing a recurrent step through a lengthy period, remind a user to keep performing the step by including a step such as "Continue monitoring ..." later in the procedure.

Concurrent Steps
Concurrent steps are performed at the same time.

1. State specifically which steps are concurrent by using such terms as "concurrently" or "at the same time."

2. Verify the concurrent actions are within the capabilities of the expected number of personnel performing the procedure.

Sign-offs, Initial Lines and Verifications

For steps requiring verification of performance, a space shall be provided for the user to initial next to the step. In some cases, the user may be instructed at the beginning of the procedure that steps with two signoff lines require independent verification.

1. Place the space in the right margin after the end of the last line of the step. Provide a label at the top right of the page titled INITIALS, and align all initial lines directly underneath this label. For example,

<div align="right">INITIALS</div>

6.2.4 In Mechanical Control Console C, at TB38 terminal 37, land
field wire 24062P.   _____

2. Repetitive steps requiring initialing may be written in a columnar format. Carefully use this format, however, to prevent the possible mixing of actions between redundant equipment if the consequences are significant. For example,

6.3.7   Close the shut-off valve for this wet dam.

VALVE	1A H/L	1A C/L	1B H/L	1B C/L
Initials:				

3.   Identify steps requiring action from groups other than the responsible group for the procedure. For example,

INITIALS

6.2.4   Have an electrician open breaker XYZ.

_____
(Electrician)

or,

INITIALS

6.2.4   Hold Card Valve SI-20A in the close position.

(O)_____

When using initials to designate the responsible groups as in the previous example, define the initials in the procedure.

4. Independent verifications (reference NAD 3.9) may be a separate sign-off. Underline the step number. Place the independent verification on the same page as the step instruction. For example,

INITIALS

_____

6.2.2 At CV-31274 (TCV-304), remove the valve positioner air supply.

_____

Independent Verification   _____

5. When required, use QC Holdpoints to verify Safety Related actions.

For example,

INITIALS

_____

QC HOLDPOINT
6.2.2 Verify bolt is torqued to 15 ft-lbs.

_____

OR

INITIALS

_____

QC HOLDPOINT #1 Verify bolt is torqued to 15 ft-lbs.   _____

Equipment Nomenclature

Use official nomenclature for equipment. Use the same nomenclature throughout all plant procedures.

1. Use nomenclature that best identifies the equipment for the procedure user (write specific system, equipment, and component nomenclature by capitalizing the first letter in each word). For example,

Main Steam System
Reactor Coolant Pump IA

2. Verify equipment designators such as valve numbers are exactly as they appear on the equipment, with the same capitalization, spacing, and hyphens (use the Approved Operations Label for equipment manipulated by operations personnel). For example,

    CONDENSER 1B BACK PRESSURE VALVE CV-31348
    Relay 16K221A

3. Use valve numbers and actuator identifications.

    RHR400B/MV32126
    SBV-1B/CD34042

4. Use all lower case letters for equipment or component names used generically. For example,

    valves, breakers, pumps, piping

5. Write alarm and annunciator legends in full capitals and exactly as they appear on the panels. For example,

    PRESSURIZER CONTROL PRESSURE HIGH
    PART LENGTH ROD CONTROL ALERT

Conditional Statements

Testing or plant conditions can determine how a user performs an action. Such conditional action steps require a decision by the user.

Use the following guidelines:

1. State the condition first.

2. Emphasize the conditional logic word using capitalization and underlining.

3. Use an IF clause for unexpected but possible conditions. For example,

    IF unable to maintain reactor water level...

4. Use a WHEN clause for expected conditions. For example,

    WHEN reactor pressure reaches 50 psig...

5. An IF or WHEN clause (the condition) always comes before the action because a user needs this information to decide whether to perform the action. Follow an IF or WHEN clause with a comma. For example,

    IF directed by the Group Shift Supervisor, THEN insert enough control rods to bring the reactor subcritical.

6. Limit using IF NOT to those cases when the user must respond to the second of two possible conditions. Use IF to specify the first condition.

7. Do not use THEN at the end of a step instructing a user to perform the next step as this runs actions together.

8. Where multiple conditions exist, use a list approach. For example,

    IF any of the following conditions exist, THEN go to "Calibration" section:

    - Condition A.
    - Condition B.
    - Condition C.

With multiple conditions, place the word AND between the description of each condition. Do not use the word AND to associate more than two conditions. Use a list format if three or more conditions are possible.

Use the word OR when referring to combinations of conditions. Only use the word OR inclusively. To specify the exclusive OR, use the following:

"Either A OR B, but not both."

NOTE: *The following comment applies to work procedure action steps involving detailed instructions.*

Avoid using AND and OR within the same action. When using AND and OR together, the meaning is usually ambiguous.

Data Blocks

Write procedures to record data directly in the procedure. Use a data sheet for situations where this method is cumbersome or to reduce records volume.

Give relevant information about using the data sheets in the procedure steps, on the data sheets, or a combination of both. Standard trade practices and skills are unnecessary.

The following format is an example of expressing required values as well as the As Found and Final values.

Table 6-7

XYZ Tank Low Level Alarm			15%	18011
TB-A 1 (+) 1 (−)	INPUT (mvdc)		ACCURACY: ± 0.2 mvdc	
	DESIRED	AS FOUND	ACCEPTANCE RANGE	FINAL
Set (Inc)	2.8		2.6 to 3.0	
Reset (Dec)	2.5		2.3 to 2.7	
M&TE ID	DESCRIPTION			CAL DUE
	Voltmeter			

Precautions, Notes, Cautions and Warnings

Precautions, Notes, Cautions and Warnings are informational statements, their usage must be consistent with the guidance in the WPS Safety Rule Book.

1. These statements never contain required action steps.

2. Precautions contain information applying to the whole procedure and that must be known before the procedure is started.

3. Notes, Cautions and Warnings are placed immediately before and on the same page as the steps they apply to.

Precautions

Provide information alerting a user about important measures used to protect equipment and personnel, including the public, or to avoid an abnormal situation or emergency.

1. Place precautions in the beginning of the procedure, before any performance steps.

2. If procedure performance causes the plant to enter a Technical Specification Limiting Condition for Operation (LCO), reference or copy the LCO in this section. Quote the LCO verbatim to avoid confusing or contradicting the Technical Specification.

Notes

Give advisory information that is not safety related.

1. Follow the word NOTE: with a colon (:).

2. Use a serif typeface, boldface and capitalize the entire designator, **NOTE:**.

3. Underline all letters of the word **NOTE:**.

4. Begin the word **NOTE**: from the same margin or tab stop that its associated step number starts.

5. Extend the statement across the page using a full paragraph indent.

6. Italicize all words in the note, for example:

   NOTE: *The following step will actuate relays 16K206B, 16K202B, and 16K201B.*

   6.2.4   Lower pressure to 1600 psig.

Cautions and Warnings

The intent of this category is to alert individuals of impending danger, either to themselves or to plant equipment. The WPS Safety Rule Book (Sections 1 and 5 and other sections as applicable), should be used to select which term is appropriate for the specific circumstance.

1. Use sans serif typeface, capitalize, boldface and underline all letters in the words either **CAUTION** or **WARNING**, then center on a separate line above the statement.

2. Extend the statement on a separate line across the page starting from the text margin.

3. To emphasize the significance of the message, enclosing it in a box is recommended. If the statement involves personnel safety, enclosing it in a box is required.

Multiple Objects and Lists

When referring to three or more objects, use a vertical list and bullets (•) or step numbering to improve readability.

1. Avoid using sentences that string out a list of objects. For example,

    THIS:
    > 6.9.3 Remove power from the following relays:
    >
    > > a. 16K206A
    > > b. 16K207A
    > > c. 16K201A
    > > d. 16K220A

    NOT THIS:
    > 6.9.3 Remove power from relays 16K206A, 16K207A, 16K201A and 16K220A.

2. If the list includes more than four items, you may want to divide the items into smaller groups. For example:

    The following test equipment is required to perform this procedure:

    - DC voltmeter
    - Pressure source
    - Pressure gauge

    - Ammeter
    - Analog simulator
    - Decade resistance box

3. Do not use bullets when step numbers are appropriate. Use bullets only in nonperformance sections of the procedure.

4. If the list is lengthy, consider using a table or checklist, as is often done with valve lineups.

5. When a listing of multiple components continues to the following page, note the continuation. For example,

<div align="center">Page 1 of 2</div>

Channel 478

- xxxxxxxxx
- xxxxxxxxx

<div align="center">Page 2 of 2</div>

Channel 478 (continued)

- xxxxxxxxx
- xxxxxxxxx

6. With multiple data sheets, ensure they are numbered (e.g., Sheet 1 of 2, Sheet 2 of 2, etc.)

Acceptance Criteria, Limits, Rates and Measurements

Use the following guidelines to specify acceptance criteria, limits, rates, and measurements:

1. If the criteria are qualitative, specify exactly, avoiding vague words such as "normal" and "satisfactory."

2. Specify quantitative values in units compatible with the units on the equipment.

3. Use readable values. A user generally interprets values at one-half the distance between markings.

4. Use the word "to" instead of a dash or hyphen to separate the upper and lower limits of an acceptance range. This avoids confusion with the minus sign.

Tolerances

Give tolerances when possible. Give nominal values and ranges in terms a user understands. Avoid having a user interpret values. If there is no specific desired value, provide the tolerance as a range. For example,

- Verify pump temperature is within operating band of 450°F to 485°F.
- Maintain tank levels between 47 ft and 52 ft.

Calculations and Formulas

Where possible, avoid using formulas and calculations.

When calculations are required, give the complete formula including the units of the data and space for notations. Define all terms used in the formula.

If possible, allow a user to perform calculations in advance, or provide a precaution or general instruction that calculations will be performed in the procedure.

1.   Require a user to perform operations no more complicated than adding, subtracting, multiplying or dividing.

2.   Minimize calculations and formulas by using graphs and tables.

Infrequently Performed Tests and Evolutions (IPTE)

For IPTEs, place the following line on the first page, immediately after the header block or place IPTE in the upper right corner of the procedure.

*** INFREQUENTLY PERFORMED TEST ***

Two examples of the type of statement that should be added to the first step in the **PROCEDURE** section are:

6.1   Complete an IPTE checklist and attach the checklist to this procedure.

OR

2.1   Prior to the performance of this IPTE procedure, an IPTE Checklist, Form NAD 3.2-2, should be filled out and attached to the procedure, when practicable.

PROCEDURE GRAPHICS

Procedure graphics are nontext materials supporting a procedure, such as illustrations, tables, and data sheets.

Criteria

Verify the following general graphics criteria:

1. Appropriate for the intended use.

2. Legible after any reduction and reproduction.

3. Consistent with procedure text using terminology and units.

4. Labeled and identified.

5. Referenced in the sequence used in the procedure text.

Selecting Graphics

An appropriate illustration avoids narrative descriptions of equipment and locations and improves user speed and accuracy. When you have identified a need for an illustration or other graphic, the type you select depends on the procedure task.

1. For dismantling and assembly tasks, use exploded view or cross-section diagrams showing how individual parts fit together.

2. For calibration and testing procedures, use diagrams, graphs, and waveform illustrations where appropriate.

Providing Legibility and Consistency

Use the following guidelines to provide legible graphics:

1. Convert photographs to line drawings by tracing the image.

2. Reproduce drawings directly from manufacturer's manuals and other existing documentation. Getting a legible copy from many manuals is often difficult, however, and reductions might make the graphic unreadable.

3. Use art work with crisp black lines to retain detail through generations of photocopying.

4. Avoid unnecessary shading on instructional drawings because this reduces the quality of the drawing.

5. Keep the drawing simple. Represent only task-specific information with a minimum of detail. Omit detailed components and parts unless related directly to the procedure.

6. When using numbered callouts to refer from the text to applicable details in the graphic, verify the following:

    a. Placing numbered callouts in a friendly pattern on the drawing.

    b. Numbered leader lines touch the related objects.

    c. Lines are uniform, short, and straight.

    d. Lines do not cross.

    e. Add arrowheads for clarity.

    f. Identify numbered callouts in the procedure text immediately after referenced items.

    g. Placing callout numbers in the background.

    h. Using no more than 20 callouts per page.

7. When using graphs, verify the following:

    a. Lines on the graph paper are reproducible.

    b. Scales are consistent with the accuracy needed by a user.

    c. Scales avoid extensive approximation or interpolation.

    d. Grid lines on the graph are lighter in weight than the axes and the data being displayed.

    e. In all procedures using the same type of graph, label each axis the same in each of the procedures.

8. Verify reduced illustrations are still readable.

9.   Reduce oversized graphics to fit within standard page margins.

10.   Verify consistency between graphics and text.

    a.   Units of measure.

    b.   Terminology (equipment names, part numbers, etc.).

Placing Graphics

Place graphics as attachments or integrate them with the procedure text.

Graphics as Attachments, Appendices or Figures

1.   Give each graphic a title, which also becomes the attachment title.

2.   Arrange the graphics in the order they will be used.

3.   Avoid attaching reference tables and graphs not required or mentioned in the procedure.

Graphics Integrated with Text

1.   Give each graphic a title.

2.   Place the graphic immediately before the step referring to it.

3.   If repeatedly using a graphic throughout a procedure, place the graphic at the beginning of the procedure.

Unacceptable Graphics

Avoid using any of the following as procedure graphics:

1.   Photographs.

2.   Colored art work.

3.   Drawings containing illegible lettering or type.

4.   Cartoons.

<u>Tables</u>

Consider some of the following guidelines when creating tables:

1. Most tables should use a double-line outside border.

2. All inside borders should use single lines.

3. Boldface table titles.

4. Boldface the data listed in the **DESIRED** and **ACCEPTANCE RANGE** columns.

WRITING MECHANICS

Punctuation

Use standard American English punctuation rules. Remember, your goal is clarity and readability. In particular, use commas carefully because in the wrong place they change meaning.

Examples of punctuation marks and their correct use follow.

Apostropbe
1.   Use an apostrophe to indicate possession. For example,

   Shift Supervisor's desk.

2.   Do not use contractions (can't, don't, it's) in procedures.

3.   Do not use apostrophes to indicate plurals, especially with acronyms. For example,

   RWPs as the plural of RWP.

Brackets
Do not use brackets except in equations and formulas.

Colon
1.   Use a colon to indicate a series or list. Verify the sentence preceding the colon is a complete sentence. For example,

   6.2.1   Complete the plant shutdown according to the following procedures:

   • Procedure 203.1, "Plant Shutdown to Hot Standby."
   • Procedure 203.2, "Plant Cooldown from Hot Standby to Cold Shutdown."

2.   Use a colon to indicate ratios or proportions. Avoid using ratios if possible.

Comma
1.   Use a comma to set off an introductory clause or phrase. Always use a comma after a conditional logic clause.

   IF battery voltage is less than 200 vdc, THEN record voltage in Table 6-1.

2. Use a comma to separate elements for clarity or emphasis.

   ... go to Procedure 107, "Procedure Control."

3. Use a comma to separate items in a series (lists are preferred, however)

   Locally open breakers 5, 8, 10, and 12.

4. Use a comma to separate four or more digits

   10,000 ppm.

Dash

The dash is specifically called an en-dash or an em-dash. An en-dash (–) is used for number sequences, such as December 7–12. The em-dash (—) is used to indicate changes in a sentence or to set off explanatory matter. Without special typesetting tools, the en-dash is usually type as a hyphen (-) and the em-dash is usually typed as a double hyphen (--).

Do not use dashes.

Exclamation point

Do not use the exclamation point. The exception is the **WARNING!** designator in a warning statement.

Hyphen

Use the hyphen to combine compound words, modify words, or to show syllable breaks.

1. Do not use hyphenation to indicate syllable breaks.

2. Do not hyphenate words with the following prefixes unless misleading or awkward letter combinations result:

   - pre   - post   - re   - sub   - super
   - micro   - mini   - multi   - non

3. Use a hyphen in compound words.

   self-explanatory.
   a one-person job.

4. Use a hyphen if it appears in component numbers.

   Verify Valve V-11-12 is OPEN.
   Isolate PT-21107 by closing valve 10.

5. If using the hyphen, do not use it at the end of a line causing the remaining part of the expression to wrap around to the next line. In such cases, type the entire hyphenated expression beginning on the next line.

Parentheses

1. Use parentheses to set off explanatory or supplementary information.

    Sodium hydroxide (NaOH).

2. Enclose component nomenclature following a component number in parentheses.

    Open valve CV-31091 (Condensate Supply to Core Spray System).

3. Specify acceptable ranges in parentheses following a desired or nominal value. Use only as a narrative method of expressing the nominal value and acceptable tolerances.

    Set the limit switch to alarm at 100 psig (96 psig to 103 psig).

4. Use parentheses to separate graphical reference parts and equipment (use a **NOTE:** to notify a user before using this format).

    Remove O-ring (2).

Periods

1. Use a period to end a sentence.

    Verify pressure is less than 3.0 psig.

2. Follow numbers or letters in a list with a period.

    1. or a.
    2. or b.
    3. or c.

3. Do not use periods in

    Acronyms: "QA", not Q.A.".
    Abbreviated units of measure: "lb", not "lb.".

Question Mark

1. Do not use the question mark in procedure text.

2. Use the question mark at decision points (diamond symbol) in flow charts.

Quotation Marks

1. Use quotation marks to set off annunciator legends.

    "ADS TIMER B START II"

2. Use quotation marks to acknowledge quoted material.

    Refer to 10 CFR 50, Appendix B, which states, "Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

3. Use quotation marks to set off titles of documents referred to in procedure steps.

    Prepare the existing piping for welding per Procedure OC-9-1, "Control of Welding."

4. Conventional punctuation rules place commas and periods within the closing quotation mark. If the enclosed word is a special term or word, however, place the punctuation outside the closing quotation mark to avoid associating the punctuation with the word. For example,

    For the channel being tested, move the Rod Stop Bypass Switch to "BYPASS".

    Mark the steps "N/A".

    Generally, however, avoid this punctuation conflict by rewording the sentence or eliminating the quotation marks. For example,

    For the channel being tested, move the Rod Stop Bypass Switch to BYPASS.

    Mark the steps N/A.

5. Sentence content determines whether to place other punctuation marks inside or outside the closing quotation mark.

Semicolon
Do not use semicolons. For example,

THIS:
  • Remove the four motor plate cap screws.
  • Lift the operator from the valve.

NOT THIS:
  Remove the four motor plate screws; lift the operator from the valve.

Slash
  1. Use slashes with units of measure.

     lb/hr.

  2. Slashes should be used with caution when combining terms.

Methods of Emphasis

There are several ways to provide emphasis in a procedure. Use emphasis techniques sparingly, however, otherwise they lose impact. Use the following guidelines.

Boldfacing
Use boldfacing to emphasize section headings, Tech Spec numbers and graphics labels.

Capitalization
Use capitalization for emphasis or attention. Use capitalization as described below.

  1. Capitalize the first letter of the following:

     a. The first word in procedure steps.

     b. The first word in a sentence.

     c. The first word in a phrase used in lists.

     d. Each word in official equipment nomenclature.

     e. Each word in a system name.

     f. Proper nouns, such as the station name or trade names.

     g. Each word in plant conditions (Hot Standby, Reactor Trip).

h. Each major word of a figure or table title.

2. Write the following items in full capital letters:

   a. Annunciator and alarm legends exactly as they appear on control panels.

   b. Acronyms: RM (Radiation Monitoring System).

   c. Other words or phrases unique in describing the step activity. If desired, use quotation marks for additional emphasis.

      For example,

      - Place the Mode Switch to "RUN".
      - Transfer flow control to AUTO.

Italics
Use italics only in a **NOTE:**.

Quotation Marks
Use quotation marks to set off unique words, designations, titles, and quotations. For example,

For the channel being tested, move the Rod Stop Bypass Switch to "BYPASS".

Mark the steps "N/A".

ANSI/ANS-3.2-1982, "Administrative Controls for Quality Assurance for the Operational Phase of Nuclear Power Plants."

Underlines
Use an underline to emphasize individual words, long phrases or important modifiers to instructions. For example,

Do not continue without QC's permission.

Use underlining to match task sections. For example,

    6.4   <u>Transmitter calibration</u>

        6.4.1 ....
        6.4.2 ....

    6.5   <u>Indicator calibration</u>

        6.5.1 ....
        6.5.2 ....

Combinations

Do not combine methods of emphasis except as noted in the following list:

1.   Capitalize and underline

    a.   Conditional statements (logic words): <u>IF</u>, <u>THEN</u>, <u>WHEN</u>, <u>AND</u>, <u>OR</u>.
    b.   Any negative such as <u>NOT</u>, <u>NEITHER</u>, or <u>NOR</u>.

2.   Use a serif typeface, capitalize, boldface and underline

    a.   Informational statement designators: <u>**NOTE:**</u>.

<u>Spelling</u>

Use a current American dictionary. When a dictionary offers a choice of spellings, use the first choice listed, as subsequent choices are variants of the first choice.

Use traditional spellings, instcad of common short-hand versions. For example,

    night, not nite.

Provide consistent spelling throughout procedures.

Vocabulary

Use vocabulary that is easy to read and understand.

1. Use short, common words except when using standard industry terms or technical words.

2. Avoid using synonyms, different words having a similar meaning. Procedure writing is not creative writing. Do not vary your vocabulary. Consistently use the identical word or term for a given action or object.

3. Use specific words describing the task. For example,

    THIS:
    Verify hourly until level is within range.

    NOT THIS:
    Verify the level frequently.

4. Do not use contractions. For example, use "do not" or "cannot" instead of "don't" or "can't."

5. Use "shall," "should," and "may" according to ANSI/ANS-3.2-1982, "Administrative Controls for Quality Assurance for the Operational Phase of Nuclear Power Plants."

Shall	=	a required action
Should	=	a recommended action
May	=	an optional action

    Note the command style (preferred) of a procedure step is equivalent to using shall. It also uses the active voice rather than the passive. The following examples are equivalent:

    Notify QC inspector before starting.
    The QC Inspector shall be notified before starting.

    Avoid using "must" as part of an action statement because the word is not defined in ANSI/ANS-3.2-1982.

6. Avoid using "will" as a synonym for "shall." Use "will" for the future tense.

7. Avoid using all-inclusive words such as "all," "always," "every," "never," "no," and "none" unless they truly express your intended meaning.

8. Avoid using adverbs ending in "ly.". The word being modified can function by itself.

9. Using "you" or other pronouns is unnecessary. An instruction implies a user is being written to directly.

10. Omit articles (the, an, a) if desired to provide quicker reading instructions, unless reading the instruction becomes awkward without them.

11. Avoid using the prefixes "re," "dis," or "de." When possible, use the main verb without the prefixes and reword the instruction.

Approved verb list

The verb is the key word in an instruction. Select and consistently use in the same context a verb describing the action. Performance errors could result when verb meanings are applied inconsistently.

Avoid verbs sounding similar to ones of opposite meaning, such as "increase" and "decrease" or "pressurize" and "depressurize."

Use the following approved verb list. UPPER CASE LETTERS indicate approved verbs. Verbs in lower case letters are synonyms of approved verbs. Choose the approved verb instead of the synonym, unless it does not precisely describe the action.

Accomplish:	Use PERFORM.
ACTUATE:	1. To trigger or to make active. "Manually actuate the pressure switch." Do not use ACTUATE for START, however.
	2. Refer to START.
ADAPT:	To make fit or use, often by modifying. "Adapt cap to valve outlet."
ADD:	To put more in. "Add water to the battery."
ADJUST:	1. To bring to a specified position or state. "Adjust micrometer to given measurement."
	2. To bring to a more satisfactory state. To manipulate controls, levers, linkages, etc., to return equipment from an out-of-tolerance condition to an in-tolerance condition. "Adjust cable tension using turnbuckles."
Advise:	Use NOTIFY.

ADVANCE: To move forward or ahead. "Advance turbine speed."

Agitate: Use SHAKE.

Aid: Use HELP.

ALERT: To warn. To call to a state of readiness or watchfulness. To notify (a person) of an impending action. "Alert personnel to vacate the area."

ALIGN: To bring into line, to line up. To bring into adjustment, correct relative position, or coincidence. "Align slot in turnbuckle barrel with slot in cable terminal."

Allocate: Use DISTRIBUTE.

ALLOW:
1. To let. To permit. To give opportunity to. "Allow sediment to settle."

2. To leave. To allot or provide for. "Allow a 2 inch slack in the rope."

ALTERNATE: To perform or cause to occur by turns or in succession. "Alternate between test instrument channels."

ANALYZE: To examine and interpret test or inspection results to determine system or equipment condition or capabilities. "Analyze generator inspection findings to determine need for repairs."

APPLY:
1. To put. To lay or spread on. "Apply sealant to gap between access cover and equipment structure."

2. To energize. "Apply power or load." "Apply pressure to cylinder." Use LUBRICATE, however, rather than APPLY LUBRICANT.

ARRANGE: To put in order. To group according to quality, value, or other characteristics. To organize. "Arrange components by size from smallest to largest."

Ascertain: Use VERIFY.

ASSEMBLE: To construct. To fit and secure together the several parts of. To make or form by combining parts. "Assemble valve components according to the specified procedures."

Assess: Use EVALUATE.

Assist: Use HELP.

Assure: Use VERIFY.

ATTACH: To join or fasten. "Attach side plate (2) of assembly using ½-inch
                     screws." Use TAG, however, rather than ATTACH A TAG. Use
                     LAND rather than ATTACH ELECTRICAL LEADS.

AVOID: To prevent the occurrence of. To keep away from. "Do not use
                     excessive force to seat the valve."

BACK OFF: To cause to go in reverse or backward. "Back off nut to nearest
                     castellation."

BALANCE: To equalize in weight, height, number, or proportion. "Balance
                     electrical loads on buses."

Be sure: Use VERIFY.

BE CAREFUL: To exercise caution. To take care. "Be careful not to inhale fumes of
                     the solvent."

BEND: To turn by force from straight or even to curved or angular. To force
                     back to an original straight or even position. "Bend until wire lies flat
                     against turnbuckle wall."

BLEED: To extract or let out some or all of a contained substance from. "Bleed
                     off tank air pressure."

BLOW: To send forth air. "Blow filtered air through hose to inspect for
                     obstructions."

Break: Use REMOVE.

CALCULATE: To figure. To compute. To determine by arithmetic processes.
                     "Calculate the voltage in a circuit with a 10-amp current and 5-ohm
                     resistance."

CALIBRATE: To determine accuracy, deviation, or variation by special measurement
                     or by comparison with a standard. "Calibrate torque handles at least
                     once each month."

CAP: To install caps. To provide with a covering. To install or provide with a device for closing off the end of a tube having a male fitting. To cap. "Cap all lines having exposed male fittings."

CATCH: To prevent from falling to the ground. To capture. "Catch any fluid drippings in a drip pan."

Categorize: 1. For determining the classification of a supply item, use IDENTIFY.

            2. Refer to SEPARATE.

Cease   Use STOP.

CENTER: 1. To adjust so that axes coincide. "Center bushing in opening."

            2. To place in the middle of. "Center pointer on dial."

Change: Use REPLACE.

CHANNEL: To form, cut, or wear a groove in. "Channel rods so they insert easily."

CHARGE: 1. To restore the active materials in a storage battery by the passage of a direct current through in the opposite direction to that of the discharge. To cycle. "Charge the battery for a short time before making a specific battery inspection."

            2. Refer to FILL.

Check: 1. Refer to INSPECT.

            2. Refer to VERIFY.

Check out: Use TEST.

CHOKE: To enrich the fuel mixture of a motor by partially shutting off the air intake of the carburetor. "Choke engine as required to start."

CLAMP: To fasten or press two or more parts together holding them firmly. "Clamp the tensiometer to the cable by releasing the handle slowly."

Classify: 1. Refer to IDENTIFY.

            2. Refer to SEPARATE.

CLEAN:
To wash, scrub, or apply solvents to. To remove dirt, corrosion, or grease. "Clean all parts using nonabrasive cleaner."

CLEAR:
To move people and/or objects away from. "Clear the area."

CLOSE:
1. To block against entry or passage. To turn, push, or pull in the direction in which flow is impeded. "Close access panel." "Close valve."

2. To set a circuit breaker into the position allowing current to flow through. "Close circuit breaker."

COAT:
To cover or spread with a finishing, protective layer. "Coat battery cables with grease."

CODE:
To mark with identifying symbols. To put into the form or symbols of a system used to represent words. "Color code equipment parts."

COIL:
To roll or twist into the shape of a coil. To make into the form or shape of a loop. "Coil wire."

COLLECT:
To bring together into one body or place. To accumulate. "Collect required hand tools."

COMMUNICATE:
To exchange information. To notify. "Communicate with technician B during entire procedure." Use NOTIFY rather than COMMUNICATE TO to make known a condition.

COMPARE:
To examine the character or quality of two or more items to discover resemblances or differences. "Compare readings from both instruments."

COMPLETE:
To bring to an end. To finish. "Complete all requirements on Data Sheet 1 before continuing."

Comply:
Use FOLLOW.

COMPRESS:
To press or squeeze together. "Compress spring-loaded assembly until latch engages."

Compute:
Use CALCULATE.

CONDUCT:
To lead, manage, or direct. "Conduct prework meeting." Use PERFORM A TEST, however, rather than CONDUCT A TEST.

CONFER: To consult. To exchange views. "Confer with maintenance supervisor."

Confirm: Use VERIFY.

CONNECT: 1. To bring or fit together to form a unit. To couple keyed or matched equipment items. To attach, mate or join. "Connect valve controller linkage."

              2. For electrical terminations, use LAND.

Construct   Use ASSEMBLE.

Contact: 1. Refer to COMMUNICATE.

              2. Refer to NOTIFY.

              3. Refer to SIGNAL.

Control: Use REGULATE.

COPY: To make an imitation, transcript, or reproduction of. "Copy the procedure for filing."

CORRECT: To make or set right. To alter or adjust to bring to some standard or required condition. "Correct any error before proceeding with activity."

COVER: To protect or shelter by placing something over or around. "Cover valve internals when operator is removed."

CRIMP: To compress or deform a connection barrel around a cable to make an electrical connection. "Crimp a connector on the yellow wire."

CUT: To divide into parts using a sharp instrument such as a scissors or knife. "If prongs of cotter pin are too long, cut them to proper length."

DATE: To affix a date to. "Sign and date Attachment 1."

Decrease: 1. Refer to LOWER.

              2. Refer to REDUCE.

Deenergize: To remove from the source of power. Use REMOVE POWER. "Remove power from circuit."

Deflate: Use LOWER.

Deliver: 1. Refer to DISTRIBUTE.

                   2. Refer to SUBMIT.

                   3. Refer to TAKE.

Depress: Use PRESS.

Depressurize: Use LOWER.

Destroy: Use DISPOSE.

DETECT: To discover or determine the existence, presence, or fact of. "Observe carefully to detect any needle movement."

Determinate: Use LIFT.

DETERMINE: To find. To investigate and decide. To discover by test, study, or experiment. "Determine the amount of tension on cable by following specified procedures." Use VERIFY, however, rather than DETERMINE to confirm a condition.

DEVELOP: To set forth or make clear by degrees or in detail. "Develop procedures fully."

DEVISE: To invent. To form by new combinations or applications of ideas or principles. "Devise new methods of troubleshooting the system."

DIAGNOSE: To recognize and identify the cause or nature of a condition, situation, or problem by examination or analysis. "Diagnose malfunction."

DILUTE: To make thinner or reduce the concentration of by adding water or other fluids. "Add 2 mils of acid to volumetric and dilute to volume."

Disassemble: Use DISMANTLE.

Disclose   Use SHOW.

Disconnect: 1. Refer to LIFT.

                   2. Refer to REMOVE.

Disengage: 1. For circuit breakers, use OPEN.

2. Refer to REMOVE.

DISMANTLE: To take to pieces. To take apart. "Dismantle valve bonnet."

DISPOSE: To get rid of. To destroy. "Dispose unused hydraulic fluid left in the can."

DISSOLVE: To cause to pass into solution. "Dissolve mixture in 2 gallons of water."

DISTRIBUTE: To deliver. To divide among several or many. To divide or separate, especially into kinds. "Distribute copies of the procedure for review."

DRAIN: To draw off (liquid). "After removing from filter valve, drain servicing hose."

DRAW IN: To pull (liquid) up into a container through suction. "Draw in electrolyte to fill hydrometer."

DRY: To cause or to be free from water or liquid. "Dry bearings with low pressure air."

Effect: Use PERFORM.

Eliminate: Use STOP.

Employ: Use USE.

EMPTY: To discharge contents. "Empty tank into overflow tank."

Energize: 1. Refer to APPLY.

2. Refer to LIGHT.

3. Refer to RESTORE.

ENFORCE: To carry out effectively. "Enforce safety regulations."

ENGAGE: To cause to interlock or mesh. "Engage threads of turnbuckle with threads of cable terminal." For circuit breakers, use CLOSE.

Ensure: Use VERIFY.

ENTER: To go or come in. "Enter compartment through main access."

ERASE: To remove stored data from a storage medium such as a CRT display or magnetic tape. "Erase image from CRT screen."

ERECT: To put up by fitting together. "Erect temporary platform."

ESTABLISH: 1. To set firmly. "Establish safety rules."

2. To bring about. "Establish communications."

ESTIMATE: To roughly judge or determine the size, extent, or nature of. "Estimate amount of cleaning solvent necessary."

EVALUATE: To assess. To determine the importance, size, or nature of to appraise. To give a value to based on collected data. "Evaluate procedure content using checklist."

Examine: Use INSPECT.

EXCEED: To go beyond a limit. "Do not exceed a pressure of 400 psig."

Execute: Use PERFORM.

EXIT: To go out or away. "Exit building through security doors."

EXTEND: To cause to be drawn out to greater length. "Extend adjustable leg to full length."

EXTINGUISH: To stop burning. "Extinguish any fires using CO_2 type extinguisher only."

Extract: 1. Refer to EXTRACT

2. Refer to REMOVE.

Fasten: 1. Refer to ATTACH.

2. Refer to CLAMP.

3. Refer to HANG.

4. Refer to LOCK.

5. Refer to SECURE.

6. Refer to TIE.

FABRICATE: To construct from standardized parts. "Fabricate ring pins from ¼-inch rods."

Figure: Use CALCULATE.

FILE:
1. To rub smooth or cut away with a file (a tool with cutting ridges for forming or smoothing surfaces). "File one end of rod to a point."

2. To place in filing system. "File the completed procedure."

FILL: To put into as much as can be held or contained or to a specified level. To flood. To replenish. "Fill tank with pure water."

Find:
1. Refer to DETERMINE.

2. Refer to LOCATE.

Flood: Use FILL.

FLUSH: To wash out with a rush of liquid. To pour liquid over or through. "Drain and flush hydraulic system."

FOLD: To lay one part over another part. To reduce the length or bulk by doubling over. "Fold sides of curtain on creases."

FOLLOW: To comply. To accept as authority. To obey. To conform with directions or rules. "Follow directions given by Shift Supervisor."

FORCE: To exert strength or power to overcome resistance. "Force pin into slot as far as possible."

FORM: To make up, to give a particular shape to. To shape or mold into a certain state. "Form the compound to completely fill the hole."

Furnish: Use PROVIDE.

GAG: To install restraining devices (on relief valves) preventing operation. "Gag relief valves within test boundary."

GIVE: To put into the possession of another. "Give keys to Shift Supervisor."

GO TO:
1. To proceed to. To transport oneself to a given destination. "Go to local panel and position switches appropriately."

2. To branch to another step, section, or procedure. "Go to Restoration section."

GRIND: To pulverize, polish, wear down, sharpen, or smooth by use of a machine or device for grinding. "Grind weld to a smooth and even finish."

GROUND: To electrically connect equipment to earth plane. "Ground servicing cart."

GUIDE: To manage or direct the movement of especially under conditions of close tolerances. "Carefully guide wedge through valve body opening."

HAND: To give, pass, or transmit with the hands. "Hand test equipment to technician located outside access opening."

HANDLE: To manipulate (load, turn, or raise) objects and equipment manually or with equipment, such as hoists. "Handle valve stem carefully."

HANG: To fasten to some elevated point without support from below. To suspend. "Hang wiring from temporary overhead hooks."

HEAT: To cause a rise in temperature. "Heat solvent before using."

HELP: To give support, to aid. "Help technician B lift the load."

HOLD:
1. To have or keep in one's grasp. "Hold power switch in position until voltmeter stabilizes."

2. To stop work. "Hold for QC inspection."

IDENTIFY:
1. To establish the identify of. "Identify components by name and function."

2. To classify a supply item. To note. "Identify component to be ordered from supply."

Illuminate: Use LIGHT.

IMMERSE: To plunge into something that surrounds or covers, to plunge or dip into a fluid. "Immerse component in solvent."

IMPROVE: To make better. To make greater in amount or degree. "Improve procedures whenever possible."

INCLUDE: To take in or comprise as a part of. To add to. "Include the following positions of the feedwater system in the hydrostatic test."

Increase: Use RAISE.

INDICATE: To point out. "Indicate which dial to monitor."

INFLATE: 1. Refer to FILL.

2. Refer to RAISE.

Inform: Use NOTIFY.

INITIAL: To affix one's initials. "Initial the Data Sheet."

Initiate: Use START. (In the context of the EOPs, "initiate" is used only when the action or function can be performed by simple operation of controls located in the Control Room.)

INSERT: To put or thrust in, into, or through. "Insert wire through hole in panel."

INSPECT: To examine or check. To perform a critical visual observation or check for specific conditions. To test the condition of. "Inspect components for deterioration or defects."

INSTALL: 1. To perform operations necessary to fit an equipment unit into the next larger assembly or system. "Install rocker assembly."

2. To place and attach. "Install nuts on bolts."

3. For wiring a circuit, use either INSTALL WIRING or WIRE. For safety wiring, use either INSTALL SAFETY WIRE or SAFETY WIRE.

4. For screws, use INSTALL SCREWS rather than SCREW.

5. Use CAP or PLUG rather than INSTALL CAPS (PLUGS).

Insure: Use VERIFY.

Interchange: Use SWAP.

ISOLATE: To close or separate segments of piping systems. "Isolate feedwater system by shutting boundary valves."

Join: Use CONNECT.

Keep:

1. Refer to AVOID.

2. Refer to MAINTAIN.

LAND   To attach or connect an electrical wiring connection. To plug in. "At TB-1, terminals 1 and 2, land wires 1A and 1B."

LATCH: To catch with a device holding a door when closed, even if not bolted. "Close and latch containment doors."

LEAVE: To go away from. Depart. "Do not leave area until activity is complete."

Let: Use ALLOW.

LEVEL: To cause equipment to become even or parallel with the plane of the horizon. "Level piping run."

LIFT:

1. To detach or separate an electrical connection. To unplug. "Lift field wires to power circuit."

2. To exert effort to overcome resistance of weight. "Lift test pump to position on platform."

LIGHT: To cause to illuminate. "Light test area using temporary lights."

LINE UP: Establish the initial conditions necessary for system operation. Does not encompass starting system pumps.

LISTEN: To pay attention to sound. "Listen to the pump while operating."

LOAD: To place in or a means of conveyance. To place supplies or components on a vehicle. To add a device to Electrical System. "Load and secure components on specified truck."

LOCATE: To find, determine, or indicate the place, site, or limits of. "Locate No. 9 fitting."

LOCK:

    1. To hold fast or inactive. To fix. "Set and lock throttle."

    2. To fasten the lock of. "Lock electrical cabinet."

Look for: Use INSPECT.

LOOSEN:

    1. To cause to become less tight fitting. To release from restraint. "Loosen lock nut on relief valve."

    2. To loosen or withdraw by rotating in the proper direction. "Loosen and remove adapter."

LOWER: To cause to move down. "Lower stem into valve body." To release gas or fluid pressure. "Lower system pressure."

LUBRICATE: To put lubricant on specified locations. "Lubricate pump bearings."

MAINTAIN:

    1. To hold or keep in any particular state or condition, especially in a state of efficiency or validity. "Maintain test pressure for 15 minutes."

    2. To sustain or keep up. "Maintain record of lost supplies."

MAKE: To carry out or cause to occur. "Make corrections where necessary."

MARK: To label. To provide with an identifying or indicating symbol. "Mark each component before removing." If marking is to be done on a tag, use TAG.

MATCH MARK: To mark the relative positions to two or more components. "Match mark bonnet assembly to valve body."

Mate: Use CONNECT.

MAY: Indicates an optional action.

MEASURE: To determine the dimensions, capacity, or amount by use of standard instruments or utensils. "Mcasure voltage drop across each unit of resistance." "Measure gap between upper and lower assemblies."

MIX: To combine or blend into one mass. "Mix resin slurry."

MONITOR: To continuously or periodically observe and evaluate at a frequency adequate to remain informed of the value, trend, and rate-of-change or a specified parameter. "Monitor indicator for a change in pressure."

MOUNT: To attach to a support or specified location. "Mount pressure gauge in its housing."

MOVE: To change the location or position. "Move valve to a clean area to overhaul."

Must: Use SHALL.

NEUTRALIZE: To nullify. To make chemically inert. "Neutralize solution before applying to equipment surface."

NOTE: 1. Refer to IDENTIFY.

2. Refer to OBSERVE.

NOTIFY: To make known to. To give notice or report the occurrence of. To inform or advise. To communicate. To contact. To relay. "Notify Shift Supervisor before starting test."

NUMBER: To affix numbers on the pages of a document. "Number the procedure pages in the correct format."

OBSERVE: 1. To watch or monitor. To visually note. To pay attention to. "Observe indicator as pressure reaches test pressure."

2. To conform one's actions or practice to. "Observe precautions."

OBTAIN: To gain or attain. "Obtain necessary supplies before starting on maintenance."

OPEN: 1. To move from closed position. To make available for passage by rotating in an appropriate direction. "Open valve."

2. To make available for entry or passage by turning back, removing, or clearing way. "Open top maintenance access."

3. To remove or pull. "Open appropriate circuit breakers."

OPERATE: To control equipment to accomplish a specific purpose. "Operate valves from local panel."

Order: Use ARRANGE.

Organize: Use ARRANGE.

Orient: Use POSITION.

OVERHAUL: The act of dismantling equipment units down to all removable parts. Cleaning. Inspecting, repairing, restoring, and replacing where necessary. Assembling, adjusting, aligning, calibrating, and verifying operational readiness by testing. "Overhaul No. 2 pump."

PACK: To fill with packing material or grease. "Pack valve." "Pack Pump." "Pack bearings."

PAINT: To color or apply pigment to the surface of. "Paint all exposed surfaces."

PATCH: To mend, cover, or fill up a hole or weak spot. "Patch tubes where necessary."

PERFORM: To do, carry out, or bring about. To accomplish. To effect. To reach an objective. "Perform hydrostatic test of steam generator."

PLACE: To put or set in a desired location or position. To locate. "Place test equipment next to electrical cabinet but away from traffic areas."

PLUG: To provide with a device for closing off the end of a tube having a female fitting. To insert or install plugs. "Plug all lines with exposed female fittings."

POSITION: To put or set in a specific configuration, place, or orientation. To locate. To reset. "Position test equipment so it can be seen by both technicians."

POUR: To cause to flow in a stream. "Pour drainage into a waste reservoir."

PREPARE: To make ready. To arrange things in readiness. To set up. "Prepare surface for paint."

PRESS: To push. To act on through thrusting force exerted in contact. "Press blower start button."

Pressurize: Use RAISE.

PREVENT: To keep from happening or existing. "Prevent oil from spilling over on components."

PROCESS: To submit to a series of actions or operations leading to a particular end. "Process waste water for appropriate disposal."

PROVIDE: To furnish. To supply what is needed. To equip. "Provide a flashlight for technician."

PULL: To exert force on an object to cause motion toward the force. "Pull out knob No. 6 on oxygen servicing cart."

PUMP:
1. To raise or lower by operating a device that raises, transfers, or compresses fluids by suction, pressure, or both. "Pump out overflow from catch pan."

2. To move up and down or in and out as if with a pump handle. "Pump engine primer knob."

PUNCTURE: To pierce with a pointed instrument or object. "Puncture opening to allow fluid to drain."

PURGE: To free of sediment or trapped air by flushing or bleeding. "Purge fuel lines."

PUSH: To move away or ahead by steady pressure. "Push access door to latch in position."

PUT: To deposit or leave. "Put tools out on the bench." Use STORE, however, rather than PUT AWAY for depositing or leaving in a specified place for future use.

RAISE:
1. To move or cause to be moved from a lower to a higher position. To elevate. "Raise control lever to RELEASE."

2. To apply pressure within by filling with gas or liquid. To pressurize. "Raise first stage chamber pressure."

READ: To interpret the meaning of by visual observation. "Read ammeter."

Readjust: Use ADJUST.

Ready: Use PREPARE.

Wisconsin Public Service Corporation	No. GNP 3.2.1 Rev. Orig
Kewaunee Nuclear Power Plant	Title: Procedure Writer's Guide
GENERAL NUCLEAR PROCEDURE	Date SEP 1 4 1993 Page 53 of 79

Reassemble: Use ASSEMBLE.

RECALL: To call back. "Recall all unmodified parts."

Recap: Use CAP.

Recapitulate: Use REPEAT.

RECEIVE: To come into possession of. "Receive supplies as they arrive."

RECOGNIZE: To perceive to be something previously known or diagnosed. "Recognize troubles through evaluation of engine operational checks."

RECOMMEND: To urge the acceptance or use of. "Recommend procedure changes where appropriate."

Reconnect: Use CONNECT.

RECORD: To set down in writing. To copy. To enter data. To tabulate. "Record time on Data Sheet 1."

REDUCE: To lower. To cause to be diminished in strength, density, or value. "Reduce pump flow."

REFER TO: To call or direct attention to something. "Refer to Table 1 for part numbers." (REFER to tables and steps, Refer to figures and illustrations).

REGULATE: To fix or adjust the time, amount, or rate of. To exercise restraining or directing influence over. To control. "Regulate electrical current generation and distribution."

Reinflate: Use INFLATE.

REJECT: To refuse to have, use, or take for some purpose. "Reject components showing excessive wear."

Relay: Use NOTIFY.

Reinstall: Use INSTALL.

RELEASE: 1. To set free from an inactive or fixed position. To unlock. "Release AUTO hold bar to provide manual control."

2. To let go of. "Release tensiometer handle."

3. To set from restraint of confinement. "Release pressure."

RELIEVE: To release. To ease or set free of a burden. "Relieve hydraulic pressure before working on system."

REMOVE:
1. To take an equipment unit out of the next larger assembly or system. "Remove bleed air shutoff valve." "Remove bolts from nuts."

2. To sever the connection between. To separate keyed or matched equipment parts. To break. Remove vent hose from tank."

3. To take off or eliminate. "Remove covers." "Remove paint."

4. For screws, use REMOVE rather than UNSCREW.

REPAIR:
1. To restore equipment to operable condition by a means other than total replacement of a part. "Repair connector by soldering leads."

2. Repair includes such methods as gluing, reattaching, patching, welding, splinting building up (a surface), sanding smooth, straightening, and soldering. Repair excludes fault isolation.

REPEAT: To make, do, or perform again. To recapitulate. "If keys do not engage lugs, remove assembly and repeat procedure."

REPLACE: To change or substitute serviceable equipment for malfunctioning, worn out, or damaged equipment. "Replace switch contact points."

Replenish: Use FILL.

REPORT: To describe as being in a specific state. "Report worn or frayed wires to supervisor."

Repressurize: Use RAISE.

REQUEST: To ask for. "If necessary, request further information."

Reset:
1. Refer to ADJUST.

2. Refer to POSITION.

3. Refer to SET.

RESTORE: To bring back or put back into a former or original state. "Restore power to PQ-48412."

RETRACT: To draw back or in. "Retract locking pins by rotating lock screw counterclockwise."

RETURN: To bring, send, or put back to a former or proper state. "After testing, return throttle valves to preset positions."

REVIEW: To examine again. To go over or examine. "Review Data Sheet 1 to verify all blanks have been filled in."

RINSE: To clean (as from soap used in washing) by clear water. "Rinse battery after cleaning with soda water solution."

ROPE OFF: To partition, separate, or divide by a rope. "Clear and rope off an area around the generator and post warning signs."

ROTATE: To cause to revolve about an axis or center. To turn. Do not use RIGHT or LEFT to describe direction, use CLOCKWISE and COUNTERCLOCKWISE. "Rotate door handle counterclockwise until latch retracts."

ROUTE: To send by a selected course of travel. To divert in a specified direction. "Route cables according to Figure 1."

Rub: Use WIPE.

SCAN: To make a wide, sweeping search of. To look through or over hastily. "Scan local panels for alarms before beginning maintenance activity."

SCREW: 1. To attach, fasten, or close using a screw. "Screw safety lock into position."

2. To attach by twisting in the proper direction. "Screw adapter onto tank fitting."

3. To attach screws, use INSTALL SCREWS.

SCRAPE: To remove from, smooth, or clean a surface by repeated strokes of an edged instrument or by other means. "Scrape surfaces of component to remove peeling or chipped paint."

SCRUB: To clean with hard rubbing. "Scrub all metal parts with nonabrasive brush."

SEAL: To secure with a closure against access or leakage. "Seal ends of pipe using plastic covers."

SECURE: To make component fast or safe or to keep from loosening during vibration. To install. "Secure bolts with safety wire." "Secure bolt with cotter pin."

SELECT: To take by preference of fitness from a number or group. To pick out. To choose. "Select battery cell and insert hydrometer nozzle in cell."

SEPARATE: To set or keep apart. To classify. To categorize. "Separate cables by at least 6 inches."

SET: To put a switch, pointer, or knob into a given position. To put equipment into a given adjustment, condition, or mode. To reset. "Set mode switch to ON."

Set up: Use PREPARE.

SHAKE: To move or cause to move to and from in a quick, jerky manner. To agitate. "Shake container to thoroughly mix paint."

SHALL: Indicates a required action.

SHOULD: Indicates a recommended action.

SHOW: To cause or permit to be seen. To exhibit. "Show defective part to supervisor."

SHUT DOWN: To perform operations necessary to cause equipment to stop or suspend operation. To stop. "Shut down air conditioning."

SIGN: To affix a signature to. "Sign Data Sheet 1."

Signal: Use NOTIFY.

SLIDE: To cause to move in a smooth manner over a surface. "Slide solid cylinder into cylindrical base."

SLIP: To move with a smooth, sliding motion. "Slip cylinder into place."

SPECIFY:
To name or state explicitly or in detail. "Specify manufacturer's number of multimeter."

SPEED UP:
To hurry. To accelerate the process or progress of. "Speed up activity by assigning two technicians."

SPILL:
To cause or allow to fall, flow, or run out. "Be careful not to spill battery acid on clothing or hands."

SPIN:
To cause to revolve rapidly. "Spin wheel by hand until a bearing drag is noticed."

SPRAY:
To apply with a device that disperses a jet of finely divided liquid. "Spray surface with a coating of cleaning solvent."

SQUIRT:
To eject liquid with a thin spurt. "Squirt solution around seal and inspect for leakage."

STABILIZE:
To become stable, firm, steady. "Allow pressure to stabilize."

START:
To perform actions necessary to set into operation. To get going. To begin. To put into mechanical motion or action. "Start pump."

STIR:
To disturb relative position of particles or parts of, especially by a continued circular motion. "Stir sample before performing conductivity test."

STOP:
1. To perform actions necessary to cause equipment to end or suspend operation. "Stop pump."

2. To ignore or set aside as unimportant, to expel. "Stop all unnecessary movement."

STORE:
To deposit or leave in a specified place for future use. To stow. To put away. "Store equipment covers after maintenance activity is completed."

Stow:
Use STORE.

SUBMIT:
To make available. To offer. "Submit completed procedure to supervisor."

SUPPORT:
To hold up or to provide a foundation or props for. "Support assembly at both ends."

SURVEY: To examine condition, situation, or value. "Survey entire equipment surface."

SWAP   To put in the place of the other. "Swap circuit cards A2 and A3."

Tabulate: Use RECORD.

TAG: To provide with an identifying or indicating symbol with a tag (a cardboard, plastic, or metal marker used for identification or classification). To label. To attach or connect a tag to. To mark. "Tag each hydraulic line before removing."

TAKE: 1. To get into or carry in one's hands or in one's possession. To deliver. "Take valve to a clean area for dismantling."

                2. To get or find out by observation or special procedures. To obtain. "Take a reading on outside circle of tensiometer."

TAP: To strike lightly. "Tap eye of cotter pin to seal it."

Terminate: Use LAND.

TEST: To perform specified operations to verify operational readiness of a component, subcomponent, system, or subsystem. To check out. "Test accuracy of indicator as follows:"

THROTTLE: To operate a valve in an intermediate position. "Throttle valve for 50% flow."

TIE: To fasten, attach, or close using a line or cord. "Tie support ropes to equipment."

TIGHTEN: To perform necessary operations to affix more firmly. "Tighten all screws."

TORQUE: To apply a specified amount of force to produce a rotation or twisting motion to affix more firmly. To tighten. "Torque nut to 1000 inch-pounds."

TRACE: To follow or study in detail or step. "Trace wiring from breaker to faulty component."

TRANSFER: To convey, transport, transmit, or cause to pass from one place to another. "Transfer radioactive test source to test area."

TRIM: .   To free of excess or extraneous matter by cutting. "Trim wires."

TRIP: To cause an opening or closing operation. "Trip breaker 1A."

TROUBLESHOOT: To localize and isolate the source of a malfunction or breakdown. "Troubleshoot pump control circuit."

Turn: Use ROTATE.

Uncap: Use REMOVE (cap).

UNLOCK:

1. To unfasten. To open. "Unlock electrical cabinet."

2. To release or detach interlocking parts. To unfasten. "Unlock turning gear."

Unplug: Use REMOVE (plug).

Unscrew

1. For screws, use REMOVE SCREWS.

2. Refer to LOOSEN.

3. Refer to REMOVE.

UNWIND: To cause to uncoil or unroll. "Unwind hoses from hose rack."

USE: To put into action or service. To avail oneself of. To carry out a purpose or action. To employ. "Use only antimagnetic fasteners."

Utilize: Use USE.

VENT: To permit a gas or liquid confined under pressure to escape at a vent. "Vent the transmitter."

VERIFY:

1. To confirm or establish a proper condition exists. To ensure. To check. To determine. "Verify light is off."

2. To check the accuracy of. "Verify readings before recording them."

WAIT: To suspend activity in a sequence of activities until a given condition occurs to a given time has elapsed. "Wait 5 minutes before performing next task."

WASH: To remove (dirt) by rubbing or drenching with liquid. To cleanse by or as if by the action of liquid. "Wash battery with cleaning solution and stiff brush."

Watch: Use OBSERVE.

WEAR: To bear or have on one's person. "Wear protective clothing."

WEIGH: To measure the heaviness of as a scale. "Weigh material and record weight on Data Sheet 1."

WIPE: To rub with something soft for cleaning or drying. "Wipe dry."

WIRE: To provide with wire. To use wire on. To install wiring. "Wire circuit."

WITHDRAW: To take back, away, or out. "Withdraw bar magnet from center of coil."

WRAP: To wind, coil, or twine, encircling or covering something. "Wrap wire around terminal."

ZERO: The act of nulling a device or system. "Zero meter with leads removed."

Commonly confused words
The following material is an alphabetical list of commonly misused words with their correct definitions.

ability, capacity   *Ability* means the power to do something.

Capacity is the power to receive or contain something.

about, approximately   *About* means a guess.

Approximately means a guess but implies accuracy.

accuracy, precision   *Accuracy* is the agreement between the true value and the result obtained by measurement.

Precision is the agreement among repeated measurements of the same quantity.

activate, actuate Both words mean "to make active," although *actuate* is usually applied only to mechanical processes. For example,

The relay actuates the trip hammer.

Activate has a wide range of applications to chemical processes, all applying to nuclear science: to make (something) radioactive, luminescent, photosensitive, photoconductive, etc.

advise, inform *Advise* means to offer suggestions.

Inform means to transmit information.

affect, effect *Affect* is a verb meaning to influence. For example,

The Commission's decision affected all licensees.

Effect can function either as a verb meaning to bring about or to cause, or as a noun meaning a result. For example,

The chief effected several changes in the Branch that had a good effect on morale.

Avoid using effect as a verb. Words such as "made" or "caused" are more preferable.

agitate, aggravate, irritate, mix, stir *Agitate* means to shake.

Aggravate means to worsen.

Irritate means to annoy or provoke.

Mix means to combine or blend into one mass.

Stir means to disturb the relative position of the particles by moving in a continuous circular motion.

alternate, alternative To *alternate* (verb) is to occur in successive turns.

An *alternative* (noun) is a choice among mutually exclusive objectives or courses of action.

all ready, already   *All ready* means something is ready.

Already means by or before a certain time.

all right, alright   *All right* means everything is okay.

There is no such word as *alright*.

all together, altogether   *All together* means everyone is together.

Altogether means entirely.

allude, refer   *Allude* means to refer indirectly.

Refer means to send directly.

analyze, determine, identify   To *analyze* is to separate into parts to determine the nature of the whole.

To *determine* is to verify definitely, as after an investigation or calculation.

To *identify* is to name a thing, to verify its origin, nature or characteristics.

and/or

Unless this is appropriate for a specific circumstance, avoid using this expression. State your meaning exactly. For example,

THIS:
Submit X or Y or both with your application, as appropriate.

NOT THIS:
Submit X and/or Y with your application, as appropriate.

assure, ensure, insure

Assure, ensure, and insure all mean "to make sure or certain."

Assure refers to people and it alone has the sense of setting a person's mind at rest. For example,

The health physicist assured the concerned public there was no risk of exposure to radiation from the normal operation of the proposed plant.

Ensure and *insure* are used almost interchangeably. It is best, however, to use insure for insurance policies and ensure to make sure of something.

because, since

Because is the strongest and most specific connective used to state a causal relationship. For example,

He was kept under observation because his dosimeter indicated exposure to radiation.

Since is a weak substitute for because when expressing cause. It is, however, the appropriate connective when the emphasis is on circumstances or conditions rather than on cause and effect. For example,

Since all the inspections proved the plant operable, the proposed startup schedule was approved.

between, among

Use *between* for two things.

Use *among* for more than two things.

bring, take

Generally, you *bring* something toward yourself.

You *take* something away form yourself.

can, may   *Can* shows ability.

May shows permission.

compose, comprise, consist   *Compose* means "to create" or "to make up the whole" of something. Parts compose (make up) a whole. For example,

Concrete is composed of cement, aggregate, and water.

Comprise means "to embrace" or "to include." The whole comprises the parts. For example,

A botanical garden (the whole) comprises trees, flowers, and other plant life (the parts).

Consist means all parts making up a whole are listed, but include does not. For example,

Concrete consists of cement, aggregate, and water. Concrete includes cement and aggregate.

conclude, decide, determine   To *conclude* is to decide or judge after careful consideration.

To *decide* is to make up one's mind, as after doubt or debate.

To *determine* is to establish or verify definitely.

continual, continuous   *Continual* means intermittent or repeated at intervals.

Continuous means without interruption in time, or of unbroken extent in space.

could of, could bave   There is no such expression as *could of*. It is confused with the spoken expression could've, which is a contraction for *could have*.

data   Use *Data* as a singular or plural noun, depending on the intended meaning.

Do not use data when a more specific term, such as compilation, list of values, physical dimensions, experimental observations, or numerical results is more accurate.

The latin singular form of data, datum, is seldom used except in surveyor's terms such as datum line and datum plane.

due to, because of   *Due to* in the sense of "caused by" is acceptable in phrases following a verb form of "to be." For example,

His fall was due to carelessness.

Due to is unacceptable when it follows other verbs and means "because of." For example,

THIS:
   He fell because of carelessness.

NOT THIS:
   He fell due to carelessness.

effective, efficient   Something is *effective* if it performs its function well.

Something is *efficient* if it does it without much waste or expense.

etc.
(such as, includes)   Do not follow a series introduced by the words "includes" or "such as" with *etc.* because the phrases, taken together, are redundant.

(Etc., when used in text, is followed by a comma except when it ends a sentence.)

Avoid overusing etc. because it introduces vagueness into the statement.

everyone,
every one   *Everyone* refers to all people.

Every one refers to each person.

factor   *Factor* has a specific mathematical meaning. Do not use it even in mathematical contexts. The expression "to improve by a factor of 3" means to triple, so use triple.

farther, further   *Farther* refers to distance. *Further* indicates additional degree, time, or quantity. For example,

As you go farther away, your ability to hear is further impaired.

fewer, less

Fewer refers to units or individuals. *Less* refers to mass or bulk. For example,

With using less powder, fewer particles result.

foreword, forward, preface

Forward describes the position of something located toward the front.

A *foreword* describes introductory material in a report. The term foreword usually applies to a statement about a book or report written by someone other than the author.

A *preface* is usually a statement by the author describing the purpose, background, or scope of a book or report. The terms foreword and preface are often used interchangeably.

i.e., e.g.

i.e. means "that is."

e.g. means "for example."

"That is" or "for example" is preferable to avoid misuse, overuse, and pompousness.

impact

Impact used as a noun means the actual striking of one body against another, or the impression of one thing on another.

Impact used as a verb means to cause to strike forcefully.

imply, infer

Imply indicates by association or consequence rather than by direct statement. For example,

The neatness of the report implies the typist is proud of his work.

Infer derives a conclusion from facts or premises. For example,

We infer that the hyphenation is correct.

irregardless

There is no such word. Use regardless.

interpolate, extrapolate

You *interpolate* (meaning estimate) between two known values.

You *extrapolate* (meaning infer or predict) from the values of a known series.

lay, lie

You *lay* or place something down.

You *lie* down or recline to rest.

like, as

Use *like* when comparing two objects (nouns).

Use *as* when introducing a clause.

may, might

May indicates permission.

Might indicates a conditional possibility.

mutual, common

Mutual refers to two persons or things, and means reciprocally exchanged.

Common means shared by all.

on the order of

Do not use *on the order of* to mean about or approximately. If you mean "within an order of magnitude," say so.

only

Place *only* immediately before the work or phrase it modifies. Note the difference in meaning caused by the word's location in the following sentences. For example,

He was the only engineer.
He was only the engineer.

opposed to, compared to

Do not use *opposed to* unless you mean in literal opposition. Use compared to instead. For example,

Force a is opposed to force b, and is stronger.
Force a compared to force b is several times greater.

order of magnitude

Use this phrase to express measurements in power of 10 only, not to mean "approximately." For example,

The earth's mass is about 5.99E24kg. The sun's is 1.99E30kg. Their masses differ by about six *orders of magnitude*.

over, above, more than

Over and *above* indicate position.

More than indicates a number.

**parameter,
property**

A *parameter* is an arbitrary constant or an independent variable through which other functions are expressed. For example,

The parameter for the first test were 6 to 12 vdc.
Four parameters, three in space and one in time, are needed to specify an event.

A *property* is an explicit value or characteristic. For example,

One of the most important properties of iodine is its low temperature of sublimation.

**practical,
practicable**

Practical means useful in actual practice.

Practicable means capable of being put into practice.

**presently, at present
currently**

Presently means in a short time, soon, directly.

At present means now or at this time.

Currently means now.

principal, principle As a noun, *principal* means head or chief. As an adjective, it means highest or best.

Principle means basic truth, law, or assumption.

prior, before *Prior* is an adjective meaning earlier in time or order.

Before as an adverb means in advance. As a preposition it means in front of or preceding. For example,

He was hired according to a prior agreement, an agreement reached before his arrival.
He must be tested before he can be interviewed.

proved, proven *Proved* is preferred as the past participle of the verb to prove. For example,

He has proved his point.

Proven is better used as an adjective. For example,

He has a proven record of achievement.

providing, if

Do not use *providing* in place of *if*. For example,

Providing jobs is difficult now, but will be easier if next year's budget is adequate.

refer, see

Refer to tables and steps. *See* figures and illustrations.

should, will

Should means ought to.

Will means to predict.

tbat, which

That is appropriate to essential (defining) clauses that are not set off by commas.

Which is appropriate to (nondefining) clauses that are set off by commas. For example,

These frequencies, which rise exponentially with voltage, can cause perturbations that are self propagating.

via

Via is Latin for "by way of." Restrict its use to routing instructions. For example,

The package was sent to Bethesda via Region I.

Do not use via to mean through or as the result of outside of such contexts.

whether, if

Whether implies a condition of doubt. For example,

He was unsure whether security was breached.

If implies no other choice. For example,

If it does not rain, we will move the equipment.

while, although, whereas

The noun *while*, when used in adverbial phrases, indicates a period of time (during, or at the same time as). When used as a conjunction, while means "as long as" in reference to time. Do not use while in the place of although, whereas, and, or but.

Although (conjunction) means regardless of the fact or even though.

Whereas (conjunction) means in view of the fact and is commonly used to indicate a comparison or contradiction.

who, tbat

Use *who* when referring to a person.

Use *that* when referring to things.

Words and pbrases to avoid

Technical writers sometimes fall prey to using big, important-sounding words and phrases. Usually, a simpler word will do. Here are some examples.

Big words to avoid	Use
abbreviate	shorten
affirmative	yes
aggregate	total, whole
alternative	choice
anomalous	abnormal
antithesis	opposite
aqueous	watery
ascertain	find out whether, verify
augment	add
autonomous	independent
beverage	drink
cease	stop, pause
coagulate	clot, thicken
commencement	start, beginning
concept	idea
conjecture	guess
contiguous	near, touching
currently	now
demonstrate	show
disengage	free
duplicate	copy
eliminate	cut out, stop
expedite	hasten, speed
facilitate	simplify

Big words to avoid	Use
feasible	possible
fundamental	basic, primary, main
furthermore	and, next, then
hence	so
heretofore	until now
homogeneous	similar
inaugurate	begin, start
inception	start, beginning
incision	cut
incombustible	fireproof
inconsiderable	slight, small, little
infiltration	in
insignificant	meaningless
moreover	also, then, in addition
necessitate	if necessary, may require
negate	cancel
nevertheless	but, still
optimum	best
procure	buy, get, purchase
subsequent to	following, after
subsequent	next
subsequently	then
sufficient	enough, adequate
terminate	end
utilize	use
validate	verify
viable	workable

Wordy phrases to avoid	Use
a large number of	many
as shown in figure 6	table 6 shows
at this point in time	at this time
could be considered as	is
despite the fact that	although
during the course of	during
hold a meeting	meet
if difficulty is encountered	if
in a situation in which	when, if
in most cases	usually
in many cases	often
in other words	this means
inasmuch as	since

Wordy phrases to avoid	Use
in the majority of instances	usually
in the vicinity of	near
in the course of	during
in the event that	if
in the form of	as
is equipped with	has, contains
longer in length	longer
make provisions for	provide
on the basis of	by, from
on an annual basis	yearly
on a weekly basis	weekly
prior to that time	before
subsequent to	after
the reason why is that	because
until such time as	until
with reference to	about
with the result that	so that

Redundancies

Sometimes we get so carried away with our prose that we repeat ourselves. Redundancies only add time to the reading effort. They add nothing to the sentence.

Redundancy	Use
absolutely essential	essential
advance plan	plan
all of	all
any and all	any
basic essentials	essentials
by means of	by, using
cancel out	cancel
combine into one	combine
continue on	continue
current status	status
final outcome	outcome
first priority	priority
goals and objectives	goals
joined together	joined
overall plan	plan
past history	history
repeat again	repeat
small in size	small
take action	act

Redundancy	Use
true facts	facts

Numerals and Units of Measure

Use the following guidelines:

1. For units of measure, distance, time, percentages and ratios, use the numeral rather than the words.

4 madc	500 gpm
3 min	47 ft
5%	2 days

2. In all other cases, spell out the word if nine or under. If two or more numbers appear in a sentence, however, and one of the numbers is greater than 10, then use numerals for all the numbers. For example,

    three technicians
    10 tool bags
    3 technicians and 10 tool bags

3. When using a number to modify another number, use both words and numerals for clarity. If the modifier is 100 or greater, then use numerals. For example,

    Twelve 2-lb packages.
    146 2-lb packages.

4.   Do not repeat a spelled-out number in parentheses. For example,

THIS:
    three technicians

NOT THIS:
    three (3) technicians

5.   For numbers less than one, precede the decimal point by a zero.

0.1.

6.   Use Arabic numerals unless the specific nomenclature contains Roman numerals.

7.   Use the units appearing on the instrument specified.

8.   Spell out zero unless it is a measurement.

9.   Use commas in numbers of four or more digits, except in serial numbers, time and fractions.

10.   Use **NO.** or **NOS.** to define a number or numbers, respectively. To avoid confusion when using the # symbol, follow the guidance found in Webster's New Collegiate dictionary: •if the # symbol precedes a numeral it is defining a number; •if it follows the numeral it is defining the term "pound." Use whichever symbol (No., Nos., #) is most appropriate for your application.

11.   Spell out **first** and **second**, do not use **1st** or **2nd**.

12.   Avoid operations requiring conversions between equivalent sets of units. When conversions are necessary, provide graphs, charts, or tables to obtain the desired value without calculation.

13.   Do not begin a sentence with numerals unless the numeral is spelled out.

Abbreviations, Acronyms and Symbols

Use abbreviations to save time and space, and when their meaning is clear to a user. Do not misuse abbreviations, symbols, and acronyms. Using them benefits the reader. They can help reduce reading time, provide clarity when space is limited, and communicate mathematic ideas. Maintain consistency throughout the procedure.

1. Keep capitalization of abbreviations uniform. If the abbreviation is composed of lowercase letters, write those letters in lowercase in a title or heading. Omit periods in abbreviations except in cases where the omission would result in confusion.

2. Use standard abbreviations for engineering units and do not spell them when first used. For example,

   "psig", not "pounds per square inch gauge."

3. An acronym is an abbreviation pronounced as a word and usually formed by the first letter or part of each of the major terms of the phrase. Use acronyms if they are defined when using them the first time or if they are commonly used. Use abbreviations and acronyms consistent with ECP Appendix A "Control Room Abbreviations."

4. To make an abbreviation or acronym plural, add a lower case "s" without an apostrophe. For example,

   SRMs, not SRM's.
   Nos., not No's.

5. In general, avoid using symbols instead of writing the word. Use symbols only when their meaning cannot be confused. For example,

   Writing "°F" is acceptable instead of "degrees Fahrenheit."

   Writing "10-inch pipe" is preferable to "10″ pipe."

Standard Abbreviations and Symbols
The following abbreviations for engineering units and other units of measure are based on the McGraw-Hill Dictionary of Scientific and Technical Terms.

The abbreviations list is followed by a list of mathematical and other symbols used in procedures.

Unit	Abbreviation
Ampere	Amp
British thermal unit	Btu
Counts per minute	CPM
Counts per second	CPS
Cubic foot (feet)	ft^3
Disintegrations per minute	DPM
Degrees Celsius (Centigrade)	C
Degrees Fahrenheit	F

Unit	Abbreviation
Disintegrations per second	DPS
Feet	ft
Gallon	gal
Gallons per hour	gph
Gallons per minute	gpm
Hertz	Hz
Inches	in
Inches in mercury	in. Hg
Inches in water	in. H_2O
Kilovolt-ampere	kVA
Kilovolt-ampere reactive	kVAR
Kilowatt	kW
Kilowatt-hours	kWh
Megavolt ampere reactive	MVAR
Megawatt	MW
Megawatt electrical	MWe
Megawatt-hour	MWH
Megawatt thermal	MWt
Milliampere	mA
Million pounds per hour	MPPH
Parts per billion	ppb
Parts per million	ppm
Parts per million boron	ppmb
Percent milli	PCM
Pound or pounds	lb
Pounds per hour	lb/hr
Pounds per square inch	psi
Pounds per square inch absolute	psia
Pounds per square inch differential	psid
Pounds per square inch gauge	psig
Revolutions per minute	rpm
Roentgen	R
Roentgen equivalent man	rem
Standard cubic feet per minute	SCFM
Standard cubic feet per second	SCFS
Volt	V
Volt-ampere	VA
Volt-ampere reactive	VAR
Voltage alternating current	VAC
Voltage direct current	VDC

Term	Symbol

Alpha	α
Approximately equal to	$\approx$
Beta	β
Degrees Celsius (Centigrade)	$^{\circ}$C
Degrees Fahrenheit	$^{\circ}$F
Delta (differential)	Δ
Equal to	$=$
Gamma	γ
Greater than	$>$
Greater than or equal to	$\geq$
Less than	$<$
Less than or equal to	$\leq$
Micro	μ
Percent	$\%$
Phase	ϕ
Plus or minus	$\pm$

REFERENCES

Several references were used to help write this guide. Plant specific examples are provided for writing procedures at KNPP. Each plant group, however, must decide on the wording needed to best accomplish their goal. It is, by no means, an exhaustive reference about technical writing or generally accepted rules of grammar and style.

Sometimes you will need direction not found in this guide. The following list of references is included to help you during those times. Several of the commercial references are inexpensive and are worth having at your desk. Industry-specific references are available in the KNPP reference library.

Commercial references

"The Elements of Style," Strunk and White, 1979
"The Elements of Grammar," Shertzer, 1986
"Reporting Technical Information," Houp & Pearsall, 1980
"Technical Writing Structure, Standards and Style," Bly and Blake, 1982

"The Technical Writer's Handbook," Young, 1989
"Professional Technical Writing," Sorenson, 1990
"McGraw-Hill Dictionary of Scientific and Technical Terms," Parker, 1983
"The Gregg Reference Manual," Sabin, 1985

Industry references

ANSI/ANS-3.2-1982 "Administrative Controls for Quality Assurance for the Operational Phase of Nuclear Power Plants"

NUREG/CR-1369 "Procedures Evaluation Checklist for Maintenance, Test and Calibration Procedures Used in Nuclear Power Plants"

INPO 84-006 "Control & Calibration of M&TE"
INPO 85-026 "Writing Guideline for Maintenance, Test, and Calibration Procedures"
INPO 85-032 "Preventive Maintenance"
INPO 85-038 "Guidelines for Conduct of Maintenance"

INPO 87-028 "Post-Maintenance Testing"
INPO 89-009 "Plant Predictive Maintenance"
INPO 90-123 "Maintenance Work Package Planning"

Plant references
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WPSC Safety Rules Manual
ECP Appendix A   "Control Room Abbreviations"

ACD 1.2   "Planning and Scheduling Program/Preventive Maintenance Program"
ACD 7.2   "Measuring and Test Equipment"
NAD 3.2   "Plant Procedures"
NAD 3.9   "Independent Verification"

NAD 12.2   "Surveillance Procedures"
NAD 12.13   "Maintenance Procedures"
NAD 12.15   "I&C Department Procedures"