

PROCEDURES GENERATION PACKAGE
FOR THE
VERMONT YANKEE NUCLEAR POWER PLANT

Prepared for:

VERMONT YANKEE NUCLEAR POWER CORPORATION

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APPENDIX A OPERATIONAL EMERGENCY PROCEDURES WRITER'S GUIDE

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Procedures Generation Package (PGP) is to describe the emergency operating procedures (EOPs) development at the Vermont Yankee Nuclear Power Plant.

The EOPS are designated as Operational Emergency Procedures (OEPs) and will be referred to as OEPs in this document.

1.2 Scope

This document was developed in response to Supplement 1 to NUREG-0737, Item 7.2b.

1.3 Organization

This document consists of the following six parts:

- Introduction
- Plant-Specific Technical Guidelines
- OEP Writer's Guide (Appendix A)
- OEP Verification Program
- OEP Validation Program
- OEP Training Program

Each part describes the approach taken as part of the overall OEP Implementation Plan for Vermont Yankee.

2.0 PLANT-SPECIFIC TECHNICAL GUIDELINES

2.1 General

The following methodology for converting the General Electric Emergency Procedure Guidelines (EPGs) into OEPs has been developed and will be used by Vermont Yankee.

The EPGs, Revision 3A, will be used for the initially implemented OEPs.

The following major items were considered in the methodology to be used:

- Mechanics of conversion
- Location of the plant-specific technical information
- How the plant-specific technical information will be used
- The use of other plants EOPs
- Documentation requirements
- Use of the background information supplied with technical guidelines

2.2 Program Description

2.2.1 Mechanics of Conversion

2.2.1.1 Preparation

The designated OEP writing team will obtain and review the following plant-specific technical information (OEP source documents):

- General Electric EPGs, Revision 3A, with background information
- Vermont Yankee FSAR

- Vermont Yankee Operational Emergency Procedures (OEPs) Writer's Guide which is based on the industry document Emergency Operating Procedures Writing Guideline (INPO 82-017) developed by the Emergency Operating Procedures Implementation Assistance (OEPIA) Review Group and published by INPO.
- Technical Specifications for Vermont Yankee
- Current Plant drawings

2.2.1.2 Writing OEPs

The OEP writing team will follow the intent of each of the EPGs adding plant specific information where designated. Concurrently, the writers will review appropriate OEP source documents. Where exceptions to the EPGs are taken in the OEPs, these will be documented.

3.0 OEP WRITER'S GUIDE

3.1 General

The OEP Writer's Guide provides specific, detailed instructions on writing OEPs. In addition to establishing sound writing principles, the guide promotes consistency among all OEPs and their revisions, independent of the OEP writer. The Writer's Guide is based on the industry document Emergency Operating Procedures Writing Guideline (INPO 82-017), developed by the OEPIA Review Group and published by INPO.

3.2 Document Description

Information on the following major items is included in the plant-specific Writer's Guide:

- OEP Definition
- OEP Format
- Writing Instructional Steps

- Mechanics of style
- Typing Format

The Vermont Yankee Operational Emergency Procedures Writer's Guide is provided as Appendix A.

4.0 OEP VERIFICATION PROGRAM

4.1 General

OEP verification is the evaluation performed to confirm the written correctness of the procedure and to ensure that applicable generic and plant-specific technical information has been incorporated properly. This evaluation also checks that the human factors aspects presented in the writers guide for OEPs have been applied.

4.2 Program Description

When developing this OEP verification program, the following items were considered:

- How OEP verification will be performed
- How completion of the OEP verification process will be documented
- What process will be used in resolving discrepancies

The verification program is based on the industry document Emergency Operating Procedures Verification Guideline (INPO 83-004), developed by the OEPIA Review Group and published by INPO.

The Vermont Yankee verification program for OEPs will address the following objectives:

- OEPs are technically correct, i.e., they accurately reflect the technical guidelines and other OEP source documents.
- OEPs are written correctly, i.e., they accurately reflect the plant-specific writers guide.

- A correspondence exists between the procedures and control room/plant hardware.
- The information presented in the OEPs will be consistent with the qualifications, training, and experience of the operating staff.

5.0 OEP VALIDATION PROGRAM

5.1 General

OEP validation is the evaluation performed to determine that the actions specified in the procedure can be performed by the operator to manage the emergency conditions effectively. The OEP validation will evaluate the operator's ability to manage emergency conditions using the OEPs and control room hardware. It will validate that part of the OEP not covered by any technical validation of generic technical guidelines.

5.2 Program Description

When developing the OEP validation program, the following major items will be considered:

- How OEP validation will be performed
- How to use simulators, walkthroughs, or table top methods of validation
- How operating and training experience will be integrated into the program evaluation
- The evaluation criteria to be applied and the methods to be followed in resolving discrepancies
- How completion of the OEP validation process will be documented

The program will be based on the industry document Emergency Operating Procedures Validation Guideline (INPO 83-006), developed by the OEPIA Review Group and published by INPO. The Vermont Yankee validation program for Emergency Operating Procedures will address the following objectives:

- The OEPs are usable, i.e., they can be understood and followed with a minimum of confusion, delays, and errors.
- A correspondence exists between the procedures and the control room/plant hardware.
- The instructions presented in the OEPs will be consistent with the shift manpower, qualifications, training, and experience of the operating staff.
- Assurance that the procedures will work, i.e., that the procedures guide the operator in mitigating transients and accidents.

6.0 OEP TRAINING PROGRAM

6.1 General

OEP training will be a vital element in the overall operator training program at Vermont Yankee. A unified effort on the part of the training department and the OEP writers will result in operators who are knowledgeable in both the use and the intent of these procedures.

6.2 Program Description

When developing training in the area of OEPs, the following major items will be considered:

- What type of operator training should be provided (initial, refresher)
- What method of operator training should be followed
- What operator knowledge and skill level is required
- What procedure tasks exist that require operator decision-making
- What training material is needed to support OEP training requirements
- What current operator licensing requirements or guidelines exist

6.3 Training Program Goals

The initial overall training goals for OEP training are as follows:

- To enable the operators to understand the structure of the OEPs
- To enable the operators to understand the technical basis of the OEPs
- To enable the operators to have a working knowledge of the technical content of the OEPs
- To enable the operators to use the OEP's under operational conditions

The following sections outline the approach to be used to train licensed operators on OEP's.

6.4 OEP Training Methods

As part of the training program, OEP training will be included to establish an operations staff which is capable and competent to respond to any off-normal plant situation. This training will consist of classroom instruction, control room walk-throughs, and simulator exercises.

6.4.1 Classroom Instruction

Classroom instruction sessions will be conducted. Included in the information presented during this method will be the following:

- The logic behind the development of OEPs
- The process used to develop the OEPs
- The OEPs themselves, including supporting technical and human factors information

6.4.2 Self-Help Supplementation

Classroom instruction will be supplemented by self-help techniques. Self-help essentially entails having the trainees review and study the

information presented in the classroom instruction via required readings. Trainees will be permitted to implement self-help during shifts when they are not performing required duties.

6.4.3 Control Room Walk-Throughs

An important part of the instruction on OEP's will be the practical experience gained through procedure walk-throughs in the control room. During this method of training, the team approach to using OEP's will be stressed. This walk-through training will also concentrate on information flow and interactions of the operators in the control room.

6.4.4 Simulator Exercises

Training on OEPs will be conducted for all licensed operators using scenarios on a control room simulator. Training will be conducted with all operators performing their normal control room functions. Additional training will be conducted where the members of a crew alternate responsibilities. This additional training promotes understanding of the other operator's responsibilities in the overall conduct of the actions, and will lead to enhanced communications within the control room.

APPENDIX A
OPERATIONAL EMERGENCY PROCEDURES WRITER'S GUIDE

OPERATIONAL EMERGENCY PROCEDURES
WRITER'S GUIDE

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SECTION 1. INTRODUCTION

1.1 Purpose and Scope

The purpose of this writer's guide is to provide administrative and technical guidance on the preparation of Operational Emergency Procedures (OEPs). The writer's guide applies to the writing of all OEP's.

SECTION 2. OEP DEFINITION

OEPs are procedures that govern the plant operation during emergency conditions and specify operator actions to be taken to return the plant to a stable condition.

2.1 OEP Numbering

Each OEP shall be uniquely identified. This identification permits easy administration of the process of procedure preparation, review, revision, distribution, and operator use. A descriptive title is to be used that also designates the scope.

2.2 Cover Sheets

Every OEP shall have a cover sheet. The primary purposes of this cover sheet are, (1) to identify the procedure and, (2) to identify the authorized revision.

2.3 Procedure Designation

The emergency operating procedure designation shall be OEP.

2.4 Procedure Numbering

A sequential number will follow the procedure designator and will consist of four digits:

OEP 31XY

2.5 Revision Numbering

Two digits following the "Rev" abbreviation will be used to designate revision levels:

Rev 01

2.6 Revision Identification

A change bar located in the left margin alongside the text change will be used to indicate a left-hand column change; a change bar located in the right margin alongside the text change will be used to indicate a right-hand column change.

2.7 Page Identification and Numbering

Each page of the procedure will be identified by:

1. The procedure number
2. The revision number
3. The page number, written as "Page ____ of ____ ."

The procedure number and revision number will be located at the top right of each page. The page number will be centered at the bottom of each page.

SECTION 3. FORMAT

The following format is to be utilized for all OEPs.

3.1 Page Format

A dual-column format will be used in which the left-hand column is designated for operator actions and notes, and the right-hand column is designated for information and caution.

3.2 Procedure Organization

The following section headings will be used for all OEPs.

1. TITLE - The title will be stated with the ENTRY CONDITIONS for operator association.
2. ENTRY CONDITIONS - The entry conditions will be those plant parameters which, when exceeded, require entry into and execution of the OEP.
3. OPERATOR ACTIONS - The operator actions will be succinct, identifiable instructions that give appropriate directions to the user.

3.3 Section Numbering

In the following format will be utilized in section numbering:

1. The first section shall be designated by a capital letter.
2. The second section shall be designated by a number.
3. The third section (if required) shall be designated by a lower case letter.

SECTION 4. WRITING INSTRUCTIONAL STEPS

4.1 Instruction Step Length and Content

Instruction steps will be succinct and precise and will be located in the instructions column of the right hand page. Succinctness denotes brevity; preciseness means exactly and correctly defined. General rules to be used in meeting these objectives are as follows:

1. Instruction steps should deal with one idea only.
2. Short, simple sentences should be used.
3. Complex evolutions should be described in a series of steps, with each step made simple.
4. Objects of operator actions should be specifically stated.
5. For instructional steps that involve an action verb relating to three or more objects, the objects will be listed with space provided for operator checkoff.
6. Limits should be expressed quantitatively.
7. Identification of components and parts should be technically correct and complete.
8. When actions are required based upon receipt of an annunciated alarm, the alarm set point should be listed.
9. If required for proper understanding, describe the system response time associated with performance of the instruction.
11. When system response dictates a time frame within which the instruction must be accomplished, denote the time frame. However,

avoid using time to initiate operator actions, as operator actions should be related to plant parameters.

12. When anticipated system response may adversely affect instrument indications, (1) describe the conditions that will likely introduce instrument error and, (2) describes a means of determining if instrument error has occurred by using a CAUTION.
13. When additional confirmation of system response is considered necessary, prescribe the backup readings to be made.

4.1.1 Instruction Column

The left-hand column of the dual-column format contains the operator instructional steps. In addition to the general rules above, general rules to be used in meeting these objectives are as follows:

1. Expected indications (e.g., specific meter or display readings or general plant response) should be presented in this column.
2. Operator actions in this column should be appropriate for the expected indications.

4.1.2 Contingency Actions Column

Contingency actions are operator actions that should be taken in the event a stated condition, event, or task does not represent or achieve the expected result, and will be presented as additional steps in the instructional column.

The contingency actions should identify, as appropriate, directions to override automatic controls and to initiate manually what is normally automatically initiated. Contingency actions will be specified for each circumstance in which the expected results or actions might not be achieved.

4.2 Use of Logic Terms

When logic statements are used, logic terms will be highlighted so that all the conditions are clear to the operator. Highlighting will be achieved by using capitalization and spacing. Use logic terms as follows:

1. Avoid the use of AND and OR within the same action. When AND and OR are used together, the logic can be very ambiguous.
2. When attention should be called to combinations of conditions, the word AND shall be placed between the description of each condition. The word AND shall not be used to join more than three conditions. If four or more conditions need to be joined, a list format shall be used.
3. The word OR shall be used when calling attention to alternative combinations of conditions. The use of the word OR shall always be in the inclusive sense.
4. When action steps are contingent upon certain conditions or combinations of conditions, the step shall begin with the words IF or WHEN followed by a description of the condition or conditions, a comma, and the word THEN followed by the action to be taken. WHEN is used for an expected condition. IF is used to determine the specific course of action based upon plant conditions.
5. Use of IF NOT should be avoided.

4.3 Cautions and Notes

Cautions shall be highlighted by the use of bold type. Cautions are preceded by a number which corresponds to the cautions in the EPGs. Those cautions will be of an abbreviated nature and will be located in the right-hand column of the page immediately opposite the procedure step or steps to which they apply.

A NOTE shall be used to define information which must be considered in conjunction with an action instruction. A NOTE should present information only, not instructions, and should be located in the left-hand column as close to the applicable instruction as possible. An example is shown below:

NOTE

Injection from RHR will not occur until reactor pressure is less than 195 psig.

4.4 Calculations

Mathematical calculations should be avoided in OEPs; a chart or graph should be used if a value has to be determined. These charts or graphs shall be located on the left-hand page across from the appropriate procedure step, if possible.

4.5 Component Identification

The following rules are to be followed with regard to component identification:

1. Equipment, controls, and displays will be identified in operator language (common usage) terms.
2. When the engraved names and numbers on legend plates and alarm windows are specifically the item of concern in the procedure, the engraving should be quoted verbatim and emphasized by using all capitals.
3. The names of plant systems titles are emphasized by initial capitalization.
4. If the component is seldom used or difficult to locate, location information should be given.

4.6 Level of Detail

The level of detail required is the detail that a newly trained and licensed operator would desire during an emergency condition. To assist in determining the level of OEP detail, the following rules apply:

1. For control circuitry that executes an entire function upon actuation of the control switch, the action verb appropriate to the component suffices without further amplification of how to manipulate the control device; recommended action verbs to be utilized are:
 - a. For power-driven rotating equipment: Start, Stop.
 - b. For valves: Open, Close, Throttle Open, Throttle Close, Throttle.
 - c. For power distribution breakers: Synchronize and Close, Trip.
2. For multiposition control switches that have more than one position for a similar function: placement to the desired position should be specified.

4.7 Printed Operator Aids

When information is presented using graphs, charts, tables, and figures, these aids must be self-explanatory, legible, and readable.

4.7.1 Units of Measure

Units of measure on figures, tables, and attachments should be given for numerical values that represent observed data, measurement data, or calculated results.

4.7.2 Titles and Headings

Capitalization should be used for references to tables and figures, titles of tables and figures within text material, and column headings within a table.

4.7.3 Figure, Table, and Appendix Designation

Figures and tables will be specifically designated by an abbreviation of the procedure in which they reside and the sequential number of the table. For example, the third table in a Drywell Temperature (DW) procedure would be designated as:

DW/T3

Page identification for appendices shall consist of a block of information that identifies (1) procedure number, (2) appendix letter, (3) page number, and (4) revision number.

SECTION 5. MECHANICS OF STYLE

5.1 Spelling

Spelling should be consistent with modern usage. When a choice of spelling is offered by a dictionary, the first spelling should be used.

5.2 Hyphenation

Hyphens are used between elements of a compound word when usage calls for it. The following rules should be followed for hyphenation:

1. When doubt exists, the compound word should be restructured to avoid hyphenation.
2. Hyphens should be used in the following circumstances:
 - a. in compound numerals from twenty-one to ninety-nine.
 - b. in fractions.
 - c. in compounds with "self".
 - d. when the last letter of the first word is the same vowel as the first letter of the second word.
 - e. when misleading or awkward consonants would result by joining the words.
 - f. to avoid confusion with another word.
 - g. when a letter is linked with a noun.

5.3 Punctuation

Punctuation should be used only as necessary to aid reading and prevent misunderstanding. Punctuation should be in accordance with the following rules:

5.3.1 Brackets

Brackets are not to be used.

5.3.2 Colon

Use a colon to indicate that a list of items is to follow.

5.3.3 Parentheses

Parentheses shall be used to indicate alternative items in a procedure, instruction, or equipment numbers.

5.3.4 Period

Use a period at the end of complete sentences and for indicating the decimal place in numbers.

5.4 Vocabulary

Words used in procedures should convey the proper understanding to the trained person. The following rules apply:

1. Utilize simple words (i.e. short words of few syllables).
2. Utilize common usage.
3. Utilize words that are concrete rather than vague, specific rather than general, familiar rather than formal, precise rather than blanket.
4. Define key words that may be understood in more than one sense.
5. Verbs with specific meanings should be used.

6. Equipment status should be denoted as follows:

- a. Operable/Operability - These words mean that a system, subsystem, train, component, or device is capable of performing its specified function(s) in the intended manner.
- b. Operating - This word means that a system, subsystem, train, component, or device is in operation and is performing its specified function.
- c. Available - This word means that a system, subsystem, train, component, or device is operable and can be used as desired.

5.5 Numerical Values

The use of numerical values should be consistent with the following rules:

1. Arabic numerals should be used.
2. For numbers less than unity, the decimal point should be preceded by a zero; for example: 0.1.
3. The number of significant digits should be equal to the number of significant digits available from the display (and required by the necessary reading precision of the operator).
4. Acceptance values should be specified in such a way that addition and subtraction by the user is avoided if possible. This can be done by stating acceptance values as limits.
5. Engineering units should always be specified for numerical values of process variables, and should be the same.

5.6 Abbreviations, Letter Symbols, and Acronyms

The use of abbreviations should be minimized. Abbreviations may be used where necessary to save time and space, and when their meaning is unquestionably clear to the intended reader. Consistency should be maintained throughout the procedure.

Capitalization of abbreviations should be uniform. If the abbreviation is comprised of lowercase letters, it should appear in lowercase in a title or heading. The period should be omitted in abbreviations except in cases where the omission would result in confusion.

Letter symbols may be used to represent operations, quantities, elements, relations, and qualities.

SECTION 6. TYPING FORMAT

6.1 General

The following general requirements are to be followed:

1. Paper size should be 8-1/2 x 11 inches.
2. White, bond paper should be used.

6.2 Heading and Text Arrangement

Block style should be used. First-level section headings shall be in full capitals and bold type; second-level section headings shall be in full capitals; and third-level section headings shall be placed in initial capitals.

1. Section numbers shall begin at least five spaces from the left-hand printed border.
2. At least three line spaces shall be allowed between headings and respective text.
3. At least two line spaces shall be allowed between paragraphs.
4. Text will be typed using single line spacing.

6.3 Breaking of Words

Breaking of words shall be avoided.

6.4 Printed Operator Aids

Printed operator aids include graphs, drawings, diagrams, and illustrations. The following rules will be followed:

IMAGE EVALUATION
TEST TARGET (MT-3)

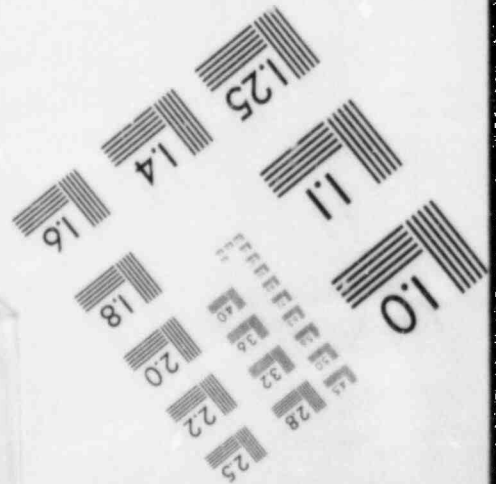
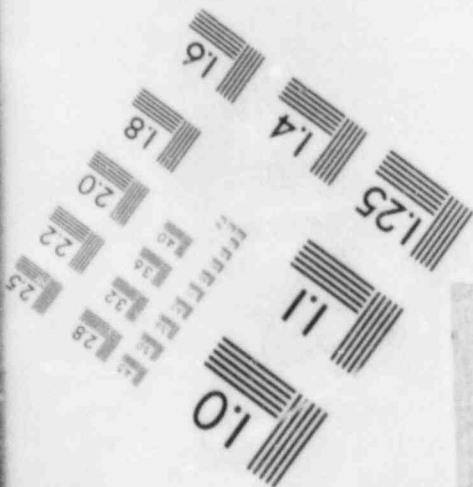
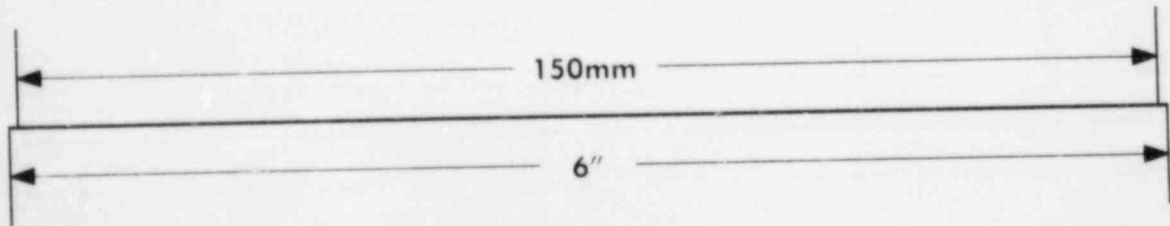
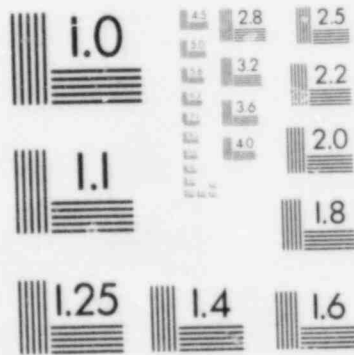
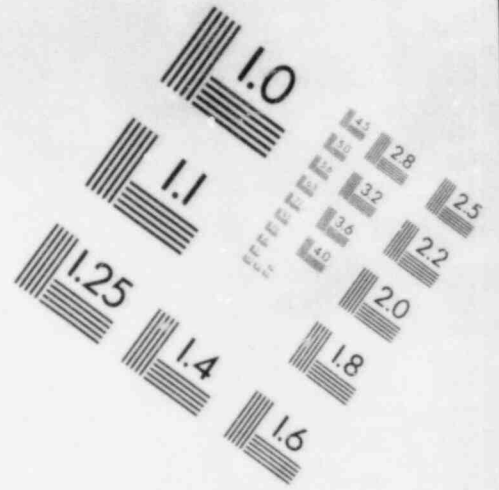
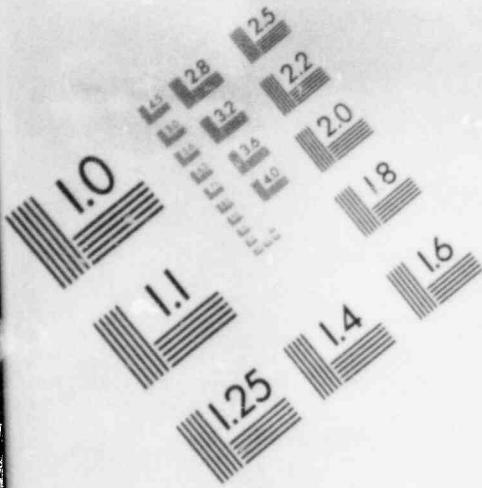
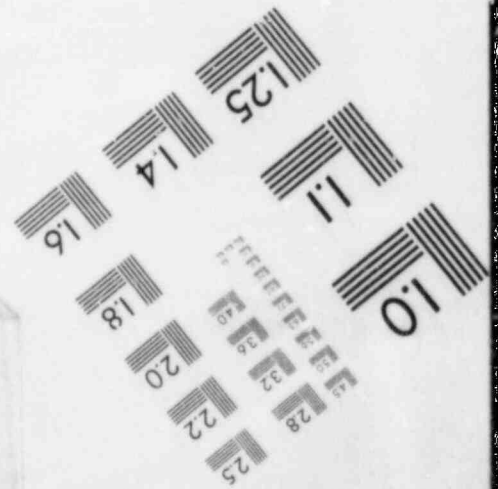
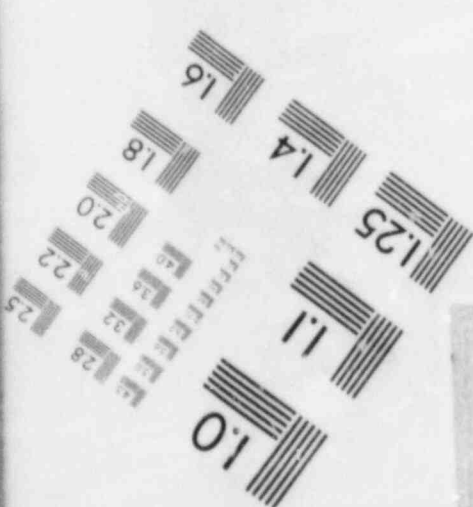
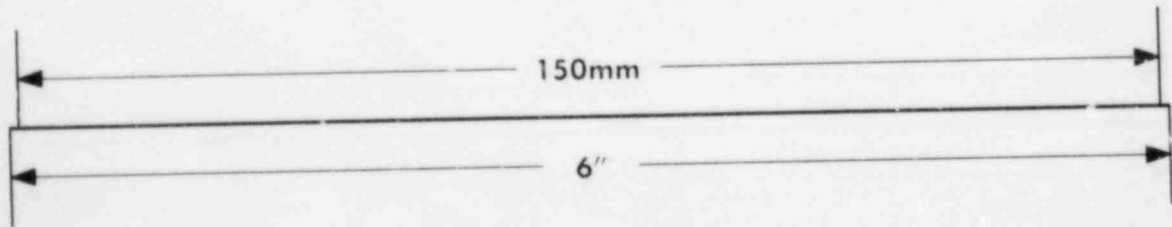
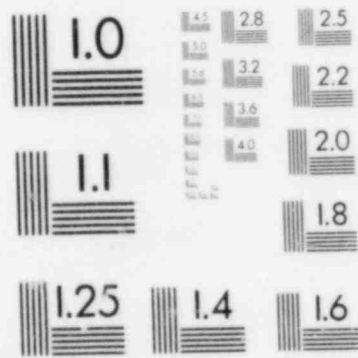
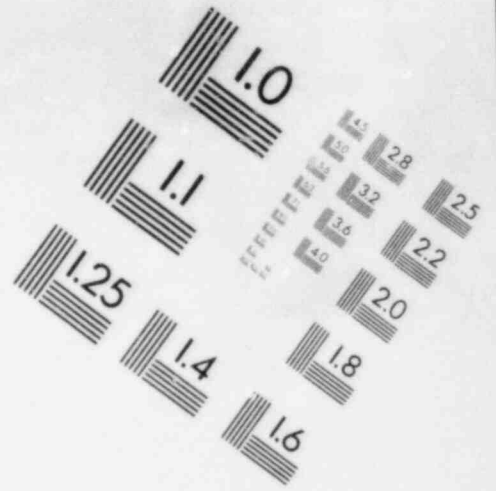
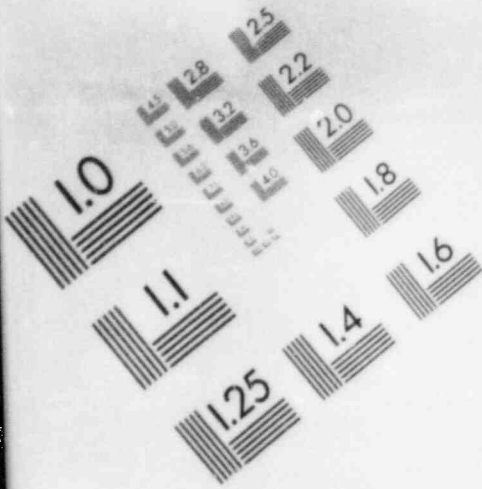


IMAGE EVALUATION
TEST TARGET (MT-3)



1. The figure number and its title are placed three line spaces below the figure field.
2. The figure field must not violate specified page margins.
3. The figure field should be of sufficient size to offer good readability.
4. The essential message should be clear; simple presentations are preferred.
5. Grid lines of graphs should be at least 1/8-inch apart; numbered grid lines should be bolder than unnumbered grid lines.
6. Labeling of items within the figure should be accompanied by arrows pointing to the item.
7. The items within the figure should be oriented naturally insofar as possible. For example, height on a graph should be along the vertical axis.
8. In general, items within the figure should be labeled. Handwritten labels should be printed, using all capitals, with letters and numbers at least 1/8-inch high.

Tables should be typed using the following rules:

1. Type style and size should be the same as that for the rest of the procedure.
2. The table number and title should be located above the table field and three line spaces below preceding text.
3. A heading should be entered for each column and centered within the column; the first letter of words in the column headings should be capitalized.
4. Horizontal lines should be placed above and below the column headings.
5. Tabular headings should be aligned as follows:
 - a. Horizontally by related entries.
 - b. Vertically by decimal point for numerical entries
 - c. Vertically by first letter for word entries; however, run-over lines should be indented three spaces.
6. Double spacing between horizontal entries suffices to segregate such entries, although horizontal lines may also be used if desired.

7. There should be no vacant cells in the table. If no entry is necessary, "N.A." should be entered to indicate not applicable.

6.5 Use of Foldout Pages

When used, a foldout page is treated as a single page. It should follow the same format as a standard page except the width is different. The page should be folded so that a small margin exists between the fold and the right-hand edge of standard pages. This will reduce wear of the fold.

6.6 Use of Oversized Pages

Oversize pages should not be used.

6.7 Use of Reduced Pages

Reduced pages should not be used.