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ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/G 5/2  
GUIDE FOR PREPARATION OF WATERWAYS EXPERIMENT STATION CONTRACT --ETC(U)  
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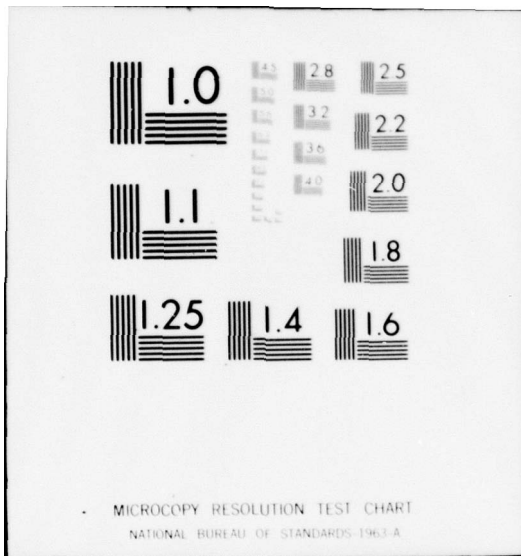
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INSTRUCTION REPORT O-74-2

**GUIDE FOR PREPARATION OF  
WATERWAYS EXPERIMENT STATION  
CONTRACT REPORTS**

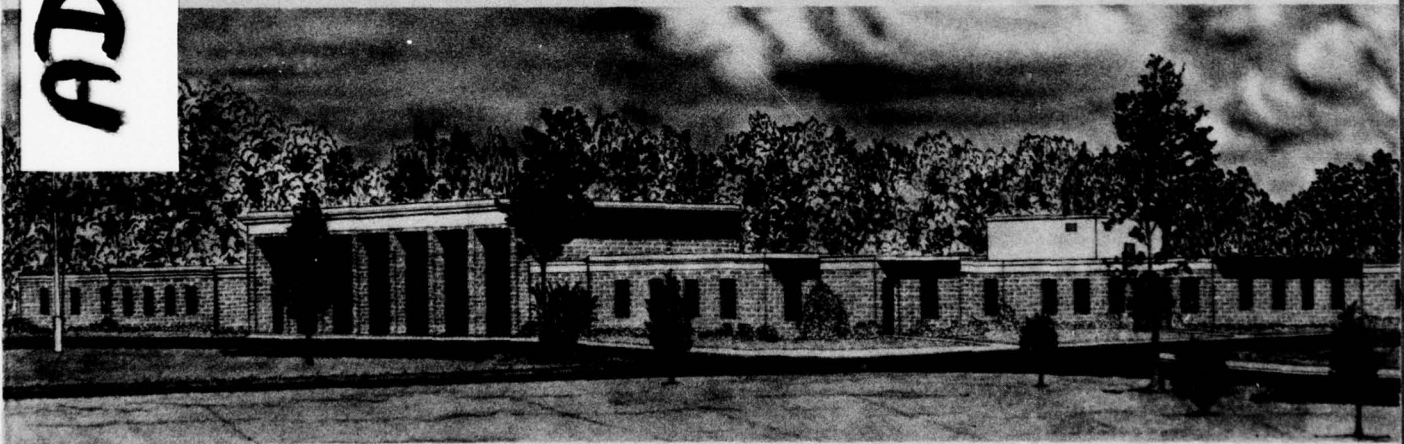
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U. S. Army Engineer Waterways Experiment Station  
P. O. Box 631, Vicksburg, Miss. 39180

August 1974

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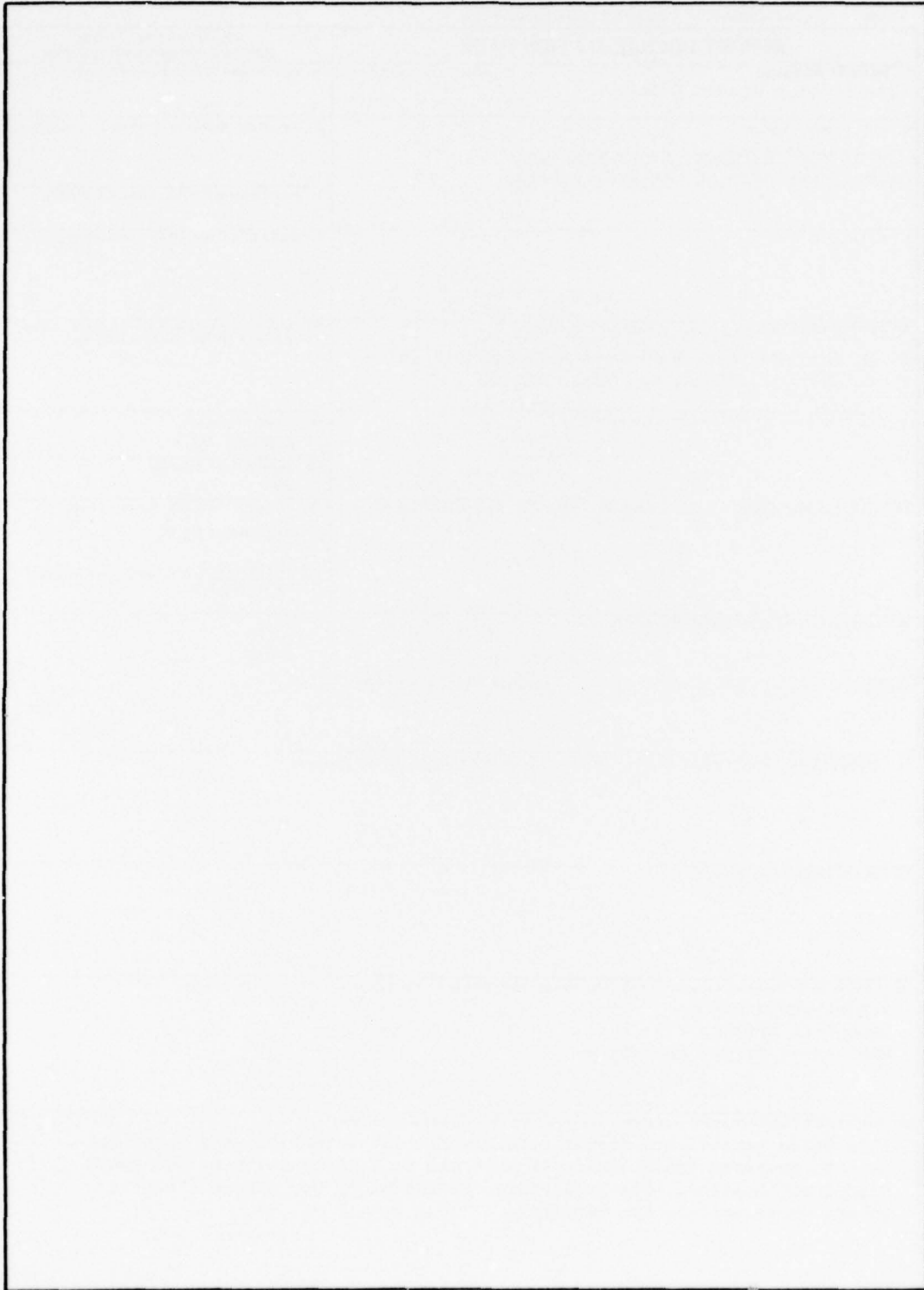
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## PREFACE

This Guide establishes format requirements for scientific and technical reports prepared under contracts with the U. S. Army Engineer Waterways Experiment Station (WES). Its provisions are mandatory for contractor reports except where options are permitted.

Much of the information in Part I of the Guide was taken from "Repro Copy Requirements for Technical Reports," published in June 1973 by Offices of Research and Development, Federal Highway Administration, Washington, D. C. 20590. The rest of the Guide was taken from "Guide for Preparation of Waterways Experiment Station Technical-Information Reports," Instruction Report O-74-1, published in 1974 by WES.

This Guide was compiled by Mrs. Dorothy P. Booth, WES Environmental Effects Laboratory, with assistance from the WES Publications and Graphic Arts Division. Director and Technical Director of WES during the compilation and publication of this Guide were COL G. H. Hilt, CE, and Mr. F. R. Brown, respectively.

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GUIDE FOR PREPARATION OF  
WATERWAYS EXPERIMENT STATION  
CONTRACT REPORTS

PART I: REPRODUCIBLE COPY REQUIREMENTS FOR FINAL  
CONTRACT TECHNICAL REPORTS

Introduction

Purpose and scope

1. This Guide establishes format requirements for technical research reports prepared as fulfillments of contracts with the U. S. Army Engineer Waterways Experiment Station (WES). These requirements are consistent with the provisions of WES Instruction Report 0-74-1, amplifying some of them where necessary and specifying preferred choices where options are provided.

Definitions

2. The following definitions include the requirements regarding each item.

- a. Reproducible copy (or repro copy) constitutes original camera-ready copy (or equivalent) suitable for offset reproduction. Specific acceptable forms and standards of quality are described in paragraphs 6, 7, and 12-16, for text; paragraphs 8 and 19-21 for illustrations; and paragraphs 26-29 for tables.
- b. Front matter includes title page (Form DD 1473); disclaimer; preface; summary; table of contents; list of figures and tables; table of factors for converting U. S. customary units of measurement to metric (SI) units; and other introductory matter not part of the body of the report.
- c. Appended material includes list of references, bibliographies, and appendixes.
- d. Originals are the papers bearing the markings actually made by the typewriter or by the draftsman's pen. For illustration artwork, unscreened photographic prints that preserve the sharpness, contrast, and other characteristics of the negatives or the originals from which they were made are equivalent to originals.
- e. Reproductions are copies made by photography, xerography, diazo processes, printing, or duplication. For the

acceptability of reproduced material in repro copy see paragraphs 16 and 17.

- f. A turn page or broadmeasure page is one in which a table or illustration is of such proportion that it is best set up to read parallel to the spine of the book. The table title and figure caption or legend must be turned to parallel the table or illustration. The page number remains in the conventional location and is not turned. (Further instructions on tables and illustrations appear in paragraphs 19-29 of this document.)
- g. The term volume designates an individually bound book. Most reports can be accommodated in one volume each. Generally, when a report exceeds 400 pages of repro copy (including illustrations, tables, appendixes, and front matter), it should be divided into two or more volumes, each to be designated by a volume number (Vol I, Vol II, etc.) as part of the subtitle.

Division into volumes should avoid splitting the main parts of the report. For example, if the body of the report requires one volume, then the appendixes can be grouped in a second volume. Exceptionally long reports may require that each appendix, or each of several groups of appendixes, be of one volume, or that individual parts or groups of parts each be of one volume. Avoid, if possible, splitting an appendix or part between volumes. So far as feasible, avoid splitting long reports into volumes of vastly disproportionate size. For example, it is better to divide a 450-page report into two volumes of approximately equal size, or even into a 150-page volume and a 300-page volume, than to divide it into one of 400 pages and one of 50 pages.

Tables of contents, lists of figures, and lists of tables in multivolume reports should, if feasible, include in each volume the contents of all volumes. Where individual volumes are produced consecutively and the detailed contents and pagination of later volumes are not known when the earlier ones are prepared, the later ones should cumulate this information so far as it is available. When the entire series of volumes is completed, it is recommended that the table of contents, etc., for the entire series be printed as an erratum or addendum to Vol I, if that volume has already been printed.

Do not designate individual volumes of multivolume reports as "section," "part," "chapter," or other kinds of subdivision. Even if the volume contains but one part or one appendix, it is still to be designated as a volume.

For treatment of pagination and front matter of multivolume reports, see paragraphs 10 and 11 of this document.

## Format and Physical Characteristics

### Dimensions

3. Standard trimmed size for WES technical reports is 8 in. horizontal by 10-1/2 in. vertical. Repro copy may be submitted on commercial standard size paper (8-1/2 by 11 in.) or on somewhat larger stock, but it will be printed on the 8 by 10-1/2-in. standard Government-size stock. To provide for adequate margins, the typed matter must not exceed 6 by 9 in., including page numbers and running heads. These maxima apply to all pages, regardless of content. (See Figure 1.)

4. As already noted, repro copy can be submitted on paper larger than 8 by 10-1/2 in., but all pages must be submitted on stock of same size.

5. Foldout pages are permitted if necessary, but are not desirable. Special arrangements for them must be made by the Contracting Officer's Representative. (Facing-page spreads may be used, but proper instruction to the printer must be furnished to ensure accurate registration.)

### Physical form

6. A repro copy shall be made for every numbered page in the report, and will contain text, figure and table captions, running heads, if any, and page numbers. Illustrations and tables to be reproduced in the original size will appear in place on the page. Others will be submitted separately, keyed by number to the proper page, and with the required photographic reduction noted thereon.

7. The preferred physical form for repro copy is substantial, opaque, clear, white litho-coated or matte-finish paper\* with the image material (text or line-type illustration) in opaque, clean-outlined black, on one side of the paper only. Since WES technical publications are generally restricted to black-and-white reproduction, originals in color are acceptable only to the extent that they can unquestionably be reproduced satisfactorily in black and white. If color reproduction

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\* The paper must not carry the name of the contractor.

First line of type of text or title or margin of illustration.

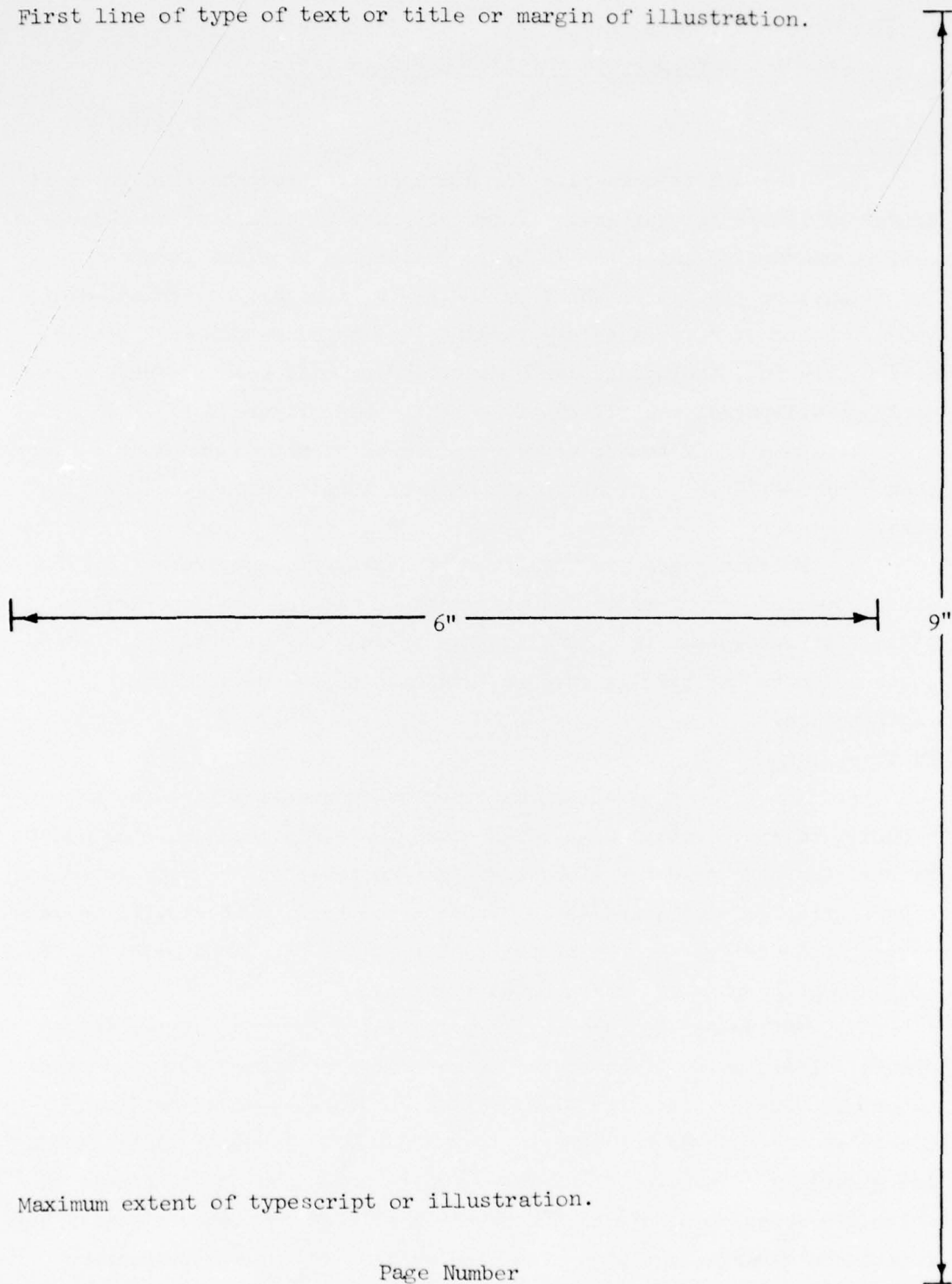


Figure 1. Recommended average dimensions for text page

is absolutely essential, special approval for it must be requested from the Contracting Officer's Representative. Notations, guidelines, instructions to the printer, and other auxiliary matter on the copy which are not to be printed must be in nonreproducible blue.

8. Black-and-white glossy photographs adequately cemented to the paper are acceptable. They should be at least 4 in. square in size. A duplicate set of the glossy prints, unmounted but adequately identified to match those mounted, will also be required.

9. An acceptable alternative to the above is negatives mounted, ready for platemaking. If the contractor uses this alternative, all pages must be submitted in this form. This acceptable form of repro cannot be combined with others. The contractor must also submit a set of positive (black-on-white) prints made from the mounted negatives.

#### Pagination

10. Except for title page and covers, all pages in the report must be numbered. Unless the report has been designated for loose-leaf format, the following number series will be used:

- a. Consecutive Arabic numbers for text, list of references, tables, photographs, and plates.
- b. Alphanumeric combinations for appendixes. For example, in Appendix A, the pagination would be A1, A2, and so on.

On every page, the number must appear centered in the bottom of the text page, next to the bottom margin. DD Form 1473, Report Documentation Page (title page, front and back), is always considered to be pages i and ii, but is not numbered. Hence the front matter following the title page is always page 1. Page 1 of the body of the report must always be numbered. Sections may begin on even- or odd-numbered pages. In multivolume reports, pagination starts anew with each volume.

11. Loose-leaf format is not acceptable unless justified by the report's special requirements or functions (for example, the report's function as a manual or operating document subject to constant change over a prolonged period, and with strictly controlled circulation). Loose-leaf format must be approved by the Contracting Officer's Representative.

## Text Requirements

### Method of production

12. Text matter may be either typeset ("hot" or "cold") or typed using typewriters that can produce copy acceptable as regards uniformity, color, neatness, and legibility. No objective standards regarding these attributes can be presented here. However, in general, electric typewriters equipped with plastic or paper carbon-coated ribbon are capable of producing acceptable copy. Typewriters using fabric (reusable) ribbon can make usable copy only if the ribbon is properly inked and not too worn; the impressions are uniform, as is true of electric typewriters in good adjustment; and the striking faces of the keys are kept clean. However, constant vigilance is required. As for manually operated typewriters, acceptable copy is possible, but variability is likely to be too great.

13. Copy produced by computer-controlled typewriters or high-speed printers is acceptable provided it is equivalent in appearance to that produced by typewriters equipped with carbon-coated ribbon. Copy produced by computer-controlled machines equipped with fabric ribbons usually is not satisfactory for offset printing.

14. Corrections made in "cold" composition or typed repro copy must not compromise the quality of the final printed product. Corrections made with white opaquing fluid are not acceptable because of the fluid's unreliable opacity. Careful erasure, patching, and correction are less risky in this respect. Corrections made on machines equipped with inked fabric ribbons are particularly vulnerable to color changes caused by ribbon wear.

15. Variations in color that will cause noticeable discrepancies in the final printing are not acceptable.

16. Reproductions may be used for text matter reproducibles only when of high enough quality to make the final printing essentially indistinguishable from copy produced as described earlier in this section. Reproduced material used in this way must be sharply outlined, well colored and contrasted, without flaws, breaks, dim patches, stains, or

spots, and close enough in color to original material in the reproducible to make the final product uniform in appearance. The responsibility for approving the use of reproduced material in this way rests with the Contracting Officer's Representative.

17. Translucent prints (such as VanDykes) intended for diazo reproduction are not acceptable as offset repro copy.

Copyrighted material

18. If the report contains copyrighted material, the contractor is responsible for identifying it, including a footnote giving credit to the copyright owner, and obtaining documentation of the owner's permission for its use. The documentation must be submitted to the Contracting Officer's Representative.

Illustrations and Tables

Illustrations

19. Photographs and line drawings may be numbered in order of mention and appear as figures within the text if they are considered necessary to interpretation of the text; otherwise they will be placed at the end of the report and referred to as photos and plates, respectively, with separate sequences of numbers. The same rules apply to illustrations for appendixes; alphanumeric identification will be used that is composed of the appendix identification letter plus consecutive numbers (Figure A1, A2, Photo A1, A2, Plate A1, A2, etc.).

20. Artwork must consist of original work (including original as distinguished from screened photographs). While xerography may be used in preparation of the artwork, using a xerographic print or a printed clipping in place of prepared original artwork will require special permission from the Contracting Officer's Representative.

21. Translucent prints intended for diazo reproduction are not acceptable for offset printing. However, this restriction does not apply to original drawings on vellum. Paragraphs 6-9 prescribe the physical presentation of both tables and figures.

22. Every illustration must have at least one text reference

which calls it out by number. Every illustration must have a legend or caption. An example of a figure caption with appropriate capitalization and punctuation appears below:

Figure 43. Functioning of discombobulator in  
first phase (schematic)

Note that the figure type appears in parentheses at the end of the caption. While not essential, this is a desirable feature and should be applied where appropriate.

23. The caption as printed is always centered below the figure. (It will be located within the boundary of a plate.) The caption for every figure must be within the text page area, never in the margin. It must appear at the bottom of the figure, and will therefore be parallel to the lines of the text where the figure is upright. If the figure is parallel to the binding of the report (turn page), the top of the figure will be to the left of a reader holding the report in normal reading attitude (binding vertical). The caption will then be to the reader's right (bottom of the picture) parallel to the binding.

24. Illustrations (with captions) may appear on the same page with text, except on turn pages. The caption must never be so displayed as to be confused with text. Spacing and type style or size can be employed to prevent this confusion. However, in the report as printed, captions must be in the same size and style for all illustrations.

25. The contractor is responsible for ensuring that copyrighted illustration material is properly credited, and that documents granting permission to use the material have been submitted to the Contracting Officer's Representative. Credits may be treated as part of the caption or as footnotes.

#### Tables

26. Tables must fit into the type page dimensions described earlier. Tables may be photographically reduced from larger originals; however, the reduced type must be legible.

27. Every table must have a centered number and caption or title,

set up at the top of the table, as shown below:

Table 29  
Discombobulator Output Variability With  
Changes in Ambient Temperature

28. When a table occupies more than one page, each succeeding page must be captioned with the table number and the word "continued" in parentheses (but without quotation marks) following the table number. The final page will be the same except that the word "concluded" will be used rather than "continued."

29. The requirements applying to figure numbers apply also to table numbers. The requirements on copyrighted material also apply. Other requirements for table captions are similar to those for figure captions.

## PART II: FORMAT AND STYLE

### Components of Reports

30. The principal components of a WES contract report (though some reports may not contain all of them) are:

- a. The cover.\*
- b. DD Form 1473 (Figure 2).\*
- c. Preliminaries.
- d. Main text or body of the report.
- e. References and/or bibliography.
- f. Tables and illustrations.
- g. Appendixes.
- h. Index.
- i. Facsimile of library catalog card.\*

### Preliminaries

#### Order

31. The preliminary pages or sections usually included in WES contract reports will be arranged in the following order. Those that are optional and those that are mandatory are so indicated.

- a. Notice concerning use of trade names and manufacturers (mandatory when trade names or manufacturers are cited in report).
  - b. Summary (mandatory).
  - c. Preface (mandatory).
  - d. Table of contents (mandatory).
  - e. List of tables
  - f. List of illustrations
- ( Necessary only when numerous  
Tables and/or illustrations  
(termed "Figures") are integrated  
in text; otherwise only total  
number of Tables; Photos, and  
Plates need be shown in contents.

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\* Prepared by WES. Contractor must provide brief abstract of about 250 words to be used on DD Form 1473.

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Figure 2. Report Documentation Page, DD Form 1473 (front)

- g. Table of factors for converting U. S. customary units of measurement to metric (SI) units (mandatory in most cases; see paragraph 36).
- h. Key (sometimes mandatory, sometimes optional, as explained in paragraph 37).

#### Content

32. Trade names notice. WES contract reports will not contain material that may be construed as advertising or that implies that the Government endorses or favors a product or service manufactured or provided by a specific supplier. If it is essential that trade names or names of manufacturers of materials or equipment be given (under the assumption that certain parts of the report are meaningless without them, or that a description included to avoid use of the trade name would be excessively long and involved), such reports will contain a page saying:

THE CONTENTS OF THIS REPORT ARE NOT TO BE  
USED FOR ADVERTISING, PUBLICATION, OR  
PROMOTIONAL PURPOSES. CITATION OF TRADE  
NAMES DOES NOT CONSTITUTE AN OFFICIAL EN-  
DORSEMENT OR APPROVAL OF THE USE OF SUCH  
COMMERCIAL PRODUCTS.

33. Executive summary. An executive summary will be included to give more information on the content of the report than can be presented in the abstract entered on the DD Form 1473. The summary is prepared primarily for the benefit of busy executives or for reference workers. It should be an informative synopsis of the main body of the report, not merely a statement of the results and conclusions, nor a listing of what the report contains. It should describe in a brief, coherent form why the work was done (the problem); the specific purpose or objective of the study; the scope of the work if pertinent; what was done (test methods or investigational means used); and what was learned (results and conclusions). Recommendations may also be included if important enough or if the author wishes to bring them to the attention of sponsoring officials who may read only the summary. The summary must be self-sufficient in order to serve its purpose. It necessarily repeats information from the body of the report, but it should never contain

information not given in the body of the report.

34. Preface. The Preface should be used to eliminate from the main text and group in one section all matters that must appear in the report but are irrelevant to and would detract from the technical text. It will include such information as authorization, pertinent dates, names of WES and other personnel who actually participated in or made a technical contribution to the investigation or report, the author(s), WES supervisory personnel, and any items required for record or acknowledgment purposes. If copyrighted material has been quoted or reproduced, the Preface will include a statement that permission to use the material has been obtained.

35. Table of contents and lists of tables and illustrations. The table of contents will contain the exact titles and page numbers of all the preliminary sections, and all Part (or Chapter) titles and primary headings in the main report and in the appendixes. If the report is so short that it is not divided into Parts, the table of contents will contain the exact titles and page numbers of the center headings and side headings. If lists of tables and/or illustrations are used, they will be arranged in numerical order and the primary titles and page numbers of the tables and figures will be given. (If a figure has a long descriptive title, only the first sentence will be given.)

36. Conversion factors table. All WES contract reports in which U. S. customary units of measure are used must contain some means of converting them to the metric (SI) system. If the report is short and/or the number of U. S. units few, metric (SI) equivalents can be given in parentheses immediately after the U. S. unit. Otherwise, a conversion factors table will be used (see Figure 3). Conversion factors shall be taken from ASTM Designation: E 380-72, Metric Practice Guide, issued in June 1972.

37. Key. When a contract report describes tests or evaluations of specific materials or types of equipment, the author may want to be very restrictive in regard to the use of trade names or names of the manufacturers. In such cases, the materials or equipment will be referred to in the text as "Product A," "Sample RCD-1," etc., and the

CONVERSION FACTORS, U. S. CUSTOMARY TO METRIC (SI)  
UNITS OF MEASUREMENT

U. S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	By	To Obtain
inches	0.0254	meters
pounds (mass)	0.4535924	kilograms
pounds (force) per square inch	6894.757	pascals
feet per second	0.3048	meters per second

Figure 3. Example of conversion factors table

designations will be defined in a Key (i.e., a page listing designations of products and/or equipment that should not be mentioned by name in the text). For the final report, the Key will be printed on red paper; it will not be bound in the report but will be hand-inserted by WES Technical Information Center (TIC) personnel in copies of the report going to persons qualified to receive the Key. The Contracting Officer's Representative will notify TIC which recipients should receive the Key. For identification purposes, the Key will bear the report number and title centered at the top of the page. Sometimes an author at his option may use a Key just for the sake of simplicity or brevity. In such cases, it will not be printed separately on red paper, but will be bound in the report just before the main text.

Main Text or Body of Contract Report

38. The body of the contract report will normally have the following major subdivisions:

- a. An introductory section.
- b. For an experimental study, a description of the test apparatus, materials, and procedures.
- c. A discussion or description of what was done, and the information or results obtained.
- d. An analysis or interpretation of the results or findings.
- e. Conclusions and recommendations.

### Introductory section

39. The introductory section usually contains background information that the reader needs to understand the rest of the report. It may include: (a) the problem that gave rise to the investigation being reported; (b) the history or theory behind the investigation; (c) mention of other reports or investigations on the subject; (d) the specific purpose or purposes of the investigation; (e) the scope of the investigation; (f) the reason for selecting the method of investigation; (g) definitions of specialized terms; and (h) description of the plan and content of the remainder of the report (this is usually necessary only when the report is rather long and complicated).

### Description of study

40. When writing the description of the test equipment and materials and the narrative of tests and results, the writer should ensure that these sections are developed in a logical manner, that emphasis is properly placed, and that the material is so arranged that all needless repetition is avoided. If the author knows who his audience will be, he may be able to eliminate details with which they are probably familiar. For example, instruments, equipment, or processes that are very likely known to the majority of readers need not be described; sometimes a footnote telling where a description of them can be found is helpful.

41. The information or results obtained may be presented either along with the various test or investigatory phases or in a separate section following the narrative of each major phase. If a separate section is used, the writer should be careful to avoid repetition of the description of the tests. In a long report involving many tests or phases, a summary of all results may be useful in reviewing and emphasizing the most important findings for the reader.

### Analysis

42. A separate section should be devoted to the analysis or interpretation of results in order to provide a clear and logical approach to the conclusions. However, in a short report, the results or findings may be analyzed or interpreted as they are introduced, thus eliminating the need for a separate section.

### Conclusions and recommendations

43. In writing the conclusions, the author should bear in mind the purposes of the investigation to ensure that they have all been covered in some way, even if negatively. Besides specific conclusions, a discussion of additional work needed to expand the knowledge obtained in the investigation may be included in this section.

44. Sometimes it is better to submit recommendations separately, since when they are presented with the conclusions they tend to limit application of the conclusions to one specific problem, whereas the findings may be useful in solving other types of problems. In some cases, very general recommendations for application of the findings may be made, and an example of such an application included.

### References to Source Material

NOTE: The following system of presenting bibliographic information will be used except in special cases as determined by the Contracting Officer's Representative. He may elect to specify the alternate system described in paragraphs 45A and 46A. If the Contracting Officer's Representative desires the alternate system to be used, he will specifically notify the contractor; otherwise, the system described in paragraphs 45 and 46 will apply.

45. If not more than four literature references are cited in the body of the report, the citations will be included as footnotes keyed to the appropriate portion of the text. If five or more citations are used, they will be grouped in a "References" section at the end of the main text and listed in the order cited. The text will include key numbers (superscript numerals) corresponding to the entry numbers. If it is desired to list pertinent literature that is not referred to in the text, such a list will be labeled "Bibliography," and the entries will be listed alphabetically according to the surname of the author. A combination of two of the methods of citing references may be used. For example, a combination may involve the use of footnotes for three cited references together with a Bibliography. Or a References section may be used in conjunction with a Bibliography.

46. The References or Bibliography should contain only documents that are unclassified, available on loan, and bound in some form. They should not contain references to correspondence or interoffice or intra-office memoranda that are not suitable for loan. If the author wishes to acknowledge unclassified material not suitable for loan, he may do so in the Preface of the report or in footnotes.

#### Alternate System of References to Source Material

45A. If not more than four literature references are cited in the body of the report, the citations will be included as footnotes keyed to the appropriate portion of the text. If five or more citations are used, they will be grouped in a "Literature Cited" section at the end of the main text and listed in alphabetical order by authors' surnames. The text will include the surname of the author(s) and the date of publication enclosed in parentheses. All authors should be included in the listing of references; in the text, if there are three or more authors, give only the first author's surname plus "et al."\* If it is desired to list pertinent literature that is not referred to in the text, such a list will be labeled "Bibliography," and the entries will be listed alphabetically according to the surname of the author. A combination of two of the methods of citing references may be used. For example, a combination may involve the use of footnotes for three cited references together with a Bibliography. Or a Literature Cited section may be used in conjunction with a Bibliography.

46A. The Literature Cited or Bibliography should contain only documents that are unclassified, available on loan, and bound in some form. They should not contain references to correspondence or interoffice or intraoffice memoranda that are not suitable for loan. If the author wishes to acknowledge unclassified material not suitable for loan, he may do so in the Preface of the report or in footnotes. Personal

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\* Examples of in-text citations: (Smith 1961); (Jones et al. 1964); (Brown and Doe 1969); and (Adams 1958, Smith 1961).

communications should be referenced in text only; e.g. (Personal Communication, 17 May 1964, Jean Hunt, Wildlife Biologist, So. Ill. Univ., Carbondale).

### Tables and Illustrations

#### Tables

47. Tables are generally the best means of presenting numerical data. However, long tabulations in the body of a report detract from its readability. Two means of avoiding long tables while still utilizing the effectiveness of tabular presentations are: (a) place excerpts from long tables in the text, and group the complete tabulations at the end of the report; and (b) break the long tables up into several short tabulations that can easily be inserted in appropriate locations in the text.

#### Illustrations

48. Only those drawings or photos that illustrate the main points or features of a study should be presented. The remainder of the data recorded in graphic, photographic, or computer-printed form can be placed in a separate appendix that might be reproduced in only a few copies.

### Appendixes

49. Appendixes may be (a) bound with the main report, (b) issued separately but simultaneously with the main report either in equal numbers or in a limited edition, or (c) published later to add supplementary information acquired after the main report was issued. Some of the types of material that may be included in appendixes issued simultaneously with the main report are:

- a. Illustrations or tables not necessary to an understanding of the main report, or which have been abstracted in the body of the report.
- b. Detailed descriptions of methods or apparatus.
- c. Descriptions of rejected methods or tests that should be included for record purposes.
- d. Theoretical analyses and mathematical derivations that

are used in but need not be explained in the body of the report.

- e. Samples of forms, data sheets, etc.
- f. Sample calculations.
- g. Plans or recommendations for future action.

#### Notation

50. A Notation is a system of characters, symbols, or abbreviations used to express technical facts or quantities (e.g., A = area,  $\gamma$  = density, GZ = ground zero). If symbols and/or unusual abbreviations are numerous, they will be listed alphabetically and defined in a Notation. For ease of reference, the Notation will be the last appendix in a report. Even though symbols and abbreviations are defined in the Notation, they should also be defined when first mentioned in the main text of the report but not thereafter. Also, at the first mention of the first symbol or abbreviation that will be included in the Notation, the following footnote should be added: "For convenience, symbols and unusual abbreviations are listed and defined in the Notation (Appendix \_\_)."

#### Index

51. In an extremely long or involved report, an alphabetical index may be included for ease of reference. The index should be as complete as the nature of the report and its probable usage require.

#### Format for Preliminaries and Main Text

##### Page numbering

52. The first right-hand page after the cover in each WES contract report will be a completed DD Form 1473, Report Documentation Page. It will not bear a page number. All preliminary pages and main text pages will be numbered consecutively at the bottom center in Arabic numerals. Odd-numbered pages will be right-hand pages and even-numbered pages will be left-hand pages. Both sides of the page will be used to the maximum extent practical.

53. The pages used for illustrations or tables within the text are numbered if the illustration or table does not occupy the entire area (6 by 9 in.) available for printed or typed matter. If there is no space for the page number, it is omitted but the page is counted. When tables or illustrations follow the main text in a group, there is no necessity for a page number.

#### Paragraph numbering

54. Paragraphs of the main text will be numbered consecutively with Arabic numerals. Paragraphs of the Preface and Summary are not numbered. Subparagraphs are not numbered, but instead are preceded by an underlined lowercase letter followed by a period.

#### Headings

55. The use of headings is helpful to the author by affording him a framework for his text, and to the reader by signifying a change in subject. However, headings must be descriptive to be of any value; such uninformative words as "General" or "Discussion" should not be used alone as headings. Too many headings may detract from the text, making it choppy and repetitious rather than a smooth narrative. Authors are cautioned to be consistent in the use of headings, and to be sure that headings of the proper weight are used for the various sections of the report.

#### Tables

56. All tables, except brief listings or descriptive tabulations incorporated in the text, will be numbered (Arabic) and given a descriptive title for convenient reference. Generally, they are grouped at the end of the text. The brief tabulations mentioned above are not numbered, do not have an overall title, and are generally referred to only once whereas numbered tables may be referred to several times in the course of the report.

57. Each column in a table must have a heading; if no common heading for all the items in a column is possible, the table should be broken up into several tables or several subdivisions that will permit the use of headings. Units of measurement should be shown in the column headings.

### Illustrations

58. Three types of illustrations are used in WES contract reports: figures, photos, and plates. Figures are incorporated in the text and generally consist of such items as vicinity maps, photographic or schematic illustrations of special pieces of equipment, photographic illustrations of test procedures, etc. Photos are grouped at the end of the text and generally illustrate test data or results such as flow conditions at various discharges, condition of test lane after various amounts of traffic, etc. Plates are line drawings that are grouped at the end of the text and generally consist of diagrams of the model layout or test section, plots of test results, etc.

59. Because drawings often make up a major part of a report, considerable care should be taken in their preparation. The author should make the drawing titles concise, specific, and informative (though not complete statements). He should see that the title of each drawing is distinctive (i.e. no two drawings should have exactly the same title). The author should combine several plots or curves on one plate if possible; this is not only more economical but also permits better comparison of data.

60. Standard-size drawings and lettering should be used throughout the report. In the interest of economy, every effort should be made to ensure that drawings are page size or less. If this is not possible, folded sheets may be used. A separate volume is sometimes the most convenient method of handling a large number of oversize drawings.

### Entries in list of references to source material

NOTE: The following system of presenting bibliographic information will be used except in special cases as determined by the Contracting Officer's Representative. He may elect to specify the alternate system described in paragraph 61A. If the Contracting Officer's Representative desires the alternate system to be used, he will specifically notify the contractor; otherwise, the system described in paragraph 61 will apply.

61. Entries in the References will be listed in the order in which they are cited in the text. Entries in the Bibliography will be listed alphabetically by surname of author. Essential information to

be included for each entry and the manner in which it is to be arranged are as follows:\*

- a. Articles. Bibliographical references to articles published in periodicals will be arranged as follows:
  - (1) Name of author(s) with surname preceding initials, followed by a comma. (If more than three authors, give only the first author's name plus "et al.")
  - (2) Title of article, in quotes, with all principal words capitalized, followed by a comma.
  - (3) Title of publication, underlined, with all principal words capitalized, followed by a comma.
  - (4) Volume number preceded by the word "Vol," and followed by a comma.
  - (5) Issue number (if any) preceded by the word "No.," and followed by a comma.
  - (6) Month (abbreviated) and year of publication, followed by a comma.
  - (7) Inclusive page numbers preceded by the abbreviation "p" or "pp," as applicable, followed by a period.
- b. Books. Bibliographical references to books will be arranged as follows:
  - (1) Name of author(s) with surname preceding initials, followed by a comma. (If more than three authors, give only the first author's name plus "et al.")
  - (2) Chapter title, if applicable, in quotes, with all principal words capitalized, followed by a comma.
  - (3) Book title, underscored, with all principal words capitalized, followed by a comma.
  - (4) Edition number if necessary (e.g. "1st ed."), followed by a comma.
  - (5) Volume number if necessary, preceded by the word "Vol," and followed by a comma.
  - (6) Name of publisher in shortened form (e.g. "Macmillan," not "The Macmillan Company"), followed by a comma.
  - (7) Publisher's location (city only, or city and state, if necessary), followed by a comma.
  - (8) Year of publication, followed by a comma.
  - (9) Inclusive page numbers (e.g. pp 6-10), if applicable, followed by a period.
- c. Technical reports, pamphlets, etc. Bibliographical references to technical reports, pamphlets, etc., will be arranged as follows:
  - (1) Name of author(s) with surname preceding initials, followed by a comma. (If more than three authors, give only the first author's name plus "et al.")
  - (2) Title of report or pamphlet, in quotes, with the principal words capitalized, followed by a comma.
  - (3) Designation and/or number of report or pamphlet, followed by a comma.
  - (4) Month (abbreviated) and year of publication, followed by a comma.
  - (5) Name of publisher, followed by a comma; if the publisher is the same as the author it is not necessary to repeat the name.
  - (6) City and state in which the volume was published, followed by a period.
- d. Transactions or Proceedings. Bibliographical references to transactions or proceedings will be arranged as follows:
  - (1) Name of author(s) with surname preceding initials, followed by a comma. (If more than three authors, give only the first author's name plus "et al.")
  - (2) Title of article, in quotes, with all principal words capitalized, followed by a comma.

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\* This style is based on "Recommended Practice for Style of References in Engineering Publications," Committee of Engineering Society Editors, Engineers Joint Council, New York, 15 Dec 1966.

- (3) Identification (underlined) of the Transactions or Proceedings (e.g. Proceedings of the Symposium on Interaction Between Fluids and Particles), followed by a comma.
- (4) Name of the society (spelled out in full), followed by a comma.
- (5) Volume number preceded by the word "Vol," and followed by a comma.
- (6) Year of publication, followed by a comma.
- (7) Inclusive page numbers preceded by the abbreviation "p" or "pp," as applicable, followed by a period.

Alternate system of entries in  
list of references to source material

61A. Entries in Literature Cited will be listed in alphabetical order by authors' surnames. Essential information to be included for each entry and the manner in which it is to be arranged are as follows:\*

- a. Articles. Bibliographical references to articles published in periodicals will be arranged as follows:
  - (1) Name of author(s) with surname preceding initials, followed by a period.
  - (2) Year of publication, followed by a period.
  - (3) Title of article, capitalize only the first word and proper nouns and adjectives, followed by a period.
  - (4) Title of publication, abbreviated in accordance with CBE, followed by a period.
  - (5) Volume number, issue number in parentheses, colon, inclusive page numbers of article, followed by a period.
- b. Books. Bibliographical references to books will be arranged as follows:
  - (1) Name of author(s) with surname preceding initials, followed by a period.
  - (2) Year of publication, followed by a period.
  - (3) Chapter title, if applicable, in quotes, with all principal words capitalized, followed by a comma, and book title, with first word capitalized, followed by a period.
  - (4) Edition number if necessary (e.g., "1st ed."), followed by a comma. Volume number if necessary, followed by a period.
  - (5) Name of publisher in shortened form, followed by a comma. Publisher's location (city only, or city and state, if necessary), followed by a period.
  - (6) Inclusive page numbers (e.g., pp 6-10 or 384 pp), followed by a period.
- c. Technical reports, pamphlets, etc. Bibliographical references to technical reports, pamphlets, etc., will be arranged as follows:
  - (1) Name of author(s) with surname preceding initials, followed by a period.
  - (2) Year of publication, followed by a period.
  - (3) Title of report or pamphlet, with first word capitalized, followed by a comma. Designation and/or number of report or pamphlet, followed by a period.
  - (4) Name of publisher, followed by a comma. City and state in which the volume was published, followed by a period.

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\* This style is based on CBE Style Manual, 3rd ed., 1972, prepared by the Committee on Form and Style of the Council of Biology Editors, published by the American Institute of Biological Sciences, Washington, D. C., 297 pp.

### Format for Appendixes

62. Appendixes in WES contract reports will be designated by capital letters (Appendix A, Appendix B, etc.). Each appendix will have its own page numbering system, being differentiated from like-numbered pages in the main text by the use of a prefix letter corresponding to the letter designation of the appendix. For example, the first page of Appendix A will be numbered A1.

63. Paragraphs in appendixes will be numbered consecutively with Arabic numerals, i.e., the first paragraph in each appendix will be numbered "1." Subparagraphs will be identified by an underlined lowercase letter followed by a period.

64. Headings in appendixes will be in accordance with the procedures described for the main text.

65. Tables and illustrations (figures, photos, and plates) in appendixes will be numbered serially with Arabic numerals preceded by the letter designation of the appendix (for example, Table A1, Figure A1, etc.). Generally, requirements for main text tables and illustrations are also applicable to appendix tables, tabulations, and illustrations.

NOTE: The following system of presenting bibliographic information will be used except in special cases as determined by the Contracting Officer's Representative. He may elect to specify the alternate system described in paragraph 66A. If the Contracting Officer's Representative desires the alternate system to be used, he will specifically notify the contractor; otherwise, the system described in paragraph 66 will apply.

66. References in the appendixes will be added (in the order cited in the appendix) to the References at the end of the main text, beginning with the next entry number after the last entry of the main text. The first reference citation in each appendix should be footnoted with an explanation of where the References section is located.

66A. References in the appendixes will be included in the Literature Cited section at the end of the main text (inserted in the listing in alphabetical order). The text of the appendix will include the surname of the author(s) and the date of publication enclosed in

parentheses. The first citation in each appendix should be footnoted with an explanation of where the Literature Cited section is located.

## Style

### Spelling

67. Webster's Third New International Dictionary, Unabridged, will be used as the primary authority in matters of spelling and hyphenation of words. When equal variants of spelling are given, one will be used consistently in the same report. The Government Printing Office Style Manual also contains excellent sections on spelling and compound words.

### Capitalization

68. The generally accepted rules of capitalization, summarized in Webster's Unabridged, will be followed. Special uses of capitals in WES reports are as follows:

- a. All capitals. Part titles, abbreviated forms of proper names (e.g. DNA, OCE, AMC, WES, etc.).
- b. Initial capitals. Major words of center headings, major words of titles, subtitles, and column headings of tables, trade names, military project or operation names, and the words "Appendix" and "Part" when followed by a letter or number. (Note that words "Figure," "Table," "Photo," and "Plate" are all capitalized when followed by a number.)

### Punctuation

69. Discussion of the rules for punctuation is beyond the scope of this Guide. Authors should consult good standard works.

### Abbreviations and symbols

70. The basic philosophy in the use of abbreviations and symbols in a report is to gain conciseness--but never to impose a hardship in understanding on the reader. Essentially three types of shortened word forms are acceptable: units of measure, agency names, and symbols.

### Numerals

71. Spell out all numbers from one through nine (except in tables or lists), with the following exceptions:

- a. Use numerals when the quantity is partly fractional, such as "1.15," "1-1/2 in." (note the hyphen in the second expression). However, fractions standing alone (with no whole number) are usually spelled out, such as "three-fourths of the dam," "half a mile" or "a half mile."
- b. Use numerals with units of measure, such as "2 by 4 in.," "5 psi," etc.
- c. In contrasted statements, if some numbers must be numerals, use numerals for all, such as "2 miles and 16 miles."
- d. In a series of connected numerical statements implying precision, use numerals, such as "2 years 5 months 3 days." The use of numerals (especially the "1") is not recommended for numbers occurring in precise statements similar to the following: "by connecting the two test coils"; "one testing machine."
- e. Use numerals after certain abbreviations that are not units of measure, such as "Vol V," "sta 1."
- f. Use numerals in proportions, such as "a ratio of 1 to 5" or "a 1:10 scale."

72. Use numerals for all numbers of 10 or higher, with the following exceptions:

- a. Do not begin a sentence with a numeral.
- b. Spell out round numbers used in an indefinite sense unless accompanied by some such label as "about" or "approximately," as "a hundred feet or so," "approximately 100 ft."
- c. Spell out numbers of less than 100 that precede another number, as in the following: "Fifteen 2-in. rods," but "120 8-in. rods."

73. In expressing percentages, precise figures, etc., use decimals; for example, use "4.5 percent, not "4-1/2 percent."

74. In decimal numbers less than unity, place a cipher before the decimal points, such as "0.65"; not ".65 in."

75. Numbers of four figures should not be separated by commas in either text or tabular matter (such as 6418 tons), except when they occur in a column of a table or a paragraph of text containing a number of more than four digits; in these cases the comma is used with the four-digit number for uniformity in that particular column or paragraph.

76. Always use numerals for the time of the day and the day of

the month: such as, "2:30 p.m."; "25 January 1913"; but spell out such phrases as "the first of May," when not referring to specific days.

Spell the numeral when referring to specific days by ordinal number:

"the fifteenth of May."

77. Type fractions "3-1/2" and not "3½."

In accordance with ER 70-2-3, paragraph 6c(1)(b), dated 15 February 1973, a facsimile catalog card in Library of Congress format is reproduced below.

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