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CHAPTER NRC-0234 MICROGRAPHICS MANAGEMENT

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REMARKS:

This chapter and appendix are revised to update the material and to reflect changes which resulted from the recent NRC reorganization.

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ARM

CHAPTER 0234 MICROGRAPHICS MANAGEMENT

0234-01 COVERAGE

This chapter and its appendix describe and establish the policies, guidelines, and procedures for the use of micrographics in the creation, use, storage, retrieval, preservation, and disposition of NRC documentation.

0234-02 OBJECTIVES

021 To assure compliance with all Federal laws, rules and regulations, specifically, 36 CFR 1230 and FIRM 201-45, Micrographics.

022 To maximize availability of NRC documentation of NRC staff.

023 To provide cost effective records management.

024 To assure standardization of microforms and micrographic equipment.

025 To assure the proper preservation of NRC record information.

026 To provide procedures for acquisition and application of micrographics technology.

0234-03 RESPONSIBILITIES

031 The Director, Office of Administration and Resources Management:

- a. Provides functional and funding support for the Micrographics Program.
- b. Delegates to the Director, Division of Information Support Services, program management responsibilities.

032 The Director, Division of Computer and Telecommunications Services:

- a. Approves or disapproves the acquisition and utilization of COM equipment according to FIRM 201.
- b. Delegates the authority for the approval or disapproval of computer equipment used in support of micrographic systems.

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- c. Develops procedures, standards, and guides for the development and operation of computer equipment used in support of micrographic systems.
- d. Operates and maintains computer equipment used in support of micrographic systems except as otherwise determined by the Executive Director for Operations.
- e. Acquires supplies and materials for the operation and maintenance of computer systems related to micrographic systems.

033 Directors, Headquarters Offices and Site Offices, and Regional Administrators:

- a. Assure that NRC staff, contractors, and consultants under their cognizance comply with the policy and procedural requirements set forth in this chapter.
- b. Refer to DISS any system that will require to use of micrographics or impact on the NRC micrographic program.

034 The Director, Division of Security, develops policies and procedures for the protection of microform products containing classified or controlled sensitive unclassified information (e.g., Safeguards Information) and for the microfilming applications used on documents containing such information.

035 The Director, Division of Information Support Services (DISS):

- a. Directs the implementation and interpretation of the requirements of this chapter.
- b. Provides guidance and assistance to Headquarters, Regional, and Site Offices in accomplishing the objectives of this chapter.
- c. Approves and publishes procedures needed to implement the policies and requirements of this chapter.
- d. Approves or disapproves proposed micrographic systems and applications on an NRC-wide basis.
- e. Approves or disapproves on an NRC-wide basis, requests for the application of micrographic equipment for the purpose of micro-publishing and other system applications which are subject to the Joint Committee on Printing, Congress of the United States.
- f. Approves requisitions (NRC Form 34) for justification and need for acquisition and issuance of micrographic equipment and related special supplies in accordance with Chapter NRC 5201.
- g. Provides for the production or purchase of all microforms.

- h. Coordinates installation of micrographic equipment and systems with the Division of Facilities and Operations Support to determine environmental and safety considerations can be met.

036 The Chief, Records Management Branch, DISS:

- a. Develops standards and guides for the application of micrographics.
- b. Reviews and makes recommendations to the Director, DISS, for the implementation of proposed micrographic systems and applications on an NRC wide basis.
- c. Maintains liaison with GSA (NARS) and other Federal Agencies on matters affecting the microfilming of records.
- d. Obtains approval of the Archivist of the U.S. for the microfilming and destruction of permanent records.
- e. Recommends to the Director, DISS, the applications of micrographic equipment for the purpose of micropublishing.
- f. Reviews ongoing micrographic systems to assure compliance with established policies, procedures, and standards.
- g. Refers to the Division of Computer and Telecommunications Services, ARM, for ADP management consideration, any micrographics application which would impact upon the NRC computer micrographic program.
- h. Makes recommendations to the Director, DISS, for the approval/disapproval of the purchases of all micrographic equipment and supplies.
- i. Provides support services to NRC staff offices in planning, developing, and using micrographic equipment and supplies.
- j. Surveys, on a fiscal basis, NRC Headquarters and Regional Offices to determine anticipated micrographic requirements and justifications for budgetary purposes.
- k. Maintains a complete inventory of micrographic related systems for use by the NRC.
- l. Provides for training and safe operating procedures including disposal and handling of supplies of all operators of micrographic equipment.
- m. Provides copies of receiving documents on micrographics-related equipment whether purchased, leased, or contractor-held in accordance with NRC 5201 and NRC 5101.
- n. Develops procedures for evaluating the continued efficiency and effectiveness of micrographic systems applications.

- o. Provides for the inspection of all archival or permanent microforms.

0234-04 BASIC REQUIREMENTS

041 Applicability. This chapter covers all applications of micrographic technology and applies to all elements and offices of the NRC.

042 Appendix 0234. The appendix to this chapter defines to standards and procedures necessary to assure the effective use of micrographics within NRC.

043 References.

- a. 36 CFR § 1230 and FIRM 201-45, Micrographics.
- b. Chapter NRC-5201
- c. 44 USC 3301
- d. FIRM 201
- e. All ANSI references are listed with appropriate sections within the appendix.

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This appendix sets the standards and procedures necessary to assure the effective use of micrographics within NRC. The intent is to assist operating officials toward implementing cost effective micrographic systems within NRC to meet Federal guidelines for micrographic management.

I. Definitions

The following are definitions which pertain directly to the micrographics management program.

- A. Archival - Permanent in that its intended use is to function as a record for an indefinite period.
- B. Archival Microfilm - Photographic film that when properly processed and stored is suitable for the preservation of records with a permanent value. (See ANSI-PH 1.25-1984; ANSI PH 1.28-1984; ANSI PH 1.41-1976.)
- C. Archival Quality - Term used in referring to film whose manufacturing, processing, and storage techniques ensure that the film can be retained for the longest retention period possible.
- D. Archival Record - Those records which have been identified as having permanent value. Also, referred to as permanent record. (See 44 U.S.C 3301.)
- E. Archival Storage Conditions - Those conditions which are suitable for the preservation of photographic film having permanent value. (See ANSI PH 1.43-1983.)
- F. COM - Computer Output Microfilm - Microfilm containing data produced by a recorder from computer generated signals.
- G. Distribution Copies - Microfilm copies produced from original film or intermediates for distribution to users.
- H. Microfilm -
 - 1. Raw (unexposed and unprocessed) film with characteristics that make it suitable for use in micrographics; or
 - 2. The process of recording microphotographs on film; or
 - 3. A fine grain, high resolution photographic film containing images greatly reduced in size from the originals.
- I. Microform - A generic term used for any form containing microimages.
- J. Micrographics - The science art and technology of applying photographic processes to record information and documents in miniaturized format, and associated storage and retrieval systems.

- K. Micrographic System - A configuration of equipment and procedures for the production, reproduction, maintenance, storage, retrieval, display, or use of microforms. A micrographic system may involve one or more, but not necessarily all, of the functions listed above.
- L. Microimage - A unit of information such as a page of text or a drawing, too small to be read without magnification.
- M. Retrieval - The process of magnifying and utilizing a microimage.

II. Micrographic Systems Studies

The following describes the micrographic systems study required for determining the potential for micrographic applications. The micrographic systems study consists of developing the study, conducting the study, and analyzing the present system.

- A. Developing the Study - A successful micrographics system is designed by following the basic principles of systems analysis and include the following:

1. Definition of the problem, which consists of background information; a determination of current inadequacies; distinguishing between symptoms and problems and determining operations affected by existing conditions.
2. Definition of the objective, which consists of stating the purpose of the project; stating the intended accomplishment(s) of the study; and establishing the criteria to define accomplishments of the objectives. These criteria may be stated in terms of material cost reduction, space and filing equipment savings, faster access to data, reduced duplication and distribution costs, improved data distribution, permanent storage medium, improved records retirement, reduction in shipping costs, labor savings, etc.
3. Definition of the scope, which sets the limits of the study, and considers the interaction of the record area under study with the overall information system.
4. Formulation of the study plan to include detailed chronological schedule of events, staffing requirements, and benchmarks against which progress will be measured.

- B. Conducting the Study

The current system should be described in documented detail and should include the following:

1. Record description
 - a. fully identified (books, catalogs, file cards, correspondence, etc.)

- b. subject matter (medical data, reference material, reports, etc.)
 - c. physical characteristics (size, color, contrast, generation, etc.)
 - d. storage (indexing, retrieval, disposition, etc.)
 - e. distribution
 - f. use
 - g. personnel requirements
 - h. organizational data
 - i. security requirements
 - j. other pertinent data.
2. The existing information flow should be traced and graphically displayed by means of flowcharts when applicable.

C. Analysis and Documentation

The information developed on the current systems should be analyzed to justify the need for the documents or information and to consider other options to store and retrieve the information. Whenever possible, the documentation should include quantitative data addressing the benefits and present value costs of the current system and the cost of alternative solutions.

D. Systems Design

The data collected must be organized into user requirements for information and related to systems which will meet those user requirements. Micrographics may or may not be indicated as an alternative. If a micrographics system is indicated as a viable alternative, handling requirements, personnel requirements, equipment requirements, security requirements, formats, environmental considerations, and all other related information should be included.

E. Implementation

The systems study must include a detailed plan for micrographics system implementation. Included in the implementation plan should be schedules for filming, handling, equipment procurement, user training, destruction plans, safe operating procedures, handling, storage of supplies and equipment, proper disposal of spent supplies, etc.

III. Standards for Microfilm Production

Uniformity of micrographic systems is essential to enhance the exchange and use of information, to provide the compatability of equipment, and to reduce to a minimum the variety of equipment required by varying formats and reduction ratios. These standards shall apply to all new micrographic systems. Any existing systems not conforming to these standards shall be evaluated to determine the feasibility of converting such systems to standard systems.

A. Source Document Microfilming

Micrographic systems involving the microfilming of original records (source documents) shall conform to the following standards:

1. Preparation - The integrity of the original records must be maintained by ensuring that the original microforms are satisfactory substitutes for and serve the purposes of the original records. Copies must be complete and contain all record information shown on the originals. The records must be arranged, identified and indexed so that any individual document or component of the records can be located. As a minimum, the records shall include information identifying the departmental element; the title of the records; the number or the identifier for each unit of film; security classification, if any; and the inclusive dates, names or other data identifying the first and last records on each unit of film.
2. Film Stock - The film stock used to make archival (Permanent) quality microforms shall be safety-base permanent record film conforming to Federal Standard 125D (current issue) and as specified in ANSI PH 1.25-1984; ANSI PH 1.28-1984; and ANSI PH 1.41-1976.

To take advantage of emerging technology, source document systems which employ non-silver halide film may be approved for non-permanent records, or for archival records where provision is made for production of a silver halide duplicate meeting this standard.

3. Indices - All indices, registers, or other finding aides, if microfilmed, will be placed in the first frame(s) following identifying and targeting frames, at the beginning of a roll of film; or in the last frame(s) of a microfiche or microfilm jacket, unless the system can be more effective using another indexing scheme.
4. Formats - The following formats and reduction ratios will be used in all source document micrographic systems within NRC.
 - a. 105mm microfiche - Source document recording on microfiche shall be in a NMA Type 1 format (ANSI/NMA MS 5) consisting of 98 frames arranged in 7 rows and 14 columns.

The reduction ratio shall be 24:1. Microfiche will be standard 148mm x 105mm in size. Other reduction ratios up to 48X may be used, for reasons of economy or system design, at the discretion and direction of NRC Program managers.

- b. 35mm aperture cards - Engineering drawings must be photographed onto 35mm aperture cards at the following reduction ratios:

- (1) up to and including 610mm x 457mm (24" x 18") (C or A2 size) will be filmed at a reduction ratio of 16:1.
- (2) Over 610mm x 457mm and up to 914mm x 610mm (36" x 24") (D or A1 size) shall be filmed at a reduction ratio of 24:1.
- (3) Over 914mm x 610mm and up to 1,219mm x 914mm (48" x 36") (E or A0 size) shall be filmed at a reduction ratio of 30:1.
- (4) Over 1,219mm x 914mm (to be filmed in sections according to NMA-MS110) shall be filmed at a reduction ratio of 30:1.

- c. 16mm - In normal document recording applications, 216mm x 279mm (8-1/2" x 11") documents may be microfilmed in a simplex comic mode at a reduction ratio of 24:1. Documents 216mm x 356mm (8-1/2" x 14") must be filmed in a simplex cine mode at a reduction ratio of 24:1. Applications in which most of the documents are of legal size may, for reasons of economy, be photographed in the simplex comic mode at a reduction ratio no greater than 32:1.

- d. COM - Mandatory Federal COM format standards are contained in Federal Information Processing Standards (FIPS) Publication Number 54 which is hereby incorporated by reference.

5. Microfilm Processing

- a. To achieve archival (Permanent) quality, microfilm must be processed so that the residual thiosulfate concentration will not exceed 0.7 micrograms of sodium thiosulfate per square centimeter as measured by the Methylene Blue method (ANSI PH 4.8-1984). This testing can be arranged through GSA(NAP), Washington, D.C. 20408, or through commercial laboratories.

- b. If reversal processing is used, it must be full photographic reversal, i.e., develop, bleach, expose, develop, fix and wash.
6. Resolution - Resolution tests for planetary or step and repeat cameras will be performed using the Microcopy Resolution Test Chart, NBS 1010A. The Standard Test Chart for Rotary Microfilm Cameras, NMA MS-112 or 113 will be used for all rotary camera microfilming. The minimum resolution for microforms of source documents as described in Practice for Operational Procedures/Inspection and Quality Control of First-Generation, Silver-Gelatin Microfilm of Documents (NMA MS-23) shall be as follows:
 - a. Archival (Permanent) and long term records - Quality Index 5 at the third generation level.
 - b. Non-Permanent and medium term records - Quality Index 5 at the user level.
7. Density - In source document filming gross densities from 0.8 to 1.3 in clear base film are recommended depending on the type of original documents filming. Following are the recommended background densities according to document type:

Group	Description	Background Density
1	High quality printed books, periodicals and dense typing	1.1 - 1.3
2	Fine line originals, letters typed with worn ribbon, pencil writing with soft lead, documents with small printing	1.0 - 1.1
3	Pencil drawings, faded printing, graph paper with pale, fine colored lines, and very small printing such as footnotes	.90 - 1.0
4	Very weak pencil manuscripts and drawings and poorly printed, faint documents.	.80 - .90
5	COM	1.2 - 1.5

Because very few micrographic applications will contain documents of all the same type or classification a recommended aim point is 1.1 for background density for most mixed document filming. The ultimate density criterion is that the microfilm be legible for its intended use (direct reading, duplication, or hard copy printing) and that all images can be printed at the same approximate printing exposure.

IV. Microfilm Storage

- A. This section prescribes the policies and procedures for microform storage. Archival or permanent microforms are to be stored according to the standards set forth in ANSI PH 1.43-1984 (Practice for Storage of Processed Safety Photographic Film.) The following is an outline of the standards set forth in ANSI 1.43-1984.
1. Microforms stored in roll form shall be wound on cores or reels made of noncorroding materials such as nonferrous metal or inert plastics. Other metals may be used provided that they are coated with a corrosion-resistant finish. Plastics and coated metals that may exude fumes during storage shall not be used. Rubber bands shall not be used for confining film on reels or cores. If paper bands are used, the paper shall meet the specifications of ANSI PH1.53-1984.
 2. Storage containers for microforms shall be made of inert materials such as metal or plastic. Containers made of paper products should be avoided unless the conditions prescribed in ANSI Standard PH1.53-1984 are met. The containers shall be closed to protect the microforms from environmental impurities and improper humidities.
 3. Microforms should be stored in closed housings such as drawers, or on shelves or racks enclosed by doors. Alternatively, open shelves and racks may be used if the microforms are in closed containers. Materials used for storage housings should be noncombustible and noncorrosive, such as anodized aluminum, stainless steel, or steel with baked on non-plasticized synthetic resin lacquer. Films of different types should not be stored in the same storage housing.
 4. Storage rooms or vaults for archival microforms shall be fire-resistant and must not be used for other purposes such as storage of other materials, office space, or working areas. The National Fire Protection Association (NFPA) publication NFPA 232, Protection of Records, 1970, provides further guidance. Protection from damage by water shall be accomplished by storing permanent record microforms above reasonably anticipated flood stages.
 5. The value of photographic film kept for archival or permanent purposes makes it advisable to provide a storage room or vault

separate from offices, work areas, or temporary storage facilities. It may be necessary to install automatic temperature and humidity control systems in storage rooms to insure consistency of the environmental conditions which follow.

- a. The relative humidity of the storage room or vault shall range from 20 to 40 percent with an optimum of 30 percent. Rapid and wide-range humidity changes will be avoided and shall not exceed a 5 percent change in a 24-hour period.
- b. Temperature shall not exceed 70°F. Rapid and wide-range temperature changes shall be avoided and shall not exceed a 5 percent change in a 24-hour period. A storage temperature of 35°F or below should be used for color film.
- c. Solid particles, which may abrade film or react with the image, shall be removed by mechanical filters from air supplied to housings or rooms used for archival storage. The mechanical filters are preferably of dry media type having an arrestance or cleaning efficiency of not less than 85 percent as determined by the stain test described in ASHRAE Standard 52-68(11).
- d. Gaseous impurities such as peroxides, oxidizing agents, sulphur dioxide, hydrogen sulfide, and others which cause deterioration of microforms shall be removed from the air by suitable washers or absorbers. Archival microforms shall not be stored in the same room with nonsilver gelatin films. They also shall not be stored in another room using the same ventilation system because gases given off by the other films may damage or destroy the images on the silver archival films.

V. Film Handling and Inspection

- A. Proper handling of film is important. Good housekeeping and cleanliness are essential. Permanent films should be handled by their edges, and the wearing of thin cotton or nylon gloves by the handlers is a good practice.
- B. The following are the procedures to be followed for film inspection.
 1. Master films of permanent record microforms and records microfilmed to dispose of the original record shall be inspected every 2 years during their schedule life. The inspection shall be made using a 1 percent randomly selected sample in the following categories: 70 percent microforms not previously tested, 20 percent--microforms tested in the last inspection, and 10 percent--control group. The control group shall represent samples of microforms from the oldest microforms filmed through the most current. The results of the inspection shall be reported to General

Services Administration (NC), Washington, DC 20408, 30 days after the inspection is completed. Reports shall include (a) the quantity of microform records on hand; i.e., number of rolls and number of microfiche; (b) the quantity of microforms inspected; (c) the condition of the microforms; (d) any defects discovered; and (e) corrective action taken.

2. The elements of the inspection shall consist of (a) an inspection for aging blemishes following the guidelines in the National Bureau of Standards Handbook 96, Inspection of Processed Photographic Record Films for Aging Blemishes; (b) a rereading of resolution tests targets; (c) a remeasurement of density; and (d) a certification of the environmental conditions under which the microforms are stored.
3. An inspection log shall be maintained. Information to be contained in the log shall include (a) a complete description of all records tested (title; number or identifier for each unit of film; and inclusive dates, names, or other data identifying the records on the unit of film); (b) the record group; i.e., newly tested, previously tested; or control group; (c) the date of inspection; (d) the elements of inspection; (e) the defects uncovered; and (f) the corrective action taken. In addition, the log shall contain the results of all archival film tests.
4. Any master microform that is deteriorating, as shown by the inspection, shall be replaced by a silver duplicate.

VI. Use of Master Microform

No master microform shall be used for any purposes other than the limited production of duplicates or the addition or deletion of images, if the microform is of the updateable format. Duplicate copies of the master are the only acceptable reference, research, and working copies for any user.

VII. Micrographics Equipment Inventory

The Division of Facilities and Operations Support maintains a complete inventory of micrographic equipment as required by FIRMR 201-45, using the Property and Supply System (PASS). The Records Management Branch, DISS, will retain micrographic system inventories to include special system configurations. Equipment placements will be reviewed by RMB periodically to determine use and suitability.

VIII. Micrographic Services

- A. All requests for the microfilming of documents are to be forwarded to the Records Management Branch, Division of Information Support Services, ARM.

The Records Management Analyst (Micrographics) will respond to each and perform the following:

1. System study as outlined in Part II of this appendix.
 2. Cost Benefit Analysis.
 3. Determine the best approach for providing services if such services are indicated from the analysis of (1) and (2). Micro-filming may be done (a) inhouse by DISS, (b) through other government agencies, or (c) by outside contractors.
- B. All requests for procurement of micrographic equipment and related supplies shall be prepared on NRC Form 34 and forwarded to the Property and Supply Branch, FOS, who will transmit the request to DISS for review and approval/disapproval of justification, applicability, compatability and need. No equipment will be procured without the concurrence of the Records Management Branch, DISS, and approval and certification of the NRC Property Management Officer in accordance with NRC 5201.
- C. Requests for existing documentation on microfiche, duplication of microfiche or blowbacks (reprints) from microfiche or aperture cards are to be forwarded, using NRC Form 358, to the Records Services Branch, DISS, ARM.
- D. Requests for repair of micrographic equipment are to be forwarded to the Property and Supply Branch, FOS, ARM.
- E. All information requests may be directed to the Records Management Analyst (Micrographics), Records Management Branch, DISS, ARM.

IX. Classified Microfiche

The handling and protection of classified microfiche is addressed in its entirety in NRC Appendix 2101, Part III.