

Mr. Mike Broderick
Environmental Program Administrator
Radiation Management Section
Department of Environmental Quality
1000 Northeast Tenth Street
Oklahoma City, OK 73117-1212

MAY - 5 1997

Dear Mr. Broderick:

In response to your request for additional background information on the Agreement State Program, attached is the following information:

1. Notice of Agreement with the Commonwealth of Massachusetts, *Federal Register*, Vol. 62, No. 66, p. 16628.
2. Final NRC Staff Assessment of the Massachusetts Program, and Summary Staff Assessment published in the *Federal Register*, Vol. 62, No. 6, January 9, 1997.
3. Event Reporting Handbook.
4. List of Regulatory Guide Series. Regulatory Guidance relevant to health physics issues may be found in Reg. Guide Divisions, 2, 3, 4, 6, 8 and 10.
5. Chronology of Amendments, as of March 20, 1997.
6. NUREG-1274, Review Process for Low-Level Radioactive Waste Disposal License Application Under Low-Level Radioactive Waste Policy Amendments Act, April 1991.
7. Executive Order 11988, Floodplain Management Guidelines.

I apologize for the delay in getting this information to you. After you have had a chance to review the information, please let us know if you have any questions. I can be reached at (301) 415-2326 and Patricia Larkins can be reached at (301) 415-2309.

Sincerely,

Original Signed By:
PAUL H. LOHAUS

Paul H. Lohaus, Deputy Director
Office of State Programs

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Mr. Mike Broderick
Environmental Program Administrator
Radiation Management Section
Department of Environmental Quality
1000 Northeast Tenth Street
Oklahoma City, OK 73117-1212

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5. Chronology of Amendments, as of March 20, 1997.
6. NUREG-1274, Review Process for Low-Level Radioactive Waste Disposal License Application Under Low-Level Radioactive Waste Policy Amendments Act, April 1991.

We have made a request to secure a copy of Executive Order 11988, Floodplain Management Guidelines, referenced in 10 CFR Part 61, and will provide a copy as soon as possible.

I apologize for the delay in getting this information to you. After you have had a chance to review the information, please let us know if you have any questions. I can be reached at (301) 415-2326 and Patricia Larkins can be reached at (301) 415-2309.

Sincerely,

Paul H. Lohaus, Deputy Director
Office of State Programs

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NAME	PMLarkins:nb	PHLohaus	RLBangart		
DATE	04/30/97	05/1/97	04/ /97		

OSP FILE CODE: SP-NA-16

impact on plant effluents and will not result in any impact to the environment.

2. The proposed amendment will not result in a significant increase in individual or cumulative occupational radiation exposure.

The proposed amendment will not increase exposure.

3. The proposed amendment will not result in a significant construction impact.

The proposed amendment will not result in any construction, therefore, there will be no construction impacts.

4. The proposed amendment will not result in a significant increase in the potential for, or radiological or chemical consequences from, previously analyzed accidents.

The proposed amendment to include a definition for completion time and to define the maximum time interval for repetitive actions will provide more formality for the conduct of plant operations. This inclusion will ensure consistent interpretation of the requirements. The proposed changes do not affect the potential for or radiological or chemical consequences from previously evaluated accidents.

5. The proposed amendment will not result in the possibility of a new or different kind of accident.

The proposed amendment to include a definition for completion time and to define the maximum time interval for repetitive actions will ensure consistent interpretation of the requirements. The changes will not create new operating conditions or a new plant configuration that could lead to a new or different type of accident.

6. The proposed amendment will not result in a significant reduction in any margin of safety.

A definition for completion time and the definition for a maximum time interval for repetitive actions were not formally defined in the past and were subject to interpretation. The addition of these definitions for completion time and the maximum time interval for repetitive actions provides more formality for the conduct of plant operations. The proposed changes cause no reductions in the margins of safety.

7. The proposed amendment will not result in an overall decrease in the effectiveness of the plant's safety, safeguards or security programs.

The proposed amendment to include a definition for completion time and to define the maximum time interval for repetitive actions provides more formality for the conduct of plant operations. The effectiveness of the safety, safeguards, and security programs is not decreased.

Effective date: 30 days after issuance

Certificate of Compliance No. GDP-1:

Amendment will incorporate a new Technical Safety Requirement, a revised Technical Safety Requirement and Safety Analysis Report changes.

Local Public Document Room location: Paducah Public Library, 555 Washington Street, Paducah, Kentucky 42003.

Dated at Rockville, Maryland, this 28th day of March 1997.

For the Nuclear Regulatory Commission.

Carl J. Paperiello,

Director, Office of Nuclear Material Safety and Safeguards.

[FR Doc. 97-8831 Filed 4-4-97; 8:45 am]

BILLING CODE 7860-01-P

NUCLEAR REGULATORY COMMISSION

Commonwealth of Massachusetts:
Discontinuance of Certain Commission
Regulatory Authority Within the
Commonwealth

AGENCY: Nuclear Regulatory
Commission.

ACTION: Notice of agreement with the
Commonwealth of Massachusetts.

SUMMARY: Notice is hereby given that Shirley Ann Jackson, Chairman of the U.S. Nuclear Regulatory Commission (NRC) and William F. Weld, Governor of the Commonwealth of Massachusetts, have signed the Agreement set forth below for the discontinuance by the Commission and assumption by the Commonwealth of certain Commission regulatory authority. The Agreement is published pursuant to Section 274 of the Atomic Energy Act of 1954, as amended. Under the Agreement, certain persons would be exempted from certain of the regulatory requirements of the Commission. The pertinent exemptions have been previously published in the *Federal Register* and are codified in the Commission's regulations as 10 CFR part 150.

FOR FURTHER INFORMATION CONTACT:
Richard L. Blanton, Office of State
Programs, U.S. Nuclear Regulatory
Commission, Washington, DC 20555-
0001. Telephone (301) 415-2322 or e-
mail RLB@NRC.GOV.

The draft of the Agreement was published in the *Federal Register* for comment on four separate dates (see, e.g. 61 FR 68066, December 26, 1996). One comment was received which requested that NRC retain jurisdiction over a site listed on the Site Decommissioning Management Plan (SDMP) until the NRC license for the site is terminated. NRC expedited the actions necessary to terminate the

subject SDMP site license and on March 21, 1997, NRC terminated the license and removed the site from the SDMP list.

Appendix—Text of the Agreement

Agreement Between the United States
Nuclear Regulatory Commission and
the Commonwealth of Massachusetts
for the Discontinuance of Certain
Commission Regulatory Authority and
Responsibility Within the
Commonwealth Pursuant to Section 274
of the Atomic Energy Act of 1954, as
Amended

Whereas, The United States Nuclear
Regulatory Commission (hereinafter
referred to as the Commission) is
authorized under Section 274 of the
Atomic Energy Act of 1954, as amended
(hereinafter referred to as the Act), to
enter into agreements with the Governor
of any State providing for
discontinuance of the regulatory
authority of the Commission within the
State under Chapters 6, 7, and 8, and
Section 161 of the Act with respect to
by-product materials as defined in
Sections 11e.(1) and (2) of the Act,
source materials, and special nuclear
materials in quantities not sufficient to
form a critical mass; and,

Whereas, The Governor of the
Commonwealth of Massachusetts is
authorized under Massachusetts General
Laws, Chapter 111H, to enter into this
Agreement with the Commission; and,

Whereas, The Governor of the
Commonwealth of Massachusetts
certified on March 28, 1996, that the
Commonwealth of Massachusetts
(hereinafter referred to as the
Commonwealth) has a program for the
control of radiation hazards adequate to
protect public health and safety with
respect to the materials within the
Commonwealth covered by this
Agreement, and that the Commonwealth
desires to assume regulatory
responsibility for such materials; and,

Whereas, The Commission found on
March 3, 1997, that the program of the
Commonwealth for the regulation of the
materials covered by this Agreement is
compatible with the Commission's
program for the regulation of such
materials and is adequate to protect
public health and safety; and,

Whereas, The Commonwealth and the
Commission recognize the desirability
and importance of cooperation between
the Commission and the
Commonwealth in the formulation of
standards for protection against hazards
of radiation and in assuring that
Commonwealth and Commission
programs for protection against hazards

of radiation will be coordinated and compatible; and,

Whereas, The Commission and the Commonwealth recognize the desirability of reciprocal recognition of licenses and exemptions from licensing of those materials subject to this Agreement; and,

Whereas, This Agreement is entered into pursuant to the provisions of the Atomic Energy Act of 1954, as amended;

Now, Therefore, It is hereby agreed between the Commission and the Governor of the Commonwealth, acting in behalf of the Commonwealth, as follows:

Article I

Subject to the exceptions provided in Articles II, IV, and V, the Commission shall discontinue, as of the effective date of this Agreement, the regulatory authority of the Commission in the Commonwealth under Chapters 6, 7, and 8, and Section 161 of the Act with respect to the following materials:

- A. By-product materials as defined in Section 11e.(1) of the Act;
- B. Source materials;
- C. Special nuclear materials in quantities not sufficient to form a critical mass; and,
- D. Licensing of Low-Level Radioactive Waste Facilities.

Article II

This Agreement does not provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of:

- A. The construction and operation of any production or utilization facility;
- B. The export from or import into the United States of by-product, source, or special nuclear material, or of any production or utilization facility;
- C. The disposal into the ocean or sea of by-product, source, or special nuclear waste materials as defined in regulations or orders of the Commission;
- D. The disposal of such other by-product, source, or special nuclear material as the Commission from time to time determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission; and,
- E. The extraction or concentration of source material from source material ore and the management and disposal of the resulting by-product material.

Article III

This Agreement may be amended, upon application by the Commonwealth and approval by the Commission, to include the additional area(s) specified

in Article II, paragraph E, whereby the Commonwealth can exert regulatory control over the materials stated therein.

Article IV

Notwithstanding this Agreement, the Commission may from time to time by rule, regulation, or order, require that the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing source, by-product, or special nuclear material shall not transfer possession or control of such product except pursuant to a license or an exemption from licensing issued by the Commission.

Article V

This Agreement shall not affect the authority of the Commission under Subsection 161b or 161i of the Act to issue rules, regulations, or orders to protect the common defense and security, to protect restricted data or to guard against the loss or diversion of special nuclear material.

Article VI

The Commission will use its best efforts to cooperate with the Commonwealth and other Agreement States in the formulation of standards and regulatory programs of the Commonwealth and the Commission for protection against hazards of radiation and to assure that Commonwealth and Commission programs for protection against hazards of radiation will be coordinated and compatible. The Commonwealth will use its best efforts to cooperate with the Commission and other Agreement States in the formulation of standards and regulatory programs of the Commonwealth and the Commission for protection against hazards of radiation and to assure that the Commonwealth's program will continue to be compatible with the program of the Commission for the regulation of like materials. The Commonwealth and the Commission will use their best efforts to keep each other informed of proposed changes in their respective rules and regulations and licensing, inspection and enforcement policies and criteria, and to obtain the comments and assistance of the other party thereon.

Article VII

The Commission and the Commonwealth agree that it is desirable to provide reciprocal recognition of licenses for the materials listed in Article I licensed by the other party or by any other Agreement State. Accordingly, the Commission and the State agree to use their best efforts to develop appropriate rules, regulations,

and procedures by which such reciprocity will be accorded.

Article VIII

The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the Commonwealth, or upon request of the Governor of the Commonwealth, may terminate or suspend all or part of this Agreement and reassert the licensing and regulatory authority vested in it under the Act if the Commission finds that (1) such termination or suspension is required to protect public health and safety, or (2) the Commonwealth has not complied with one or more of the requirements of Section 274 of the Act. The Commission may also, pursuant to Section 274j of the Act, temporarily suspend all or part of this Agreement if, in the judgment of the Commission, an emergency situation exists requiring immediate action to protect public health and safety and the Commonwealth has failed to take necessary steps. The Commission shall periodically review this Agreement and actions taken by the Commonwealth under this Agreement to ensure compliance with Section 274 of the Act.

Article IX

This Agreement shall become effective on March 21, 1997, and shall remain in effect unless and until such time as it is terminated pursuant to Article VIII.

Done at Rockville, Maryland, in triplicate, this 10th day of March, 1997.

For the United States Nuclear Regulatory Commission,
Shirley Ann Jackson,
Chairman.

Done at Boston, Massachusetts, in triplicate, this 19th day of March, 1997.
For the Commonwealth of Massachusetts
William F. Weld,
Governor.

Dated at Rockville, MD., this 1st day of April, 1997.

For the U. S. Nuclear Regulatory Commission.

John C. Hoyle,
Secretary of the Commission.

[FR Doc. 97-8829 Filed 4-4-97; 8:45 am]
BILLING CODE 7530-01-P

NUCLEAR REGULATORY COMMISSION

Draft Regulatory Guide; Issuance, Availability

The Nuclear Regulatory Commission has issued for public comment a draft of a guide planned for its Regulatory Guide Series. This series has been developed

Attachment
FINAL NRC STAFF ASSESSMENT
OF THE MASSACHUSETTS PROGRAM

ASSESSMENT

of the proposed

MASSACHUSETTS PROGRAM FOR THE REGULATION OF AGREEMENT MATERIALS

as described in the Commonwealth's

Request for an Agreement

This assessment, prepared by NRC staff, examines the proposed radiation control program of the Commonwealth of Massachusetts with respect to the ability of the program to regulate the possession, use, and disposal of radioactive materials subject to the Atomic Energy Act of 1954, as amended. The assessment was performed against the criteria set forth in the Commission's policy statement "Criteria for Guidance of States and NRC in Discontinuance of NRC Regulatory Authority and Assumption Thereof by States Through Agreement" (referred to below as the "criteria")¹ using an internal procedure developed by the Office of State Programs. Each criterion, and the NRC staff's assessment related thereto, is addressed separately below.

OBJECTIVES

1. Protection. A State regulatory program shall be designed to protect the health and safety of the people against radiation hazards.

The NRC staff determined that the proposed radiation control program will have an organizational subdivision identified as the "Low-Level Waste and Agreement State" unit (referred to below as the "agreement materials unit") that will have the responsibility for regulating radioactive materials licensees and an anticipated future low-level radioactive waste disposal facility. The unit will regulate both users of radioactive materials covered by the Atomic Energy Act (known as agreement materials), and users of naturally occurring or accelerator produced radioactive materials. Other organizational subdivisions of the program will have responsibilities for regulating machine produced radiation (x-ray), licensing medical radiography technologists, etc. NRC staff determined that this is a typical pattern for regulating radiation hazards that is used successfully in other Agreement States.

NRC staff concludes that the proposed Massachusetts radiation control program is appropriately designed to provide protection of the health and safety of the public against radiation hazards from the materials and uses over which the Commonwealth proposes to assume regulatory responsibility.

References: Program Narrative Description and Organizational Charts (Enclosure 3 and Attachment 1 to Enclosure 3 of the Request for an Agreement by Governor Weld.)

¹NRC Statement of Policy published in the Federal Register January 23, 1981 (46 FR 7540-7546), a correction was published July 16, 1981 (46 FR 36962) and a revision of Criterion 9 published in the Federal Register July 21, 1983 (48 FR 33376).

essentially identical to the terms contained in 10 CFR Part 20. The MRCR contain all of the provisions on maximum permissible doses, levels of radiation, and concentrations of radioactivity that NRC staff believes necessary in order to be compatible with the regulations of the NRC on the effective date of the Agreement between the Commonwealth and the Commission.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.005, 105 CMR 120.203, 105 CMR 120.302, 105 CMR 120.502, 105 CMR 120.772, 105 CMR 120.803, 105 CMR 120.902.

4. Total Occupational Radiation Exposure. The regulatory authority shall consider the total occupational radiation exposure of individuals, including that from sources which are not regulated by it.

The review determined that under the MRCR, as adopted, licensees are required to evaluate the radiation dose received by those individuals who are occupationally exposed to radiation in activities under the licensee's control. In conducting the evaluation, the licensees are required to consider the total radiation doses to the individuals from all sources of radiation (except background radiation and radiation from medical treatment or examinations, as is the case in the NRC rules), whether the sources are in the possession of the licensee or not. The definitions related to occupational exposure are essentially identical to those of the NRC.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.211 - 218, 105 CMR 120.221.

5. Surveys, Monitoring. Appropriate surveys and personnel monitoring under the close supervision of technically competent people are essential in achieving radiological protection and shall be made in determining compliance with safety regulations.

The review demonstrated that the MRCR impose requirements on the licensees to conduct surveys to evaluate potential exposures from sources of radiation. Likewise, the MRCR contain requirements for personnel monitoring. All of these requirements are based on, and consistent with, the equivalent requirements contained in NRC regulations.

The MRCR further specify requirements similar to those in NRC regulations for the training and experience of workers. The NRC staff believes that the MRCR requirements are adequate to assure the technical competency of workers conducting surveys and monitoring.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.225.

6. Labels, Signs, Symbols. It is desirable to achieve uniformity in labels, signs, and symbols, and the posting thereof. However, it is essential that there be uniformity in labels, signs, and symbols affixed to radioactive products which are transferred from person to person.

The review disclosed that the radiation labels, signs and symbols, and posting requirements adopted in the MRCR are essentially identical to those contained in 10

Requirements for transfer of waste for the purpose of ultimate disposal at a land disposal facility (waste transfer and manifest system) shall be in accordance with 10 CFR 20. The waste disposal standards shall include a waste classification scheme and provisions for waste form, applicable to waste generators, that is equivalent to that contained in 10 CFR Part 61.

The review confirmed that the MRCR contain provisions relating to the disposal of radioactive materials into the air, water and sewer, and by burial in soil which are at least as protective as the equivalent rules in 10 CFR Part 20. The MRCR require licensees to apply for and obtain a specific license condition to dispose of radioactive waste using methods other than as provided in the rules.

Waste transfer and manifest system requirements applicable to transfers of waste intended for ultimate disposal at a land disposal facility were also identified in the review and found to be as protective as the NRC rules. The Massachusetts waste disposal requirements include a waste classification scheme and requirements for waste form that were found to be equivalent to the requirements in 10 CFR Part 61.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.251 - 120.257.

(b) Land Disposal of waste received from other persons. The State shall promulgate regulations containing licensing requirements for land disposal of radioactive waste received from other persons which are compatible with the applicable technical definitions, performance objectives, technical requirements and applicable supporting sections set forth in 10 CFR Part 61. Adequate financial arrangements (under terms established by regulation) shall be required of each waste disposal site licensee to ensure sufficient funds for decontamination, closure and stabilization of a disposal site. In addition, Agreement State financial arrangements for long-term monitoring and maintenance of a specific site must be reviewed and approved by the Commission prior to relieving the site operator of licensed responsibility (Section 151(a)(2), Pub. L. 97-425).

Massachusetts has requested the authority to regulate the disposal of low-level radioactive waste received from other persons at a land disposal site. In support of this requested authority, Massachusetts has promulgated regulations that are equivalent to those in 10 CFR Part 61. The NRC staff review of these regulations determined that they contain all of the specified requirements of compatibility with two caveats.

First, it is noted that Massachusetts prohibits, by statute, shallow land burial as a disposal method. Secondly, an agency of the Commonwealth, the Low-Level Radioactive Waste Management Board (Board), is designated by statute to be the owner of the site. The Board will select an operator for the site who will be the site licensee during operations. At the end of the site operation, the operator will transfer the license to the Board to start the institutional control period. Thus the Board will act as the custodial agency as defined in 10 CFR Part 61. The Board will, by statute, remain the site owner and licensee indefinitely.

whose jurisdiction over interstate shipment of such materials necessarily continues. State regulations regarding transportation of radioactive materials must be compatible with 10 CFR Part 71.

The NRC staff's review of the MRCR determined that the sections applicable to the preparation of radioactive materials for shipment are similar to the NRC regulations in 10 CFR Part 71 that were effective prior to April 1, 1996. On that date, amended regulations in Part 71 became effective. Since negotiations pursuant to Section 274b of the Act were already in progress, Massachusetts chose to continue with the request for an Agreement while developing amended State regulations in parallel. NRC staff does not expect the amended Massachusetts rules to become effective before the Agreement is signed.

The Massachusetts radiation control program has committed to enforcing the provisions of the amended Part 71 rules by issuing appropriate regulatory orders to the affected licensees, and to continue the process of adopting amendments to the Massachusetts rules. The orders are intended to spare NRC licensees transferred to Massachusetts from the "whipsaw" effect of being regulated first under the amended NRC regulations, then the old regulations when the Agreement takes effect, then again under the amended regulations when later adopted by Massachusetts. Previously, NRC has required a State proposing to enter into an agreement to have regulations equivalent to current NRC regulations in effect at the time the agreement is signed. However, the Commission's legal counsel has indicated that Agreement States have the flexibility to use alternate legally binding methods of imposing NRC regulatory requirements on their licensees. On this basis, NRC staff find that the Massachusetts plan is acceptable.

Since the amended NRC regulations are coordinated with the regulations of the U. S. Department of Transportation (DOT), the amended Massachusetts regulations will also be compatible with the DOT regulations. The NRC staff concludes, therefore, that the Massachusetts radiation control program will satisfy the elements of this criterion.

References: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.770 - 120.795; Letter with attachments from Massachusetts Department of Public Health Commissioner Mulligan dated August 14, 1996

11. Records and Reports. The State regulatory program shall require that holders and users of radioactive materials (a) maintain records covering personnel radiation exposures, radiation surveys, and disposals of materials; (b) keep records of the receipt and transfer of the materials; (c) report significant incidents involving the materials, as prescribed by the regulatory authority; (d) make available upon request of a former employee a report of the employee's exposure to radiation; (e) at request of an employee advise the employee of his or her annual radiation exposure; and (f) inform each employee in writing when the employee has received radiation exposures in excess of the prescribed limits.

The review confirmed that the MRCR require licensees to maintain the specified records and to make reports similar to those specified in NRC regulations. The requirements are generally consistent with the equivalent NRC requirements. The NRC staff noted that for some NRC rules that specify a records retention period of

The review concluded that the MRCR contain regulations similar to the current NRC regulations specifying the required content of applications for licenses, renewals, and amendments. The MRCR also contain requirements similar to the NRC requirements for issuing licenses and specifying the terms and conditions of licenses. In some cases, the Massachusetts requirements may be more stringent than the equivalent NRC requirements to reflect concerns unique to the Commonwealth. The agreement materials unit has adopted procedures for processing applications that assure the regulatory requirements will be met or exceptions granted as provided for by regulation.

The MRCR also provide for general licenses compatible with those provided by the NRC regulations. The MRCR allow the possession and use of agreement materials exempt from license under the same conditions as allowed by NRC. The MRCR note that a license authorizing the distribution of agreement materials that will subsequently be exempt from regulatory control may be issued only by the NRC. The agreement materials unit will regulate several licensees to whom NRC has issued licenses of broad scope. Staff has determined that the MRCR contains provisions equivalent to the rules in 10 CFR Part 33 for the regulation of broad scope licenses.

Since criterion nine was adopted, the Commission in SECY-95-136 determined that the regulatory authority to conduct safety evaluations of sealed sources and devices should be retained by the NRC, unless the State requests assumption of the authority and the State has in place an adequate and compatible program to implement the authority. Massachusetts has requested the authority to conduct safety evaluations of sealed sources and devices. NRC staff have evaluated the regulations and procedures related to that program element, and determined that they are adequate and compatible. In the proposed Agreement, the authority to conduct safety evaluations of sealed sources and devices is transferred as part of the overall authority to issue licenses.

The NRC staff finds that the Massachusetts regulations and procedures for licensing are adequate, and compatible with those of the NRC.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.133 - 120.135.

14. Evaluation Criteria. In evaluating a proposal to use radioactive materials, the regulatory authority shall determine the adequacy of the applicant's facilities and safety equipment, his training and experience in the use of the materials for the purpose requested, and his proposed administrative controls. States should develop guidance documents for use by license applicants. This guidance should be consistent with NRC licensing and regulatory guides for various categories of licensed activities.

The NRC staff found that the Massachusetts agreement materials unit licensing procedures manual contains instructions to the unit staff addressing the specific elements listed in the criterion. The licensing procedures manual and the accompanying Massachusetts regulatory guides are similar to NRC licensing procedures and regulatory guides.

The review found that Massachusetts has adopted policies, procedures, and form letters to convey the results of inspections to the licensees, both when violations are found, and when no violations are found.

Reference: Radioactive Materials Inspection Manual, Attachment 7 to Enclosure 3 of the Request for an Agreement by Governor Weld.

ENFORCEMENT

19. Enforcement. Possession and use of radioactive materials should be amenable to enforcement through legal sanctions, and the regulatory authority shall be equipped or assisted by law with the necessary powers for prompt enforcement. This may include, as appropriate, administrative remedies looking toward issuance of orders requiring affirmative action or suspension or revocation of the right to possess and use materials, and the impounding of materials; the obtaining of injunctive relief; and the imposing of civil or criminal penalties.

The review found that the radiation control program is authorized by statute to enforce the regulations using a variety of sanctions, including the imposition of civil penalties and the issuing of orders to suspend, modify or revoke licenses. Although the impounding of materials is not directly provided, Massachusetts General Law Chapter 111, Section 50 allows the program to seek restraining orders, which may bar the use of materials or the access to premises. The program has adopted procedures to implement this authority.

References: Massachusetts General Law Chapter 111, Section 50; Massachusetts Regulations for the Control of Radiation at 105 CMR 120.016 - 120.019.

PERSONNEL

20. Qualifications of Regulatory and Inspection Personnel. The regulatory agency shall be staffed with sufficient trained personnel. Prior evaluation of applications for licenses or authorizations and inspection of licensees must be conducted by persons possessing the training and experience relevant to the type and level of radioactivity in the proposed use to be evaluated and inspected. This requires competency to evaluate various potential radiological hazards associated with the many uses of radioactive material and includes concentrations of radioactive materials in air and water, conditions of shielding, the making of radiation measurements, knowledge of radiation instruments—their selection, use and calibration—laboratory design, contamination control, other general principles and practices of radiation protection, and use of management controls in assuring adherence to safety procedures. In order to evaluate some complex cases, the State regulatory staff may need to be supplemented by consultants or other State agencies with expertise in geology, hydrology, water quality, radiobiology and engineering disciplines.

To perform the functions involved in evaluation and inspection, it is desirable that there be personnel educated and trained in the physical and/or life sciences, including biology, chemistry, physics and engineering, and that the personnel have had training and experience in radiation protection. For example, the person who will be responsible for the actual performance of evaluation and inspection of all of the various uses of byproduct, source and special nuclear material which might

materials licenses will seek to combine them. This experience suggests a final number of 450 to 500 licenses.

The organizational chart shows 31 professional staff positions, of which 13 would be assigned to the agreement materials program unit. Currently, there are 7 individuals assigned to the unit full-time, and 5 assigned part time, with 1 vacancy. One of the part-time staff members is the program director, who will also act as the unit manager. The combined effort of the 5 part-time individuals sums to 2 full-time-equivalents (FTE). The NRC staff sums the total technical/professional effort of the 12 individuals to equal 9 FTEs.

Although there is no current quantitative guideline in this area, NRC has, in the past, used a guideline indicator of 1.0 to 1.5 FTE per 100 licenses in reviewing existing Agreement State programs. Using the estimates of 9 technical/professional FTEs in the agreement materials unit, and 600 licenses initially, there would be approximately 1.5 technical/professional FTE per 100 licenses. While this number is at the high end of the range, NRC staff notes that the Commonwealth will assume regulatory responsibility for several licensees with unusually complex operations, including large medical, university, and industrial manufacturing programs. NRC staff believes, therefore, that an initial staffing level at or above the high end of the range is appropriate.

NRC staff further notes that several of the agreement materials unit positions will, in the future, be dedicated to the licensing and regulation of an anticipated low-level radioactive waste disposal site. The program does not, however, expect to receive an application for a waste disposal site in the near future. The anticipated combination of NARM and agreement materials licenses by facilities that currently hold both types will reduce the total number of licenses as described above and increase the staff-to-materials-license ratio. This will have the effect of allowing staff members to be reassigned to waste site issues. Further, when an application is received, the program plans to supplement staff with contractors. For current activities related to waste management, the Massachusetts program director has stated that less than one professional FTE is required.

Based on the above, the NRC staff concludes that the Massachusetts program staffing plan provides an adequate number of personnel to meet the anticipated program needs.

2. Assessment of Staff Education, Training and Experience

The 12 individual members of the agreement materials unit's professional/technical staff are trained in physics or health physics (5), life sciences including radiologic technology, biophysics, and public health (6), and physical sciences (geophysics - 1).

Of the seven full-time agreement materials unit staff members, one has 15 years experience in the Massachusetts program. The other six full-time staff members have 4 years or less experience in the Massachusetts program, although one individual has 3 years experience working in another radiation control program. Each of the six, however, has 5 years or more working experience in the fields of health physics, reactor health physics, or medical physics. The duties of these

The review found that the Massachusetts regulations do contain a provision to avoid interference with the duties imposed on State licensees by the NRC.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.002.

22. Special Nuclear Material Defined. Special nuclear material, in quantities not sufficient to form a critical mass, for present purposes means uranium enriched in the isotope U-235 in quantities not exceeding 350 grams of contained U-235; uranium 233 in quantities not exceeding 200 grams; plutonium in quantities not exceeding 200 grams; or any combination of them in accordance with the following formula: For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified above for the same kind of special nuclear material. The sum of such ratios for all of the kinds of special nuclear material in combination should not exceed "1" (i.e., unity). For example, the following quantities in combination would not exceed the limitation and are within the formula, as follows:

$$175 \text{ (grams contained U-235)} / 350 + 50 \text{ (grams U-233)} / 200 + 50 \text{ (grams Pu)} / 200 = 1$$

(This definition is subject to change by future Commission rule or regulation.)

The review of Massachusetts regulations equivalent to 10 CFR Part 150 revealed that the definition of the term "special nuclear material in quantities not sufficient to form a critical mass" therein is essentially identical to the above definition.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.005, Definition of Special Nuclear Material in Quantities Not Sufficient to Form a Critical Mass.

ADMINISTRATION

23. Fair and Impartial Administration. State practices for assuring the fair and impartial administration of regulatory law, including provision for public participation where appropriate, should be incorporated in procedures for:

- a. Formulation of rules of general applicability;
- b. Approving or denying applications for licenses or authorization to possess and use radioactive materials, and
- c. Taking disciplinary actions against licensees.

The Massachusetts radiation control program is bound by statutory provisions with respect to providing the opportunity for public participation in rulemaking, licensing actions, and disciplinary actions. The program has adopted regulations to implement the enforcement authority granted by law. The legislation also provides for the administrative and judicial review of actions taken by the program.

of such license or on the date of expiration specified in the NRC license, whichever is earlier.

The Massachusetts regulations also provide for "timely renewal," the continuance of licenses for which an application for renewal has been filed more than 30 days prior to the date of expiration of the license. Licenses in timely renewal are not excluded from the transfer continuation provision.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 120.133, 120.136.

26. Relations With Federal Government and Other States. There should be an interchange of Federal and State information and assistance in connection with the issuance of regulations and licenses or authorizations, inspection of licensees, reporting of incidents and violations, and training and education problems.

The NRC staff found that the proposed agreement commits the Commonwealth to use its best efforts to cooperate with the NRC and the other Agreement States in the formulation of standards and regulatory programs for the protection against hazards of radiation and to assure that the Commonwealth's program will continue to be compatible with the Commission's program for the regulation of like materials.

Reference: Proposed Agreement between the Commonwealth of Massachusetts and the Nuclear Regulatory Commission, Article VI.

27. Coverage, Amendments, Reciprocity. An Agreement providing for discontinuance of NRC regulatory authority and the assumption of regulatory authority by the State may relate to any one or more of the following categories of materials within the State, as contemplated by Public Law 86-373 and Public Law 95-604:
- a. Byproduct materials as defined in Section 11e(1) of the Act,
 - b. Byproduct materials as defined in Section 11e(2) of the Act,
 - c. Source materials,
 - d. Special nuclear materials in quantities not sufficient to form a critical mass,
 - e. Low-level wastes in permanent disposal facilities, as defined by statute or Commission rules or regulations containing one or more of the materials stated in a, c, and d above but not including byproduct material as defined in Section 11e(2) of the Act; but must relate to the whole of such category or categories and not to a part of any category. If less than the five categories are included in any discontinuance of jurisdiction, discontinuance of NRC regulatory authority and the assumption of regulatory authority by the State of the others may be accomplished subsequently by an amendment or by a later agreement.

Reference: Massachusetts Regulations for the Control of Radiation at 105 CMR 1006(B).

STAFF CONCLUSION

Section 274d of the Atomic Energy Act of 1954, as amended, states: "The Commission shall enter into an agreement under subsection b of this section with any State if:

- (1) The Governor of that State certifies that the State has a program for the control of radiation hazards adequate to protect the public health and safety with respect to the materials within the State covered by the proposed agreement, and that the State desires to assume regulatory responsibility for such materials; and
- (2) The Commission finds that the State program is in accordance with the requirements of subsection o. and in all other respects compatible with the Commission's program for the regulation of such materials, and that the State program is adequate to protect the public health and safety with respect to the materials covered by the proposed amendment."

The staff has concluded that the Commonwealth of Massachusetts meets the requirements of Section 274 of the Act. The statutes, regulations, personnel, licensing, inspection and administrative procedures are compatible with those of the Commission and adequate to protect the public health and safety with respect to the materials covered by the proposed Agreement. Since the Commonwealth of Massachusetts is not seeking authority over uranium milling activities, subsection o. is not applicable to the proposed Massachusetts agreement.

per response); *recordkeeping*, 150 hours (1.2 hours per respondent).

7. **Abstract:** 10 CFR 110 provides application, reporting, and recordkeeping requirements for exports and imports of nuclear material and equipment subject to the requirements of a specific license or a general license and exports of incidental radioactive material. The information collected and maintained pursuant to 10 CFR 110 enables the NRC to authorize only imports and exports which are not inimical to U.S. common defense and security and which meet applicable statutory, regulatory, and policy requirements.

Submit, by March 10, 1997, comments that address the following questions:

1. Is the proposed collection of information necessary for the NRC to properly perform its functions? Does the information have practical utility?
2. Is the burden estimate accurate?
3. Is there a way to enhance the quality, utility, and clarity of the information to be collected?
4. How can the burden of the information collection be minimized, including the use of automated collection techniques or other forms of information technology?

A copy of the draft supporting statement may be viewed free of charge at the NRC Public Document Room, 2120 L Street NW, (lower level), Washington, DC. Members of the public who are in the Washington, DC area can access this document via modem on the Public Document Room Bulletin Board (NRC's Advanced Copy Document Library), NRC subsystem at FedWorld, 703-321-3339. Members of the public who are located outside of the Washington, DC area can dial FedWorld, 1-800-303-9672, or use the FedWorld Internet address: fedworld.gov (Telnet). The document will be available on the bulletin board for 30 days after the signature date of this notice. If assistance is needed in accessing the document, please contact the FedWorld help desk at 703-487-4608.

Comments and questions may be directed to the NRC Clearance Officer, Brenda Jo. Shelton, U.S. Nuclear Regulatory Commission, T-6 F33, Washington, DC 20555-0001, or by telephone at 301-415-7233, or by Internet electronic mail at BJS1@NRC.GOV.

Dated at Rockville, Maryland, this second day of January, 1997.

For the Nuclear Regulatory Commission.
Gerald F. Crawford,
Designated Senior Official for Information
Resource Management.
[FR Doc. 97-472 Filed 1-8-97; 8:45 am]
BILLING CODE 7590-01-P

**Commonwealth of Massachusetts:
Staff Assessment of Proposed
Agreement Between the Nuclear
Regulatory Commission and the
Commonwealth of Massachusetts**

AGENCY: Nuclear Regulatory
Commission.

ACTION: Notice of proposed Agreement
with the Commonwealth of
Massachusetts.

SUMMARY: The U. S. Nuclear Regulatory Commission (NRC) has received, from the Governor of the Commonwealth of Massachusetts, a proposal to enter into an Agreement pursuant to Section 274 of the Atomic Energy Act of 1954, as amended (Act). The proposed Agreement would permit Massachusetts to assume certain portions of the Commission's regulatory authority. As required by the Act, NRC is publishing the proposed Agreement for public comment. NRC is also publishing a summary of the NRC staff assessment of the proposed Massachusetts radiation control program. Comments are requested on the proposed Agreement, especially public health and safety aspects, and the assessment.

The Agreement will effectively release (exempt) persons in Massachusetts from certain portions of the Commission's regulatory authority. The Act also requires that NRC publish those exemptions. Notice is hereby given that the pertinent exemptions have been previously published in the *Federal Register* and are codified in the Commission's regulations as 10 CFR Part 150.

DATES: The comment period expires January 23, 1997.

Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Written comments may be submitted to Mr. David L. Meyer, Chief, Rules Review and Directives Branch, Division of Freedom of Information and Publications Services, Office of Administration, Washington, DC 20555-0001. Copies of comments received by NRC may be examined at the NRC Public Document Room, 2120 L Street, NW, (Lower Level), Washington, DC. Copies of the proposed Agreement, along with copies of the request by

Governor Weld including referenced enclosures, applicable legislation, regulations for the control of radiation, and the full text of the NRC staff assessment are also available for public inspection in the NRC's Public Document Room.

FOR FURTHER INFORMATION CONTACT:
Richard L. Blanton, Office of State
Programs, U.S. Nuclear Regulatory
Commission, Washington, DC 20555-
0001. Telephone (301) 415-2322 or e-
mail RLB@NRC.GOV.

SUPPLEMENTARY INFORMATION: The Commission has received a request from Governor William Weld of Massachusetts to enter into an Agreement whereby the NRC would discontinue, and the Commonwealth would assume, certain regulatory authority as specified in the Act. Section 274 of the Act authorizes the Commission to enter into such an agreement.

Section 274e of the Act requires that the terms of the proposed Agreement be published for public comment once each week for four consecutive weeks. This notice is being published in the *Federal Register* in fulfillment of the requirement.

I. Background

(a) Section 274d of the Act provides the mechanism whereby a State may assume regulatory authority, otherwise reserved to the NRC, over certain radioactive materials¹ and uses thereof. In a letter dated March 28, 1996, Governor Weld certified that the Commonwealth of Massachusetts has a program for the control of radiation hazards that is adequate to protect health and safety of the public within the Commonwealth with respect to the materials covered by the proposed Agreement, and that the Commonwealth desires to assume regulatory responsibility for these materials. Included with the letter was the text of the proposed Agreement, which is shown in Appendix A to this notice.

The specific authorities requested by the Commonwealth of Massachusetts under this proposed Agreement are (1) the regulation of byproduct materials as defined in Section 11e.(1) of the Act, (2) the regulation of source materials, (3) the regulation of special nuclear materials in quantities not sufficient to form a critical mass, (4) the evaluation

¹ The materials, sometimes referred to as "agreement materials," are: (a) Byproduct materials as defined in Section 11e.(1) of the Act; (b) Byproduct materials as defined in Section 11e.(2) of the Act; (c) Source materials as defined in Section 11e. of the Act; and (d) Special nuclear materials as defined in Section 11aa. of the Act, restricted to quantities not sufficient to form a critical mass.

of the safety of sealed sources and devices (containing materials covered by the Agreement) for distribution in interstate commerce, and (5) the land disposal of low-level radioactive waste (as defined in the Low-Level Radioactive Waste Policy Amendments Act of 1985, 42 U.S.C. 2021b) received from other persons. The Commonwealth does not wish to assume authority over the regulation of byproduct materials as defined in Section 11e.(2) of the Act, that is over tailings from the recovery of source materials from ore, but does reserve the right to apply at a future date for an amended agreement to assume authority in this area.

(b) The proposed agreement contains nine articles that (1) list the materials and activities to be covered by the Agreement; (2) specify the activity for which the Commission will retain regulatory authority; (3) allow for future amendment of the Agreement; (4) allow for certain regulatory changes by the Commission; (5) reference the continued authority of the Commission for purposes of safeguarding nuclear materials and restricted data; (6) commit the Commonwealth and NRC to exchange information necessary to maintain coordinated and compatible programs; (7) recognize reciprocity of licenses issued by the respective agencies; (8) identify criteria for the suspension or termination of the Agreement; and (9) specify the proposed effective date. The Commission reserves the option to modify the terms of the proposed Agreement in response to comments, to correct errors, and to make editorial changes in style. Also, because of several issues posed by this request which required resolution before the Agreement could be concluded, the effective date requested by the Governor could not be realized. The final text of the Agreement, with the actual effective date, will be published after the Agreement is approved by the Commission.

(c) The Massachusetts radiation control program currently regulates users of naturally-occurring and accelerator-produced radioactive materials, and users of certain radiation-producing electronic machines. The program was enabled by Massachusetts law (Massachusetts General Law [M.G.L.] Chapter 111, §5B) in 1958. This statute was later replaced by M.G.L. Chapter 111, Sections 5M through 5P. In 1987, M.G.L. Chapter 111H was added to provide for the regulation of low-level radioactive waste. Section 7 of the legislation contains the authority for the Governor to enter into an Agreement with the Commission.

The Massachusetts regulations contain provisions for the orderly transfer of authority over NRC licenses to the regulatory control of the Commonwealth. After the effective date of this proposed Agreement, licenses issued by NRC will continue in effect under Massachusetts regulatory authority until these licenses expire or are replaced by Commonwealth issued licenses.

(d) The NRC staff assessment finds the proposed Massachusetts program adequate to protect public health and safety, and compatible with the NRC program for materials regulation.

II. Summary of the NRC Staff Assessment of the Massachusetts Program for the Control of Agreement Materials

NRC staff has examined the proposed Massachusetts radiation control program with respect to the ability of the program to regulate agreement materials. The examination was based on the Commission's policy statement "Criteria for Guidance of States and NRC in Discontinuance of NRC Regulatory Authority and Assumption Thereof by States Through Agreement" (referred to herein as the "criteria") (46 FR 7540; January 23, 1981, as amended).

(a) *Organization and Personnel.* The proposed program unit responsible for regulating agreement materials will consist of 13 technical/professional positions within the existing radiation control program of the Massachusetts Department of Public Health. The qualifications for staff members specified in the personnel position descriptions, and the qualifications of the current staff members, meet the criteria for education, training and experience. All current staff members hold at least bachelor's degrees in physical or life sciences, or have a combination of education and experience at least equivalent to a bachelor's degree. Most staff members hold advanced degrees, and have had additional training and experience in radiation protection. Senior staff have more than five years experience each in radiation control programs. The program director has a master's degree in public health and 15 years experience in regulatory health physics.

(b) *Legislation and regulations.* The Massachusetts Department of Public Health is designated by statute to be the radiation control agency. The Department is provided by statute with the authority to promulgate regulations, issue licenses, issue orders, conduct inspections, and to enforce compliance with regulations, license conditions,

and orders. Licensees are required by law to provide access to inspectors.

The Department has adopted regulations (Massachusetts Regulations for the Control of Radiation or MRCR) providing radiation protection standards essentially identical to the standards in 10 CFR Part 20. Technical definitions in the MRCR are also essentially identical. The MRCR require consideration of the total radiation doses to individuals from all sources of radiation (except background radiation and radiation from medical treatment or examinations, as is the case in the NRC rules), whether the sources are in the possession of the licensee or not. The MRCR also require appropriate surveys and personnel monitoring under the close supervision of technically competent people, and the use of radiation labels, signs and symbols essentially identical to those contained in 10 CFR Part 20. Posting requirements and instruction of workers requirements adopted in the MRCR are compatible with the equivalent current requirements of the NRC.

Nothing in the Massachusetts statutes or regulations seeks to regulate areas not permitted by the Atomic Energy Act. The MRCR contain a provision to avoid interference with those regulatory requirements imposed by NRC pursuant to the Act, and for which Commonwealth licensees have not been exempted under the agreement.

(c) *Storage and Disposal.* The MRCR also contain compatible requirements for the storage of radioactive material, and for the disposal of radioactive material as waste. The waste disposal requirements cover both waste disposal by material users and the land disposal of waste received from other persons. The NRC staff noted some differences in the MRCR waste regulations as compared to the NRC regulations in 10 CFR Part 61, but determined that the differences are related either to the prohibition of shallow land burial as a disposal technology or to the ownership of the disposal site by the Massachusetts Low-Level Radioactive Waste Management Board. Because of these special provisions, NRC staff determined that the differences in the regulations do not reduce the ability of the Massachusetts radiation control program to protect health and safety, nor reduce the compatibility of the program or the regulations themselves.

(d) *Transportation of Radioactive Material.* The MRCR contains rules equivalent to 10 CFR Part 71 as in effect prior to April 1, 1996. Effective on that date, the NRC amended Part 71. Under current policy, an existing Agreement State is allowed up to three years after

NRC adopts a final rule to adopt a compatible rule, or to impose each regulatory provision of the rule using an alternate legally binding requirement (LBR), such as an order or license condition. A State seeking an agreement is expected to have effective rules or LBRs compatible with those of NRC in effect at the time the agreement becomes effective. The intent of this expectation is to spare licensees in the new Agreement State from the "whipsaw" effect of being subjected first to the new NRC requirements, then the old requirements when the agreement takes effect, then again to the new requirements when later adopted by the State. Massachusetts is in the process of adopting rules compatible with the revised 10 CFR Part 71. However, these rules may not become effective before the Agreement is signed. Massachusetts intends to impose the requirements of the new Part 71 rules in the interim by issuing appropriate orders to the affected licensees.

(e) *Recordkeeping and Incident Reporting.* The MRCR incident reporting requirements are similar to the requirements in the NRC rules. The NRC staff noted that for some NRC rules that specify a records retention period of less than five years, the retention period specified in the MRCR is shorter. The NRC staff concluded, however, that the retention periods specified in the MRCR rules are adequate since the retention periods are long enough to permit examination of the records during routine inspections. The MRCR imposes retention requirements similar to the NRC rules for records which must be retained indefinitely or until the license is terminated.

(f) *Evaluation of License Applications.* The MRCR contains requirements equivalent to the current NRC regulations specifying the required content of applications for licenses, renewals, and amendments. The MRCR also provide requirements equivalent to the NRC requirements for issuing licenses and specifying the terms and conditions of licenses. The agreement materials program unit has adopted a procedure for processing applications that assures the regulatory requirements will be met, or, if appropriate, exceptions granted. The program unit has the authority by Statute to impose requirements in addition to the requirements specified in the regulations. The program unit also retains by regulation the authority to grant specific exemptions from the requirements of the regulations. The MRCR specifies qualifications for the use of radioactive materials in or on

humans that are similar to the NRC requirements in 10 CFR Part 35.

The Massachusetts licensing procedures manual, along with the accompanying regulatory guides, are adapted from similar NRC documents and contain adequate guidance for the agreement materials program unit staff to use when evaluating license applications.

(g) *Inspections and Enforcement.* The Massachusetts radiation control program has adopted a schedule providing for the inspection of licensees as frequently as, or more frequently than, the inspection schedule used by NRC. The agreement materials program unit has adopted procedures for the conduct of inspections, the reporting of inspection findings, and the report of inspection results to the licensees. The program has also adopted procedures for enforcement in the MRCR.

(h) *Regulatory Administration.* The Massachusetts Department of Public Health is bound by procedures specified in Commonwealth statute for rulemaking. The program has adopted procedures to assure fair and impartial treatment of license applicants.

(i) *Cooperation with Other Agencies.* The MRCR deems the holder of an NRC license on the effective date of the Agreement to possess a like license issued by Massachusetts. The MRCR provides that these former NRC licenses will expire either 90 days after receipt from the radiation control program of a notice of expiration of such license or on the date of expiration specified in the NRC license, whichever is earlier. The MRCR also provides for "timely renewal." This provision affords the continuance of licenses for which an application for renewal has been filed more than 30 days prior to the date of expiration of the license. Licenses in timely renewal are not excluded from the transfer continuation provision. The MRCR provide exemptions from the Commonwealth's requirements for licensing of sources of radiation for NRC and U.S. Department of Energy contractors or subcontractors.

The Department of Public Health and the Department of Labor and Industries have entered into a Memorandum of Understanding, as authorized elsewhere in Massachusetts law, which provides for the Department of Public Health to exercise the responsibility and authority of the Department of Labor and Industries with respect to radiation and radioactive materials. The Department of Environmental Protection is designated as the agency to adopt the suitability standards for any proposed disposal site under the Massachusetts Low-Level Radioactive Waste

Management Act. The Department of Public Health will license and regulate the site only after the Executive Secretary for Environmental Affairs has determined that the report on the site characterization study is in conformance with the suitability standards, and the Low-Level Radioactive Waste Management Board has selected the operator.

The proposed Agreement commits the Commonwealth to use its best efforts to cooperate with the NRC and the other Agreement States in the formulation of standards and regulatory programs for the protection against hazards of radiation and to assure that the Commonwealth's program will continue to be compatible with the Commission's program for the regulation of like materials. The proposed Agreement stipulates the desirability of reciprocal recognition of licenses, and commits the Commission and the Commonwealth to use their best efforts to accord such reciprocity.

III. Staff Conclusion

Subsection 274d of the Act provides that the Commission shall enter into an agreement under subsection 274c with any State if:

(a) The Governor of the State certifies that the State has a program for the control of radiation hazards adequate to protect public health and safety with respect to the materials within the State covered by the proposed Agreement, and that the State desires to assume regulatory responsibility for such materials; and

(b) The Commission finds that the State program is in accordance with the requirements of Subsection 274c, and in all other respects compatible with the Commission's program for the regulation of such materials, and that the State program is adequate to protect public health and safety with respect to the materials covered by the proposed Agreement.

On the basis of its assessment, the NRC staff has concluded that the Commonwealth of Massachusetts meets the requirements of Section 274 of the Act. The Commonwealth's statutes, regulations, personnel, licensing, inspection, and administrative procedures are compatible with those of the Commission and adequate to protect public health and safety with respect to the materials covered by the proposed Agreement. Since the Commonwealth is not seeking authority over byproduct material as defined in Section 11e.(2) of the Act, Subsection 274c is not applicable to the proposed Agreement. The language of the Agreement requested by Governor Weld has been

revised to reflect that the effective date of the proposed Agreement and the location at which it will be signed remain to be determined. Certain conventions have been used to highlight the proposed revisions. New language is shown inside boldfaced arrows, while language that would be deleted is set off with brackets.

IV. Small Business Regulatory Enforcement Fairness Act

In accordance with the Small Business Regulatory Enforcement Fairness Act of 1996, the NRC has determined that this action is not a major rule and has verified this determination with the Office of Information and Regulatory Affairs of the Office of Management and Budget (OMB).

Dated at Rockville, Maryland, this 19th day of December, 1996.

For the U. S. Nuclear Regulatory Commission.

Paul H. Lohaus,

Acting Director, Office of State Programs.

Appendix A Proposed Agreement

Agreement Between the United States Nuclear Regulatory Commission and the Commonwealth of Massachusetts for the Discontinuance of Certain Commission Regulatory Authority and Responsibility Within the Commonwealth Pursuant to Section 274 of the Atomic Energy Act of 1954, as Amended

Whereas, The United States Nuclear Regulatory Commission (hereinafter referred to as the Commission) is authorized under Section 274 of the Atomic Energy Act of 1954, as amended (hereinafter referred to as the Act), to enter into agreements with the Governor of any State providing for discontinuance of the regulatory authority of the Commission within the State under Chapters 6, 7, and 8, and Section 161 of the Act with respect to by-product materials as defined in Sections 11e. (1) and (2) of the Act, source materials, and special nuclear materials in quantities not sufficient to form a critical mass; and,

Whereas, The Governor of the Commonwealth of Massachusetts is authorized under Massachusetts General Laws, Chapter 111H, to enter into this Agreement with the Commission; and,

Whereas, The Governor of the Commonwealth of Massachusetts certified on [June 1, 1995.] #March 28, 1996, # that the Commonwealth of Massachusetts (hereinafter referred to as the Commonwealth) has a program for the control of radiation hazards adequate to protect [the] public health

and safety with respect to the materials within the Commonwealth covered by this Agreement, and that the Commonwealth desires to assume regulatory responsibility for such materials; and,

Whereas, The Commission found on [November 1, 1995.] # (date to be determined) # that the program of the Commonwealth for the regulation of the materials covered by this Agreement is compatible with the Commission's program for the regulation of such materials and is adequate to protect public health and safety; and,

Whereas, The Commonwealth and the Commission recognize the desirability and importance of cooperation[s] between the Commission and the Commonwealth in the formulation of standards for protection against hazards of radiation and in assuring that Commonwealth and Commission programs for protection against hazards of radiation will be coordinated and compatible; and,

Whereas, The Commission and the Commonwealth recognize the desirability of reciprocal recognition of licenses and exemptions from licensing of those materials subject to this Agreement; and,

Whereas, This Agreement is entered into pursuant to the provisions of the Atomic Energy Act of 1954, as amended;

Now, therefore, It is hereby agreed between the Commission and the Governor of the Commonwealth, acting in behalf of the Commonwealth, as follows:

Article I

Subject to the exceptions provided in Articles II, IV, and V, the Commission shall discontinue, as of the effective date of this Agreement, the regulatory authority of the Commission in the Commonwealth under Chapters 6, 7, and 8, and Section 161 of the Act with respect to the following materials:

A. By-product materials as defined in Section 11e.(1) of the Act;

B. Source materials;

C. Special nuclear materials in quantities not sufficient to form a critical mass; and,

D. Licensing of Low-Level Radioactive Waste Facilities.

Article II

This Agreement does not provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of:

A. The construction and operation of any production or utilization facility;

B. The export from or import into the United States of by-product, source, or

special nuclear material, or of any production or utilization facility;

C. The disposal into the ocean or sea of by-product, source, or special nuclear waste materials as defined in regulations or orders of the Commission;

D. The disposal of such other by-product, source, or special nuclear material as the Commission from time to time determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission; and,

E. The extraction or concentration of source material from source material ore and the management and disposal of the resulting by-product material.

Article III

This Agreement may be amended, upon application by the Commonwealth and approval by the Commission, to include the additional area(s) specified in Article II, paragraph E, whereby the Commonwealth can exert regulatory control over the materials stated therein.

Article IV

Notwithstanding this Agreement, the Commission may from time to time by rule, regulation, or order, require that the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing source, by-product, or special nuclear material shall not transfer possession or control of such product except pursuant to a license or an exemption from licensing issued by the Commission.

Article V

This Agreement shall not affect the authority of the Commission under Subsection 161b or 161i of the Act to issue rules, regulations, or orders to protect the common defense and security, to protect restricted data or to guard against the loss or diversion of special nuclear material.

Article VI

The Commission will use its best efforts to cooperate with the Commonwealth and other Agreement States in the formulation of standards and regulatory programs of the Commonwealth and the Commission for protection against hazards of radiation and to assure that Commonwealth and Commission programs for protection against hazards of radiation will be coordinated and compatible. The Commonwealth will use its best efforts to cooperate with the Commission and other Agreement States in the formulation of standards and regulatory programs of the Commonwealth and the Commission for protection against

hazards of radiation and to assure that the Commonwealth's program will continue to be compatible with the program of the Commission for the regulation of like materials. The Commonwealth and the Commission will use their best efforts to keep each other informed of proposed changes in their respective rules and regulations and licensing, inspection and enforcement policies and criteria, and to obtain the comments and assistance of the other party thereon.

Article VII

The Commission and the Commonwealth agree that it is desirable to provide reciprocal recognition of licenses for the materials listed in Article I licensed by the other party or by any other Agreement State. Accordingly, the Commission and the State agree to use their best efforts to develop appropriate rules, regulations, and procedures by which such reciprocity will be accorded.

Article VIII

The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the Commonwealth, or upon request of the Governor of the Commonwealth, may terminate or suspend all or part of this Agreement and reassert the licensing and regulatory authority vested in it under the Act if the Commission finds that (1) such termination or suspension is required to protect public health and safety, or (2) the Commonwealth has not complied with one or more of the requirements of Section 274 of the Act. The Commission may also, pursuant to Section 274j of the Act, temporarily suspend all or part of this Agreement if, in the judgement of the Commission, an emergency situation exists requiring immediate action to protect public health and safety and the Commonwealth has failed to take necessary steps. The Commission shall periodically review this Agreement and actions taken by the Commonwealth under this Agreement to ensure compliance with Section 274 of the Act.

Article IX

This Agreement shall become effective on [April 24, 1996.] (date to be determined) and shall remain in effect unless and until such time as it is terminated pursuant to Article VIII.

Done at (Boston, Massachusetts) (location to be determined), in triplicate, this [24]th Day of [April, 1996] (date to be determined).

For the United States Nuclear Regulatory Commission.

Shirley Ann Jackson,
Chairman.

For the Commonwealth of Massachusetts.

William F. Weld,
Governor.

[FR Doc. 97-403 Filed 1-8-97; 8:45 am]

BILLING CODE 7550-01-P

SECURITIES AND EXCHANGE COMMISSION

[Release No. 35-28640]

Filings Under the Public Utility Holding Company Act of 1935, as Amended ("Act")

January 3, 1997.

Notice is hereby given that the following filing(s) has/have been made with the Commission pursuant to provisions of the Act and rules promulgated thereunder. All interested persons are referred to the application(s) and/or declaration(s) for complete statements of the proposed transaction(s) summarized below. The application(s) and/or declaration(s) and any amendments thereto is/are available for public inspection through the Commission's Office of Public Reference.

Interested persons wishing to comment or request a hearing on the application(s) and/or declaration(s) should submit their views in writing by January 27, 1997, to the Secretary, Securities and Exchange Commission, Washington, D.C. 20549, and serve a copy on the relevant applicant(s) and/or declarant(s) at the address(es) specified below. Proof of service (by affidavit or, in case of an attorney at law, by certificate) should be filed with the request. Any request for hearing shall identify specifically the issues of fact or law that are disputed. A person who so requests will be notified of any hearing, if ordered, and will receive a copy of any notice or order issued in the matter. After said date, the application(s) and/or declaration(s), as filed or as amended, may be granted and/or permitted to become effective.

Entergy Corporation (70-8077)

Entergy Corporation, 639 Loyola Avenue, New Orleans, Louisiana 70113 ("Entergy"), a registered holding company, has filed a declaration with the commission pursuant to sections 6(a) and 7 of the Act.

Entergy adopted an employee stock option plan, known as the Entergy Stock Investment Plan ("Plan"), dated October 29, 1993. In connection with the

implementation of the Plan, the Commission, by order dated December 28, 1993 (HCAR No. 25963), authorized Entergy, from time to time through March 31, 1997, to (i) grant options ("Options") to eligible employees (as hereinafter defined) to purchase up to 2,000,000 shares of its common stock, \$5 par value, or any successor security ("Stock"), and (ii) to issue and sell up to 2,000,000 shares of such Stock upon the exercise of such Options. In addition, Entergy was authorized to purchase, from time to time through March 31, 1997, up to 2,000,000 shares of Stock to be held as treasury shares, pending resale to such employees, for the purpose of satisfying the anticipated requirements of the Plan.

The Plan, as currently in effect, provides for three consecutive annual offerings of Stock, with the first such annual period commencing on April 1, 1994 and the third and final such annual period terminating March 31, 1997. Entergy now proposes to renew and extend the Plan for an additional three year period commencing April 1, 1997, and to amend the Plan to provide for such renewal and extension and for the sale of up to 2,000,000 additional shares of Stock during this extended term.

Accordingly, Entergy requests authorization, from time to time during the period through March 31, 2000, to grant additional Options pursuant to the terms of the Plan, as amended, and, in connection with the execution of such Options (and the Options previously granted), to sell up to an aggregate maximum of 4,000,000 shares of its Stock (including the 2,000,000 shares currently authorized) which may be either authorized but unissued shares or previously issued shares purchased by Entergy on the open market and held by the Corporation as treasury shares. Entergy intends, pursuant to rule 42, to purchase on the open market, from time to time through March 31, 2000, up to an aggregate maximum of 4,000,000 shares of Stock (including the 2,000,000 shares currently authorized), to be held as treasury shares pending resale to participating employees pursuant to the terms of the Plan.

Funds for the purchase of shares of Stock on the open market to satisfy the requirements of the Plan will be obtained from internally generated funds. Proceeds from the sale of shares of Stock under the Plan will become part of the general corporate funds of Entergy and will be used (i) to purchase Stock of Entergy sold or to be sold by Entergy under the Plan, or (ii) for other general corporate purposes. Any authorization that is required under the

DRAFT

Handbook on Nuclear Material Event Reporting in the Agreement States

Draft for Comment

February 1995

**Office of State Programs
U.S. Nuclear Regulatory Commission**

Contact: Patricia M. Larkins

ABSTRACT

The review and evaluation of operating experience of programs involving the use of nuclear materials licensed by the Agreement States is an integral part of the scope of the Commission's responsibility under the Atomic Energy Act. It is important to articulate an industry and regulatory responsibility to report operating experience that may benefit health and safety. The review and evaluation of operational data identifies safety-significant events and concerns, and their causes.

This handbook has been developed to provide helpful information to the staff of the Agreement States who prepare operating experience reports for events that have occurred in their State for voluntary submission to the NRC through a voluntary exchange of information program carried out under the Agreement State Program. The handbook presents the scope of the program and describes procedures for the review, reporting, evaluation, and followup of nuclear material events that occur in the Agreement States. The objective of the handbook is to:

- Improve technical information
- Standardize format
- Ensure consistency
- Facilitate information retrieval
- Reduce duplication of effort

It has been divided into two sections and one appendix.

Section I - defines the scope and responsibilities of the Agreement States and NRC offices for reporting incidents and events involving nuclear materials.

Section II - describes the process for reporting nuclear material events that have occurred in the Agreement States.

Appendix - contains forms, figures and tables.

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PREFACE

Introduction

By formal agreement with the Nuclear Regulatory Commission, a total of 29 States have assumed regulatory authority over byproduct, source and small quantities of special nuclear material. These States, known as Agreement States, carry out independent regulatory programs under State statutes and regulations for nuclear materials licensees located in their respective States. The NRC directly regulates licensees in the remaining 21 States, the District of Columbia, and all the United States (U.S.) territories. Approximately 15,000 users are licensed by the 29 Agreement States. Of these, about 10,000 are authorized to use byproduct materials for industrial uses such as, manufacturing and commercial distribution of licensed materials in calibration and test sources, monitoring and measuring devices, academic research and development, medical applications and radiography. The remaining 5000 Agreement State licensees are authorized to use radioactive materials for medical diagnosis or therapy. See map of Agreement States in this Handbook. The regulatory authority and policies governing the Agreement State Program and the reporting of events is defined below.

Regulatory Authority

Section 274 of the Atomic Energy Act, covering Cooperation With States, states "It is the purpose of this section--:

"(1) to recognize the interests of the States in the peaceful uses of atomic energy, and to clarify the respective responsibilities under this Act of the States and the Commission with respect to the regulation of byproduct, source, and special nuclear materials (SNM);

(2) to recognize the need, and establish programs for cooperation between the States and the Commission with respect to control of radiation hazards associated with use of such materials;"

Statutory Reporting Requirements

The Energy Reorganization Act, of 1974, as amended, directs the Commission to:

"(2) investigate abnormal occurrences and defects in nuclear power plants and other licensed facilities..."

"(3) safeguard special nuclear materials at all stages of the nuclear fuel cycle..."

"(4) investigate suspected, attempted, or actual thefts of special nuclear materials in the licensed sector and develop contingency plans for dealing with such incidents."

"(6) protect the public against the hazards of low-level radioactive emissions from licensed nuclear activities and facilities..."

As part of the collective effort by NRC and the Agreement States to regulate nuclear facilities and nuclear materials NRC, and compatible Agreement State, regulations require the reporting, by the regulated community, of incidents and events involving nuclear materials. Agreement States, however, provide information concerning incidents and events to the NRC on a voluntary basis.

Review of State Regulatory Programs

The NRC is required by the Atomic Energy Act of 1954 to periodically review Agreement State radiation control programs and confirm that they are adequate to protect public health and safety and are compatible with NRC programs. The reviews follow the guidelines contained in a Commission Policy Statement published in the *Federal Register* on May 22, 1992. Incidents and events that have occurred in the Agreement States are included in the formal radiation control program reviews.



SECTION I

Scope

Responsibilities

1.0 SCOPE AND RESPONSIBILITIES

Introduction

The scope and responsibilities of NRC offices and the Agreement States in the review, evaluation, and followup, of operational and occupational incidents and events involving nuclear material, including the medical use of byproduct material, is outlined below.

Reporting of Event Information by Agreement State Licensees

Agreement States voluntarily provide information on incidents and events to NRC through an exchange of information program. Reports of operational events by licensees are required through Agreement State regulations that are compatible with NRC reporting requirements, e.g. 10 CFR §§ 20.2201-20.2206, § 30.50, § 34.30, § 35.2, § 35.14, §§ 35.32-35.33, § 39.77, § 70.50. Agreement State licensees submit event reports consistent with their importance and regulatory requirements to the Agreement States. The Agreement States voluntarily provide summary reports and statistical data on operational events to the NRC through the Office of State Programs (OSP), Regional Offices, and the Office for Analysis and Evaluation of Operational Data (AEOD). Additional information may be requested from the Agreement State by OSP, the Regional Office, or AEOD.

Notification Criteria - The Agreement States notify NRC through the NRC Operations Center, within the next working day, of significant incidents that have occurred in their State. The Regional State Agreements Officer (RSAO) or a backup staff member is responsible for follow-up of significant

events that have occurred in an Agreement State. The Agreement States provide timely updates of information on significant events through the RSAO and the NMED database system. The Agreement States notify NRC of other events on a routine basis, within 30 days of notification by an Agreement State licensee, (1) through the Nuclear Material Events Database (NMED) system or, (2) on NRC Forms 565 and 566, with additional supporting background information comparable to the information needed for NMED.

Agreement State Event Reporting - The Agreement States are responsible for the review, evaluation, and followup of incidents and events involving nuclear materials that have occurred in their State. They also identify significant events that meet the abnormal occurrence criteria. They are responsible for collecting, logging, storing, and retrieving nuclear material incident and event information in accordance with State regulations that are compatible to those of the NRC. The Agreement States provide summary reports and statistical data on incidents and events to the NRC.

Preliminary Analyses - Prompt reviews of events by the Agreement States shall be performed in accordance with State regulations that are compatible to NRC

regulations, to identify health and safety concerns of an immediate nature. When an event occurs in an Agreement State, the State is responsible for taking all necessary action to ensure public health and safety. NRC assistance may be provided for events involving health and safety concerns of an immediate nature when requested by the State. Appropriate program review and followup may be provided by the Regional Offices and OSP, for events that have been identified as having a significant potential risk to public health and safety.

Nuclear Material Data Collection - The office of AEOD is responsible for developing and maintaining a Nuclear Material Events Database (NMED) collection of all nuclear material event information that has been received from NRC material licensees and the Agreement States. AEOD, along with their contractor, Idaho National Engineering Lab (INEL), has developed an interim event reporting database system using "FoxPro 2.0" software. As of October 1994, all of the Agreement States were provided with a copy of the interim FoxPro version of the NMED system. The Agreement States have begun working with the interim NMED system and will provide feedback on their experience with the system. Agreement States now have the capability to send updated information to NRC via diskette.

NOTE: The short-term, interim "FoxPro" software based system, developed in a DOS environment, requires the use of PC diskettes to update information. The long-

term "Microsoft Access" windows version, client/server software, will provide on-line real-time electronic transmission of event data through the NMED system. We expect to implement the Microsoft Access system by the end of CY1995.

Dissemination - Summaries and reports of Agreement State nuclear material operational event information shall be maintained by AEOD. Any preliminary **predecisional** supporting documentation, i.e., inspection or investigation reports, etc. submitted in written form will become part of the agency's automated Document Control System (DCS). Therefore, any predecisional information provided by Agreement States that should be restricted from public disclosure, should be clearly identified on the cover page, as follows: **"Preliminary, Not for Public Disclosure."**

All other nuclear material event information, provided to NRC electronically or in written form, i.e., interim and final event reports, medical consultant reports, licensee event reports, inspection reports, enforcement action, etc. will be considered public information, and made available to the public in response to specific public inquiries for event information. Additional specific information may also be extracted from the NMED system in response to public inquiries.

Summaries and reviews of operational events and experience for NRC licensees and Agreement State licensees will be published annually in NUREG-1272, Office for Analysis and Evaluation of

Event Reporting Handbook

Operational Data, Annual Report, Part II, and those that have been identified as abnormal occurrences will be made publicly available through NUREG-0090, Report to Congress on Abnormal Occurrences, published quarterly.

Coordination with Food and Drug Administration (FDA)

Through a formal agreement to exchange information, NRC provides information to FDA on incidents and events that may potentially effect public health and safety, such as equipment malfunctions and failures, or medical misadministrations involving products of mutual regulatory concern.

Review of Operational Event Data - The NRC Operations Center staff respond to prompt notification calls received from Agreement State staff, informing the NRC of significant events that have occurred in an Agreement State. The NRC Operations Center staff promptly transmit the information to the NRC Regions via the Event Notification (EN) system. The Regional State Agreements Officer (RSAO) who is responsible for review and followup of events involving nuclear material that have occurred in an Agreement State, promptly notifies OSP when an event may involve significant health and safety issues or national interest. The RSAO is also responsible for preparation of Preliminary Notifications (PNs) on a given event in accordance with criteria contained in NRC Inspection Manual 1120. Please note that IM1120 recommends the issuance of a PN

within two hours of receiving information on a given event.

NRC Operations Center - The NRC Operations Center in Rockville, MD, serves as the focal point for communicating with NRC licensees, State agencies, and other Federal agencies about operating events in both the nuclear reactor and nuclear material industry. The Operations Center is staffed 24 hours a day by an NRC Headquarters Operations Officer (HOO), who is trained to receive, evaluate, and respond to events reported to the Operations Center.

Long-Term Trends and Analyses - Long-term trends and analyses studies of nuclear materials operational event information are performed by AEOD in coordination with other offices. The various elements of the AEOD studies are as follows:

1. Determination of the safety importance and possible generic implications.
2. Coordination of the overall NRC operational data program, and support of the agency effort to prevent unnecessary duplication of effort.
3. Evaluations of trends or patterns of events in order to study and determine implications for: safety concerns arising from the frequency of less significant events; inadequacies or unreliability of specific equipment or procedures.
4. Evaluation of specific events in order to: identify potential abnormal

occurrences for possible inclusion in NUREG-0090, Report to Congress on Abnormal Occurrences, published quarterly by NRC. Some events can require analysis from several perspectives, perhaps by several different NRC offices in the context of each office's responsibilities.

5. **Feedback to industry, the regulatory community and others** lessons learned in order to improve safety.

An abnormal occurrence (AO) is defined as follows:

Abnormal Occurrence - Section 208 of the Energy Reorganization Act of 1974 identifies an abnormal occurrence as an unscheduled incident or event that the NRC determines to be significant from the standpoint of public health or safety and requires a quarterly report of such events to be made to Congress.

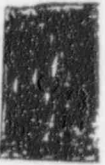
The Agreement States voluntarily provide draft AO writeups for events that meet the AO criteria through the Agreement State exchange of information program. The draft writeups provide information consistent with the samples provided in the Appendix to this handbook. The AO criteria are described in NUREG-0090, "Report to Congress on Abnormal Occurrences," a quarterly report prepared by AEOD. The Appendix to this Handbook contains a description of the current AO criteria. The criteria are currently under revision. (The revised criteria are expected to be published for

comment in a *Federal Register Notice* in early 1995.)

Feedback and Follow-on Actions - As part of operating experience feedback, AEOD may provide lessons learned to the industry and the regulatory community, and may make recommendations to improve operational safety. Specific recommendations may involve: changes in operations or procedures; improvements in training; changes in guidance documents or the inspection program; the issuance of reports, or improvements in data collection, assessment, and feedback. AEOD publishes studies of specific operational events and, as appropriate, recommends action to reduce the probability that these events will recur with the same frequency or will lead to more serious events. AEOD also provides technical training programs and develops and provides videotapes to support various training programs.

Overview through Agreement State Program Reviews - Regular assessments and evaluations of event review, reporting, and follow-up are performed by the Regional State Agreements Officer, OSP and team members from other technical offices, as deemed necessary, during scheduled followup and routine biennial reviews of the Agreement State radiation control programs.

Resolution of Problems - Any disagreements in the implementation of these activities between other NRC offices and the Agreement States shall be referred to OSP.



SECTION II

Event Reporting Process

2.0 EVENT REPORTING PROCESS

Introduction

When submitting an event report, enough information about an event should be provided so that NRC can evaluate the event in terms of safety significance, long-term generic implications, and as a possible candidate for the "Abnormal Occurrence Report to Congress." The following guidance has been provided to help in submitting event information to the "Nuclear Materials Events Database (NMED)" or for written form event information, completing NRC Form 565 or 566, along with a **complete abstract and supporting documentation, when necessary**. Event information submitted in written form should be compatible to the information that is necessary for entry into the NMED system. Agreement States should generally, only submit information on incidents and events that meet the regulatory reporting requirements of Agreement State regulations.

Unique Event ID Number: Always begin the original event report and any updates to it, with the "Original Item No.," consisting of the State ID, year, sequentially assigned ID number, i.e., (NY-94-001), (NYC94-001), (UT-94-001). The "Original Item No." should be used for telephone, electronic or written notification of an event. This Original Item No. is to be specified by the State at the time of the initial telephone call, and used for all subsequent transmissions involving the specific event.

Prompt Notification

1. Agreement States should report to the NRC, within the next working day of being notified, significant events requiring prompt notification (within 24 hours or less) as determined under applicable Agreement State regulations and which are determined to be significant from the standpoint of public health and/or safety.

NOTE: Agreement States may use their discretion in reporting other events that do not meet regulatory requirements but have the potential for high media interest. (Significant event is defined in Table 1)

2. Agreement States should report the events by telephone to the NRC Operations Center, telephone No. (301) 816-5100, (301) 951-0550, and FAX (301) 816-5151.

The following information should be provided as a minimum:

- a. Original Item No.
 - b. License No.
 - c. Licensee
 - d. Event time, date, location
 - e. Event type
 - e. Any notifications, i.e., other agencies, patient, press release, etc.
 - f. Event description: release, isotope, activity, exposure(s), dose, contamination level(s), equipment, malfunction, model No., etc.
3. The NRC Operations Center will promptly notify the Region Duty Officer of Agreement State events.

4. All events reported to the NRC Operations Center will be entered into the Event Notification (EN) database and distribution channel.

5. Following Region procedures, the Regional State Agreements Officer (RSAO) will prepare Preliminary Notifications of Events or Unusual Occurrences (PNs) as appropriate, follow up on events with the Agreement State, and act as a point of contact for the NRC in developing additional information on the event. The RSAO is responsible for preparation of PNs on a given event in accordance with criteria contained in NRC Inspection Manual 1120. Please note that IM1120 recommends preparation of a PN within two hours of receiving information on a given event. The Region and the Office of Nuclear Material Safety and Safeguards will decide whether follow-up information and/or a follow-up PN will be issued on a case by case basis.

6. Agreement States should also provide a record of the event through the NMED database system as soon as they have sufficient information to indicate what happened (30 day report). This record should be updated as new or clarifying information is developed.

7. The Idaho National Engineering Laboratory (INEL) will receive information on the event for input into the Nuclear Material Events Database (NMED) as follows:

- (1) through the Preliminary Notification of Events or Unusual Occurrences (PN),
- (2) through the Operations Center Events Notification system, and

- (3) the record entry by the Agreement State.

Routine Event Reporting

1. Agreement States should report routine events within one month of being notified of an event by an Agreement State licensee or other person. (Routine event is defined in Table 1)

2. Agreement States should provide a record of the event through the NMED database system. Follow the procedures in the NMED Coding Manual provided by INEL.

Event Report Updates (followup information)

1. The initial **Unique Event ID Number (Original Item No.)** should be included whenever additional followup event information is provided to NRC.

2. Such documents may include, event reports submitted to the Agreement State by the licensee, and inspection or investigation reports. The followup event information may be extracted, summarized, and entered into NMED.

3. Follow the procedures for filing event update reports to ensure that complete information on events is input into the Material Events Database. These procedures are contained in the NMED Coding Manual provided by INEL.

4. Additionally, when providing follow-up reports, provide clear reference to documents on file at the State used to generate the event reports.

5. Written Followup Information: Written form followup reports of **significant** (24 hour notification requirement) events that are not readily available in electronic form or are too bulky (lengthy) to send via E-mail, i.e. licensee reports, inspection reports, State investigation reports, medical consultant report, etc. should be sent with a cover page (see p. 8 of the Handbook) to the Regional State Agreements Officer (RSAO) and the Deputy Director, OSP.

Any event information that is considered preliminary predecisional information by the State should be clearly identified on the cover page as follows: **"Preliminary, Not for Public Disclosure."**

Reporting Events through the Nuclear Material Events Database (NMED)

Agreement States can use the event preparation program (computer software distributed to the Agreement States at the end of October 1994) to prepare event reports. Reports in diskette form should be sent to the Idaho National Engineering Laboratory (INEL).

Beginning with the September 30, 1994 distribution of the interim database system, operating event data submitted by Agreement States and operating event data submitted to NRC by NRC licensees can be shared by NRC and the Agreement States. Agreement States will receive monthly updates of data direct from INEL.

An on-line system, replacing the diskette system for preparing and transmitting event reports to NRC, will be available by

the end of calendar year 1995. This system will also provide database query and reporting capabilities. Beginning on November 30, 1994, the IRM software contractor will begin testing this system with query capability only.

Written Reports

Agreement States that choose not to voluntarily participate in the Nuclear Material Events Database (NMED) program, may complete NRC Form 565, "Event Report" or NRC Form 566, "Medical Misadministration," whichever is applicable. These forms provide limited basic information only. Written report information should be compatible to the level of detail on an event that is necessary for the "NMED" database. Therefore, in **addition**, please attach any background documentation, i.e., State summary report, licensee event description, inspection report, etc. that provides a **complete description** of the event and any actions taken to prevent a recurrence. Please use these guidelines when preparing a written event report for an incident that has occurred in your State. Please send your completed form and supporting descriptive documents, along with a cover page (see p. 8 of the Handbook) to the Deputy Director, OSP.

The following pages contain a consecutive listing of the items that are included in NRC Form 565, Event Report, and NRC Form 566, Medical Misadministration report form, as well as, any additional necessary information, followed by a description of the information that should be provided. Also provided is a sample cover page for sending in written event information.

EVENT REPORT COVER PAGE

AGREEMENT STATE

EVENT REPORT NO. _ - _ - _

DATE:

TO:

**Deputy Director
Office of State Programs**

SUBJECT:

STATE:

Signature and Title: _____

EVENT REPORT FORM 565
(Basic Information)

This form is an option for those Agreement States who choose not to voluntarily participate in the Nuclear Material Events Database (NMED). The information provided shall be compatible to the information needed for the NMEI system and presented clearly in typed form.

- | | |
|--|---|
| <p>(a) Licensee (Name, city and State)</p> <p>(b) Original Item No. (NYC-94-001) (MS-94-001), State ID, year, sequentially assigned ID number.</p> <p>(c) Type of License</p> <p>(d) License No.</p> <p>(e) This Item No. (Update No. 01, 02, etc.)</p> <p>(f) Abnormal Occurrence (Y\N). See AO Criteria contained in NUREG-0090</p> <p>(g) Follow-up Report (Y\N) for information that becomes available after the initial report has been submitted.</p> <p>(h) Isotope (i.e., Cs-137; Ir-192, Co-60, Am-241, Po-210 etc. (clearly identify any compound radioisotopes).</p> <p>Need to clearly show radiopharmaceuticals, as well as isotopes.</p> | <p>(i) Type of Isotope (AEA material, accelerator produced, NARM, etc.)</p> <p>(j) Date of Event</p> <p>(k) Date of this Report</p> <p>(l) Amount of Radioactive Material (Do not complete form if below regulatory requirement).</p> <p>(m) Events Involving Overexposure</p> <ul style="list-style-type: none">- No of Overexposures- Source of Radiation- Type of Individual- Event Location- Dose <p>(n) Leaking Source</p> <p>(o) Lost or Stolen Material</p> <ul style="list-style-type: none">- Event- Event Location- Probable Disposition <p>(p) Release of Material</p> <ul style="list-style-type: none">- Form- Event- Location <p>(q) Events Involving Facilities</p> <p>(r) Events Involving Gauges</p> <ul style="list-style-type: none">- Type- Event <p>(s) Events Involving Radiography</p> <ul style="list-style-type: none">- Location- Event |
|--|---|

Event Reporting Handbook

- (t) Event Involving an Irradiator
- (u) Events Involving Teletherapy
- (v) Transportation Event
 - Location
 - Shippers name and address
 - Package type
 - Package Identification No.
- (w) Regulatory reporting requirement
(Indicate applicable licensee reporting requirement)
- (x) **ABSTRACT:** Include where, when, how, and why. (Describe the cause of the event(s), all persons involved and any health effects, and licensee corrective actions.) Include any actions taken by the State such as enforcement. Attach any supporting documentation, i.e., State summary report, licensee report, inspection report, etc.

**MEDICAL MISADMINISTRATION
FORM 566 (Basic Information)**

This form is an option for Agreement States that choose not to voluntarily participate in the Nuclear Material Events Database (NMED). The information provided shall be compatible to information needed for the NMED system and presented clearly in typed form.

- (a) Licensee (Name, city and State)
- (b) Original Item No. (NYC-94-001) (MS-94-001), State ID, year, sequentially assigned ID number.
- (c) Type of License (Broad scope, private practice medical, etc.)
- (d) License No.
- (e) This Item No. (Update No. 01, 02, 03, etc.)
- (f) Abnormal Occurrence (Y/N). See AO Criteria contained in NUREG-0090.
- (g) Follow-up Report (Y/N)
- (h) Patient\Responsible Relative
Notified (Y/N)
- (i) 15 day Written Report Provided (Y/N)
- (j) Date of Event
- (k) Date of this Report

- (l) Regulatory reporting requirement (Indicate applicable licensee reporting requirement)

(m) **ABSTRACT:**

Initial report: Include where, when, how, and why, (provide as much information as is known at the time of the initial report).

NOTE: Need to clearly show radiopharmaceuticals, as well as isotopes.

Isotope and dose involved: (i.e., 200 μ Ci of Iodine Hippurate I-131; 5 mCi of Iodine-125; 10 mCi of Iodine-131; 40 rad of Cs-137; 2 mCi of Tc-99m; 5 mCi of P-32, etc. (clearly identify any compound radioisotopes).

Exposure: Intended and actual

Treatment plan: fractionations, if any.

Device (Equipment) involved: High Dose Rate Afterloader, Make and Model No. _____, non-AEA Accelerator, X-Ray, etc. (where applicable).

Systems: Computer program and developer.

Referring Physician notified: (Y/N)

Abstract Information cont.

Include information on all person(s) that may have been involved including employees, i.e. assistants, technicians, nurses, etc. Where applicable, describe the prescribed treatment plan and the actual treatments administered, including fractionations. Provide an assessment of any expected effects on all those who were exposed, for unusual cases it may be necessary to include a medical consultant. What caused the event? Consultant used, identify. Describe licensee's corrective actions.

Updated Information: provide any updated information in future reports, use the Original Item ID# (MS-94-001) and indicate on the cover page that it is updated information.

INFORMATION THAT WILL BE REQUIRED FOR PROPOSED ABNORMAL OCCURRENCES

In accordance with Section 208 of the Energy Reorganization Act of 1974 (Public Law 93-438, 42 USC 5848) the Commission shall submit to Congress each quarter a report listing any abnormal occurrences... each report shall contain:

- (a) The date and place of each occurrence;
- (b) The nature and probable consequences (effects) of each occurrence;
- (c) The cause or causes of each; and,
- (d) Any action taken to prevent recurrence,

(this includes corrective actions taken by the licensee, and any action taken by the State, (i.e. satisfied with the following corrective actions taken by the licensee ..., and/or any actions taken by the State, including enforcement.)

The Agreement States support the NRC in their effort to keep Congress apprised of any significant events that may directly affect public health and safety by voluntarily providing information on proposed abnormal occurrences that have occurred in their State.

ABNORMAL OCCURRENCE REPORTS

Provisions for NRC obtaining sufficient details to file Abnormal Occurrence Reports to Congress.

1. AEOD supervisor will directly contact supervisor at Agreement State and request additional information if needed to prepare AO reports.
2. Agreement States will screen events for events meeting AO criteria and recommend events for potential AOs. AEOD also screens events for events meeting AO criteria; and in some cases, AEOD may independently recommend events for potential AOs. NRC Management Directive 8.1 "Abnormal Occurrence Reporting" currently is being revised to address Agreement State screening of events for potential AOs and other issues.
3. Agreement States, in accordance with instructions in Appendix A to this Handbook, will prepare write-up for potential AO events.
4. **Future goal:** Improve data collection and event reporting by Agreement States and revise Abnormal Occurrence write-ups to make write-up more closely linked to information in the Material Events Database to eliminate need for Agreement States to provide draft Abnormal Occurrence write-ups.

**EDITORIAL STYLE FOR NUMERICAL
SCIENTIFIC TERMS**

Metric System: Use dual units, first use International System of Units (SI) with the English unit equivalent following in parentheses. Spell out the first time it appears, continue with an abbreviation. For example:

1000 centigray (cGy) (1000 rad) the first time, and continue with 1000 cGy (1000 rad).

50 millisieverts (mSv) (5 rem)

730 megabecquerel (MBq) (20.4 mCi)

UNITS OF RADIATION DOSE
(As defined in § 20.1004(a))

Gray (Gy) is the SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 joule/kilogram (100 rads).

Rad is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/grams or 0.01 joule/kilogram (0.01 gray).

Rem is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rems is equal to the absorbed dose in rads multiplied by the quality factor (1 rem = 0.01 sievert).

Sievert is the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sieverts is equal to the absorbed dose in grays multiplied by the quality factor (1 Sv = 100 rems).

The following three tables provide useful information on 1. Definitions of event categories, 2. Reportable Events, and 3. Examples of reported events and sources of information.

Table 1
DEFINITIONS OF EVENT CATEGORIES

Potential Abnormal Occurrences (AO)	An abnormal occurrence is an unscheduled incident or event which the Commission has determined to be significant from the standpoint of public health or safety. NRC has established specific criteria to evaluate the significance of an event as a potential AO (see Appendix for additional information).
Other Significant Events	Any event involving licensed nuclear materials that does, will, or may impact public health and safety. Incidents that fall under this category should be reported by the licensee to the appropriate regulatory agency within 24 hours. As a minimum, this should include events that are required under NRC and compatible State regulations, such as 10 CFR 20.2202 (a), (b); §§30.50(a), (b); §§35.33(a).
Routine Events	Any event involving licensed nuclear material that does, will or may lead to or may be part of a pattern that could pose a health and safety risk. This category includes events that are required to be reported within 30 days such as 10 CFR 34.40. Events that do not require immediate notification. Incidents that do not meet the regulatory threshold that could lead to or may be part of a pattern that could pose a health and safety risk are also included in this category.

Table 2
REPORTABLE EVENTS

Typical items covered under reporting requirements include the following:

10 CFR 20.2201	reports of theft or loss of licensed material.
10 CFR 20.2202	immediate notifications... and 24 hour notification criteria for events involving byproduct, source, or special nuclear material.
10 CFR 20.2203	radiation exposures, releases or concentrations of radioactive material that exceed the limits.
10 CFR 21.21	reporting of defect in basic component, structure or system.
10 CFR 30.50	reporting of events involving: Prevention of immediate protective action, Unplanned contamination restricting access > 24 hours, Safety equipment failed or disabled, Unplanned medical treatment of contaminated person, Fire, explosion affecting integrity of material or container.
10 CFR 34.30	radiation safety reporting requirements for radiographic operations.
10 CFR 35.33	notifications, reports, and records of misadministrations.
10 CFR 35.2	definitions, covering "Medical Use of Byproduct Material."
10 CFR 36.83	notification of events involving irradiators.
10 CFR 39.77	notification of incidents and lost sources, abandonment procedures for irretrievable source
10 CFR 40.60	reporting requirements for domestic licensing of source material to receive, possess, use, transfer, or deliver source and byproduct material
10 CFR 70.50	reporting requirements for incidents involving special nuclear material (SNM).

Table 3
EXAMPLES OF REPORTED EVENTS AND SOURCES OF INFORMATION

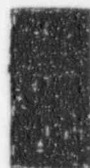
OPERATIONAL EVENTS

- Medical Misadministrations (10 CFR Part 35)
 - Radiopharmaceutical
 - Brachytherapy
 - Teletherapy
 - Gamma Stereotactic Radiosurgery
- Radiation overexposures exceeding Part 20 dose limits
- Unplanned contamination events
- Radiography equipment failures
- Loss or release of radioactive material
- Leaking sealed sources
- This would include reporting of incidents or conditions that could have caused a radiation exposure or loss of material or otherwise affected public health and safety, but did not meet the regulatory requirement.

SOURCES OF INFORMATION

- Voluntary event reports prepared by the Agreement States
- Voluntary submission of licensee event reports by Agreement States to NRC
- Voluntary submission of proposed abnormal occurrence reports
- Analysis of and/or response to Agreement State incident/allegations program during performance of routine program review by OSP and the Regional State Agreements Officer (RSAO).

APPENDIX



(4-84)

EVENT REPORT

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 1 HOUR. THIS INFORMATION IS REQUESTED TO ASSESS MATERIALS EVENTS AND EVALUATE ACTIONS NECESSARY TO PREVENT THEIR RECCURENCE. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-4 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0178), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE		CITY AND STATE		ORIGINAL ITEM NUMBER	
TYPE OF LICENSE (i.e., Radiography, Private Practice Medical, etc.)		LICENSE NUMBER		THIS ITEM NUMBER	
ABNORMAL OCCURRENCE	FOLLOW-UP REPORT	ISOTOPE	TYPE OF ISOTOPE		DATE OF EVENT
YES	YES		AEA MATERIAL		DATE OF THIS REPORT
NO			ACCELERATOR PRODUCED		
			NORM		
AMOUNT OF RADIOACTIVE MATERIAL (If amount of material is below exempt quantity, do not complete this form)					
< 1 MILLICI	100 MILLICI - < 1 CI	10 CI - 100 CI	UNKNOWN		
1 MILLICI - < 100 MILLICI	1 CI - < 10 CI	> 100 CI			
EVENTS INVOLVING OVEREXPOSURE					
NUMBER OF OVEREXPOSURES	TYPE OF INDIVIDUAL	EVENT LOCATION	DOSE TO	DOSE	RAD
			WHOLE BODY		
SOURCE OF RADIATION	EMPLOYEE	RESTRICTED AREA	LENS OF EYE		
EXTERNAL	MINOR EMPLOYEE	UNRESTRICTED AREA	EXTREMITY		
INTERNAL	EMBRYO/FETUS	CONTROLLED AREA	SKIN		
BOTH	PUBLIC		ORGAN		
LEAKING SOURCE					
LOST OR STOLEN MATERIAL					
EVENT	EVENT LOCATION	PROBABLE DISPOSITION			
LOST	FIXED SITE	WELL LOGGING RECOVERED SOURCE			
FOUND	TEMPORARY JOB SITE	WELL LOGGING IRRETRIEVABLE SOURCE			
THEFT	LICENSED VEHICLE	COMMERCIAL WASTE			
THEFT, WITH FORCE	COMMERCIAL CARRIER	INCINERATOR			
	OTHER (Specify)	SCRAP METAL			
RELEASE OF MATERIALS					
FORM	EVENT	LOCATION			
SOLID	SPILL	RESTRICTED AREA			
LIQUID	TRANSPORTATION	UNRESTRICTED AREA			
GAS	OTHER (Specify)	CONTROLLED AREA			
EVENTS INVOLVING FACILITIES					
FIRE	SPILL	OTHER (Specify)			
DAMAGE TO DEVICE	> 24-HOUR DENIAL OF ACCESS				
EXPLOSION	DAMAGE TO SAFETY EQUIPMENT				
EVENTS INVOLVING GAUGES			EVENTS INVOLVING RADIOGRAPHY		
TYPE	EVENT	LOCATION	EVENT		
GENERAL LICENSE	SHUTTER	FIXED	SOURCE DISCONNECT		
EXEMPT	MOISTURE/DENSITY GAUGE DAMAGE	TEMPORARY JOB SITE	SOURCE NOT RETURNED TO FULLY SHIELDED POSITION		
SPECIAL LICENSE	LOST/STOLEN		CABLE FAILURE		
FIXED	OTHER (Specify)		FAILURE TO FOLLOW PROCEDURES		
PORTABLE					
EVENT INVOLVING AN IRRADIATOR		MANUFACTURER	MODEL	SERIAL NUMBER	
EVENTS INVOLVING TELETHERAPY					

ABSTRACT (Include the cause of the event(s) and licensee corrective action. May be continued on the reverse side)

MEDICAL MISADMINISTRATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 1 HOUR. THIS INFORMATION IS REQUESTED TO ASSESS MISADMINISTRATIONS AND EVALUATE ACTIONS NECESSARY TO PREVENT THEIR RECURRENCE. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0178), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE		CITY AND STATE		ORIGINAL ITEM NUMBER
TYPE OF LICENSE (e.g., Broad Scope, Private Practice Medical, etc.)		LICENSE NUMBER		THIS ITEM NUMBER
ABNORMAL OCCURRENCE		FOLLOW-UP REPORT		DATE OF EVENT
YES	YES	YES	DATE OF THIS REPORT	
NO	NO	NO		

SODIUM IODINE, I-125 OR I-131, > 30 MICROCURIES

- ☐ WRONG PATIENT
☐ WRONG RADIOPHARMACEUTICAL
☐ ADMINISTERED DOSE DIFFERS FROM PRESCRIBED DOSE BY > 20% AND DIFFERENCE EXCEEDS 30 MICROCURIES

THERAPEUTIC RADIOPHARMACEUTICAL DOSE, OTHER THAN I-125 OR I-131

- ☐ WRONG PATIENT
☐ WRONG RADIOPHARMACEUTICAL
☐ WRONG ROUTE OF ADMINISTRATION
☐ ADMINISTERED DOSE DIFFERS FROM PRESCRIBED DOSE BY > 20%

STEREOTACTIC RADIOSURGERY (GAMMAKNIFE)

- ☐ WRONG PATIENT
☐ WRONG TREATMENT SITE
☐ ADMINISTERED DOSE DIFFERS FROM PRESCRIBED DOSE BY MORE THAN 10%

TELETHERAPY

- ☐ WRONG PATIENT
☐ WRONG MODE OF TREATMENT
☐ WRONG TREATMENT SITE
☐ ADMINISTERED DOSE DIFFERS FROM PRESCRIBED DOSE BY MORE THAN 10% IF THERE ARE 3 OR FEWER FRACTIONS PRESCRIBED, OR WHEN WEEKLY CALCULATED ADMINISTERED DOSE EXCEEDS PRESCRIBED DOSE BY > 30% OR WHEN CALCULATED TOTAL ADMINISTERED DOSE DIFFERS FROM PRESCRIBED DOSE BY > 20%

BRACHYTHERAPY

- ☐ WRONG PATIENT
☐ WRONG RADIOISOTOPE
☐ WRONG TREATMENT SITE
☐ LEAKING SOURCE
☐ ONE OR MORE SOURCES NOT REMOVED AT END OF TREATMENT
☐ CALCULATED ADMINISTERED DOSE DIFFERS FROM PRESCRIBED DOSE BY > 20%

DIAGNOSTIC RADIOPHARMACEUTICAL DOSE, OTHER THAN QUANTITIES THAT EXCEED 30 MICROCURIES OF I-125 OR I-131, OR BOTH, WHEN THE PATIENT DOSE EXCEEDS 5 REM EFFECTIVE DOSE EQUIVALENT OR 50 REM ORGAN DOSE AND INVOLVES

- ☐ WRONG PATIENT
☐ WRONG RADIOPHARMACEUTICAL
☐ WRONG ROUTE OF ADMINISTRATION
☐ ADMINISTERED DOSE DIFFERS FROM PRESCRIBED DOSAGE

ABSTRACT (Include the cause of the misadministration, contributing factors, and licensee corrective action. May be continued on the reverse side.)

APPENDIX

ABNORMAL OCCURRENCE CRITERIA

The following criteria, used to determine abnormal occurrence (AO), were set forth in an NRC policy statement published in the Federal Register on February 24, 1977 (Vol. 42, No. 37, pages 10950-10952).

An event will be considered an AO if it involves a major reduction in the degree of protection of the public health or safety. Such an event would involve a moderate or more severe impact on the public health or safety and could include but need not be limited to:

1. Moderate exposure to, or release of, radioactive material licensed by or otherwise regulated by the Commission;
2. Major degradation of essential safety-related equipment; or
3. Major deficiencies in design, construction, use of, or management controls for licensed facilities or material.

Examples of the types of events that are evaluated in detail using these criteria are:

For All Licensees

1. Exposure of the whole body of any individual to 25 rem or more of radiation; exposure of the skin of the whole body of any individual to 150 rem or more of radiation; or exposure of the feet, ankles, hands or forearms of any individual to 375 rem or more of radiation [10 CFR 20.403(a)(1)], or equivalent exposures from internal sources.
2. An exposure to an individual in an unrestricted area such that the whole body dose received exceeds 0.5 rem in one calendar year [10 CFR 20.105(a)].
3. The release of radioactive material to an unrestricted area in concentrations which, if averaged over a period of 24 hours, exceed 500 times the regulatory limit of Appendix B, Table II, 10 CFR Part 20 [CFR 20.403(b)(2)].
4. Radiation or contamination levels in excess of design values on packages, or loss of confinement of radioactive material such as (a) a radiation dose rate of 1000 mrem per hour three feet from the surface of a package containing the radioactive material, or (b) release of radioactive material from a package in amounts greater than the regulatory limit.

Event Reporting Handbook

5. Any loss of licensed material in such quantities and under such circumstances that substantial hazard may result to persons in unrestricted areas.
6. A substantiated case of actual or attempted theft or diversion of licensed material or sabotage of a facility.
7. Any substantiated loss of special nuclear material or any substantiated inventory discrepancy that is judged to be significant relative to normally expected performance and that is judged to be caused by theft or diversion or by substantial breakdown of the accountability system.
8. Any substantial breakdown of physical security or material control (i.e., access control, containment, or accountability systems) that significantly weakened the protection against theft, diversion, or sabotage.
9. An accidental criticality [10 CFR 70.52(a)].
10. A major deficiency in design, construction, or operation having safety implications requiring immediate remedial action.
11. Serious deficiency in management or procedural controls in major areas.
12. Series of events (where individual events are not of major importance), recurring incidents, and incidents with implications for similar facilities (generic incidents) that create major safety concern.

Medical Misadministrations

The NRC policy statement on Abnormal Occurrences (AOs) was published before licensees were required to report medical misadministrations to the NRC. Therefore, during 1984, NRC developed guidelines for selecting such events for AO reporting. These guidelines, which are summarized in Table A-1, augment the NRC policy statement.

The AO criteria guidelines are currently under development to bring them into conformance with new medical misadministration definitions that became effective on January 27, 1992.

Event Reporting Handbook

Table A-1
NRC Guidelines for Selecting Medical Misadministration Events
for Abnormal Occurrence (AO) Reporting

AO Reporting Threshold

Event Type	Diagnostic Exposure	Therapeutic Exposure
(1) Administering a radiopharmaceutical or radiation from a sealed source other than the one intended.	<p>If the improper administration results in any part of the body receiving unscheduled radiation, an AO report should be proposed if:</p> <ul style="list-style-type: none"> (a) the actual dose to the wrong body part is greater than five times the upper limit of the normal range of exposures prescribed for diagnostic procedures involving that body part, <u>or</u> (b) there are clinical indications of <u>any</u> adverse health effects to the wrong body part. <p>If the parts of the body receiving radiation improperly would have received radiation anyway, had the proper administration been used, an AO report should be proposed if:</p> <ul style="list-style-type: none"> (a) the actual dose is greater than five times that intended to the above described body parts, <u>or</u>, (b) the above described body parts show signs of adverse health effects greater than expected had the proper administration been used. 	<p>If the improper administration results in any part of the body receiving unscheduled radiation, an AO report should be proposed for any such event.</p> <p>If the parts of the body receiving radiation improperly would have received radiation anyway, had the proper administration been used, an AO report should be proposed if:</p> <ul style="list-style-type: none"> (a) the actual dose is greater than 1.5 times that intended to the above described body parts, <u>or</u>, (b) the actual dose is less than 0.5 times that intended to the above described body parts, <u>or</u>, (c) the above described body parts show signs of adverse health effects greater than expected had the proper administration been used, <u>or</u>
(2) Administering a radiopharmaceutical or radiation to the wrong patient.	<p>An AO report should be proposed if:</p> <ul style="list-style-type: none"> (a) the actual dose to the wrong patient exceeds five times the prescribed dose for the intended patient, <u>or</u> (b) the event results in any adverse health effects. 	<p>An AO report should be proposed for any such event.</p>

Event Reporting Handbook

Table A-1 (Continued)

AO Reporting Threshold

<u>Event Type</u>	<u>Diagnostic Exposure</u>	<u>Therapeutic Exposure</u>
(3) Administering a radiopharmaceutical or radiation by a route of administration other than that intended by the prescribing physician.	Same guidelines as for Event Type 1.	Same guidelines as for Event Type 1.
(4) Administering a diagnostic dose of a radiopharmaceutical differing from the prescribed dose by more than 50 percent.	<p>An AO report should be proposed if:</p> <ul style="list-style-type: none"> (a) the actual dose is greater than five times the prescribed dose, <u>or</u>, (b) the event results in adverse health effects worse than expected for the normal range of exposures prescribed for the diagnostic procedure. 	Not applicable.
(5) Administering a therapeutic dose of a radiopharmaceutical differing from the prescribed dose by more than 10 percent; or administering a therapeutic radiation dose from a sealed source such that errors in the source calibration, time of exposure, and treatment geometry result in a calculated total treatment dose differing from the final prescribed total treatment dose by more than 10 percent.	Not applicable.	<p>An AO report should be proposed if:</p> <ul style="list-style-type: none"> (a) the actual dose is greater than 1.5 times the prescribed dose, <u>or</u>, (b) the actual dose is less than 0.5 times the prescribed dose, <u>or</u> (c) the event results in adverse health effects worse than would be expected for the normal range of exposures prescribed for the therapeutic procedure, <u>or</u>, (d) the event (regardless of any health effects) affects two or more patients at the same facility.

Event Reporting Handbook

Table A-1 (Continued)

AO Reporting Threshold

Event Type

- (6) Recurring or series of events
(regardless of the number of
patients or facilities involved.)

Diagnostic and Therapeutic Exposure

For either diagnostic or therapeutic exposures, an AO report should be proposed for recurring events or a series of events (in which each individual misadministration is not of major importance) that create a significant public health or safety concern.

- (7) Generic events.

For either diagnostic or therapeutic exposures, an AO report should be proposed for misadministrations with generic implications that create a significant public health or safety concern.

* * * * *

GUIDELINES FOR ABNORMAL OCCURRENCE WRITE-UPS

All AO write-ups should be complete, up-to-date, and written in the proper format in a level that is understandable to non-technical readers. Please do not use **bold** or *italics* in your writeup; use underline instead. Any special fonts will be added during the publishing stage by the Technical Publications Specialist using the Kodak Ektaprint Electronic Publishing System.

NOTE: Those Agreement States that already have INTERNET E-Mail capability may electronically send their AO information to OSP via Internet using WordPerfect. Convert the file to a "DOS text" file by using the "Text In/Out" function key in WordPerfect; add ".txt" as the file extension and attach it to your E-mail transmission.

Margin notation - Indicate the Original ID No., State ID-YR-ITEM NO. (XX-94-01).

First paragraph - State the particular AO criteria. Refer to the most recent report (NUREG-0090), Appendix A. Agreement State events shall identify the State and the date the information was provided.

Date and Place - Self explanatory

Nature and Probable Consequences - Summarize the event and explain why the event is important. State when you received notification from the licensee. Provide the specific details of the event, i.e., exposure (where applicable), source, indicate the specific isotope(s) (compound), quantity, dose (where applicable), treatment plan (where applicable), equipment, manufacturer and Model No. Describe any immediate actions taken by the licensee or the State (confirmatory action letter, special inspection, enforcement conference, enforcement action(s), etc. The write-up should answer where, when, how, why, and efforts to prevent recurrence.

For occupational, medical, or public overexposures identify whether the person was notified. For medical misadministrations, include the intended and actual treatment plan, identify any health effects. Mention if a medical consultant has been contracted to review the event. Include the consultant's conclusions and identify the effects on the patient. Never mention any health effects on a patient without attributing the statement to the licensee or medical consultant. Indicate whether the physician was notified.

NRC policy states that all documents must be published in dual units (Metric and English).

Event Reporting Handbook

Cause or Causes - Self explanatory

Action(s) taken by the licensee, NRC, or Agreement State to prevent recurrence - Provide the licensee actions in addition to the State actions (Inspection reports, enforcement actions, civil penalties, information notices, bulletins, etc.)

Describe the State agency action to emphasize the corrective actions taken that resulted in the State closing out the item, i.e., was State satisfied with the licensee's corrective actions, if so, please indicate that the "state was satisfied with the following corrective actions taken by the licensee" or "the licensee has complied with the corrective actions recommended by the State as follows . . ." Were there any enforcement actions, penalties, etc.?

Last paragraph - Indicate the status by stating whether the AO is closed or remains open waiting additional significant information. An item should only be identified as open if the State expects additional significant action may take place that will be covered in a followup report. The followup report should be sent to NRC for inclusion as an update to the original AO write-up.

SAMPLE INDUSTRIAL RADIOGRAPHY AO REPORT

State ID-Yr-No.

(XX-94-01)

Industrial radiography overexposure at (Name of facility, City, State) location.

In accordance with the AO criteria an extremity exposure greater than 375 rem is considered an abnormal occurrence.

Date and Place: The Agency was notified on (notification date), by (Licensee), that a radiography overexposure had occurred on (event date), at (facility, location (City, State)).

Source\Quantity

Exposure

Nature and Probable Consequences: On (event date), at approximately 7:00 PM, a radiography trainer working for (Licensee) in (facility, location, (City, State)), experienced a source disconnect of a 96 curie iridium-192 radiography source, that resulted in an extremity exposure of at least 500 rem to the thumb and index finger of a radiographer's left hand. The radiography trainer was radiographing welds on a 12 inch pipe line in a five foot deep ditch at (Licensee), and began experiencing difficulty with the source exiting from and retracting into the camera earlier in the day. After completing a radiograph, while trying to retract the source to the shielded position, survey meter readings indicated a source disconnect. The radiographer got a one inch thick lead sheet from the radiography truck and covered the source in the guide tube. By this time it was dark. The radiographer helper rope off a larger area and stayed a distance from the source. He then asked the (Licensee) inspector to notify the radiography company RSO, but to tell him that everything was under control, and that the radiographer could handle the situation. As the trainer disconnected the guide tube, the source assembly fell into the mud at the bottom of a ditch. While picking up the source assembly from the mud with channel lock pliers, the source slipped. He instinctively reached for and straightened the source assembly (pigtail) with his hand, apparently touching the source in the process. He placed the pigtail into the camera, intending to place the source capsule in first. He noticed the survey meter reading high, indicating the source was outside of the camera. The radiographer then removed the source from

the camera and placed it under the lead sheet. He then removed the lockbox from the camera, inserted the source end of the pigtail, replaced the lockbox and locked it. The source was now secured in the shielded position. The barricades were taken down, the equipment was loaded on the truck, and the crew returned to the office. The company did not notify the Agency of the disconnect.

*Equipment \ Device
(Manuf. \ Model No.)*

About 10 days later, the radiographer started experiencing discomfort in his left thumb and index finger and visited a doctor for treatment on March 9, 1994, March 14, and April 1, 1994. On April 11, 1994, the RSO and the radiographer visited the Agency office and reported the incident. The Agency investigated the incident at this time. The radiographer's film badge reading was 1.06 rem whole body. An inspection of the camera was performed by the company RSO the day after the incident. The Licensee and the State Agency determined that the company had ordered two model #22 pigtails and sources from (Manufacturer, City, State), for the company's Gamma Century radiography cameras. (Manufacturer) inadvertently sent a model #22 and a Model #23 pigtail instead of the two model #22's ordered. The two models appear similar, but close examination reveal two differences. The model #22 is manufactured with 1/8 inch aircraft cable and a 3/4 inch connector, the model #23 is manufactured with teleflex cable, the same as the drive cable material, and a one inch connector. The model #23 is not made to be used in the Gamma century camera. The radiography company assumed the two pigtails sent to them were model #22's. The #23 was mistakenly placed in the Gamma century camera and is apparently the cause of the disconnect. The Agency investigation determined that the trainer had received at least a 1500 rem exposure to the thumb and index finger of the left hand. The (State) Radiation Control Program, in which the manufacturer was licensed, was informed of the incident and investigated the manufacturer's (Licensee) error in sending the two different pigtails to the radiography company.

Cause or Causes - The manufacturer's mistaken delivery of a pigtail model number different than the one ordered and the radiography company's assumption that the pigtails they

received were the models they ordered, resulted in a pigtail being used in a camera for which it was not manufactured. The disconnect resulted from the difference in the length of the connectors between the two models. Also, the radiographer attempted an unauthorized recovery of the disconnected source. The radiographer was not trained in source recovery and had no previous experience with source disconnects.

Actions Taken to Prevent Recurrence

Licensee - Actions will be given at the enforcement conference.

State Agency - The Licensee and radiographer were cited for violations of the (State) Regulations for Control of Radiation. The Licensee was cited for the extremity exposure, unauthorized retrieval of a disconnected source, failure to immediately notify the Agency of the incident, and failure to notify the Agency in writing within thirty days of the incident. The radiographer was cited for unauthorized retrieval of a disconnected source. The incident has been referred for escalated enforcement.

Status

This file is (open\closed) in (State). The event will remain open for additional information from the State of (State).

SAMPLE MEDICAL AO REPORT

State ID-YR-NO.
(XX-94-02)

Medical Brachytherapy Misadministration at
(Name of facility, City, State) location.

Criteria

In accordance with the AO criteria, administering a therapeutic dose that is greater than 1.5 times the prescribed dose should be considered an abnormal occurrence.

Date and Place - The Agency was notified on (Date), that a brachytherapy overexposure had occurred on (Event date(s)); at Facility; City and State location).

Procedure

Source(s)

Treatment plan

Device\Equipment

Nature and Probable Consequences - A 68-year-old woman with Stage II vaginal cancer was referred to the hospital's radiation therapy department for a gynecological brachytherapy procedure involving the afterloading of cesium-137 and iridium-192 sources. A plan was developed to deliver a total dose of 6000 centigray (cGy) (6000 rad) by a combination of 4000 cGy (4000 rad) from an external beam (linear accelerator) and 2000 cGy (2000 rad) from vaginal implant therapy. The external beam therapy was completed on September 9, 1993. The patient was then evaluated and plans were made to complete the implantation portion of the treatment. The treatment plan for the implant therapy included calculations for the time required to deliver 6000 cGy (6000 rad). The dose already delivered by the external beam was not considered in the plan.

The attending physician reviewed the dose calculations on October 9, the fourth day of the implant, and determined that the duration of the implant treatment was likely to have been too long. He immediately removed the implants. Calculations revealed that the patient received 4000 to 4500 cGy (4000 to 4500 rad) from the brachytherapy treatment. Two days later, on Monday October 11, the attending physician verified with the physics staff that his dose calculations were correct. The patient received a total dose of 8000-8500 cGy (8000-8500 rad),

Actual vs. intended

administration

(4000 from external beam and 4000-4500 from the implant) rather than the 6000 cGy intended (4000 from external beam and 2000 from the implant). On October 11, the attending physician in radiation oncology reviewed the radiation therapy calculations and verified with staff the actual administered dose. A telephone report was made to the [Identify State Health Department] on October 12, 1993, and an on-site investigation by State staff was conducted on October 14. A written report from the licensee was submitted to the State agency on October 26. A committee of professionals convened to perform a quality review. As a result of a literature and standard practice review the committee concluded that the recommended treatment for Stage II vaginal carcinoma is generally in a range of 7000-7500 cGy (7000-7500 rad) total dose with an external dose of 4000-5000 cGy (4000-5000 rad) and delivery of the remaining dose by implant. Others have recommended up to a total dose of 8500 cGy (8500 rad). This patient while receiving more than her physician initially intended, did not receive a dose markedly beyond recommended treatment for her disease. The dose was within an acceptable range, therefore, it is not anticipated that any complications beyond those normally seen with treatment for this therapy will occur. However, the patient will be closely monitored for any complications and appropriate treatment will be provided. The patient had been notified of the event by the attending physician on October 20. A letter confirming the discussion of the event was also sent to the patient.

*Health effect
to patient*

*Patient
notification*

Cause or Causes - The reportable event was caused by a failure to account for the previously administered external beam therapy. The incident occurred due to lack of communication of the prior therapy during the planning of the brachytherapy treatment.

Actions Taken to Prevent Recurrence

Licensee - As soon as the licensee's management determined that a reportable event had occurred, they formed a committee of professionals not involved in the patient's care to conduct a quality assurance review. The committee concluded that the incident occurred due to lack of communication of the prior therapy during the planning of the brachytherapy treatment. They recommended that no brachytherapy be given without a signed, written prescription by the attending physician. The written prescription must contain information about all radiation therapy given to the patient. The medical center has adopted the committee's recommendations and has initiated training to the affected staff. This action should prevent a recurrence of a similar event.

State agency - The results of the on-site investigation by the State staff agrees with the findings of the licensee's quality assurance review. The licensee's proposal appears to be adequate to prevent recurrence.

Status

The State considers this item (open, closed).

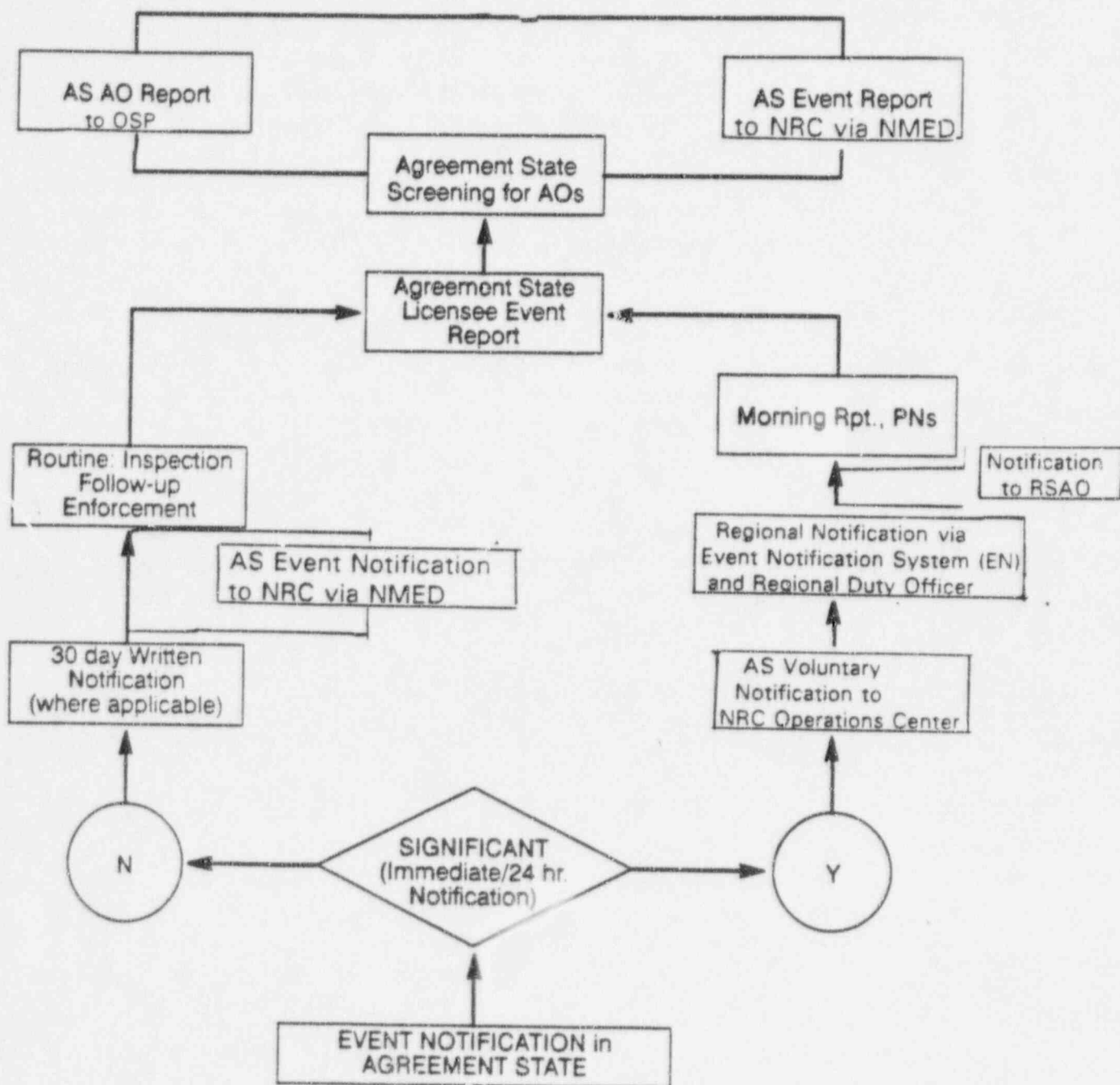
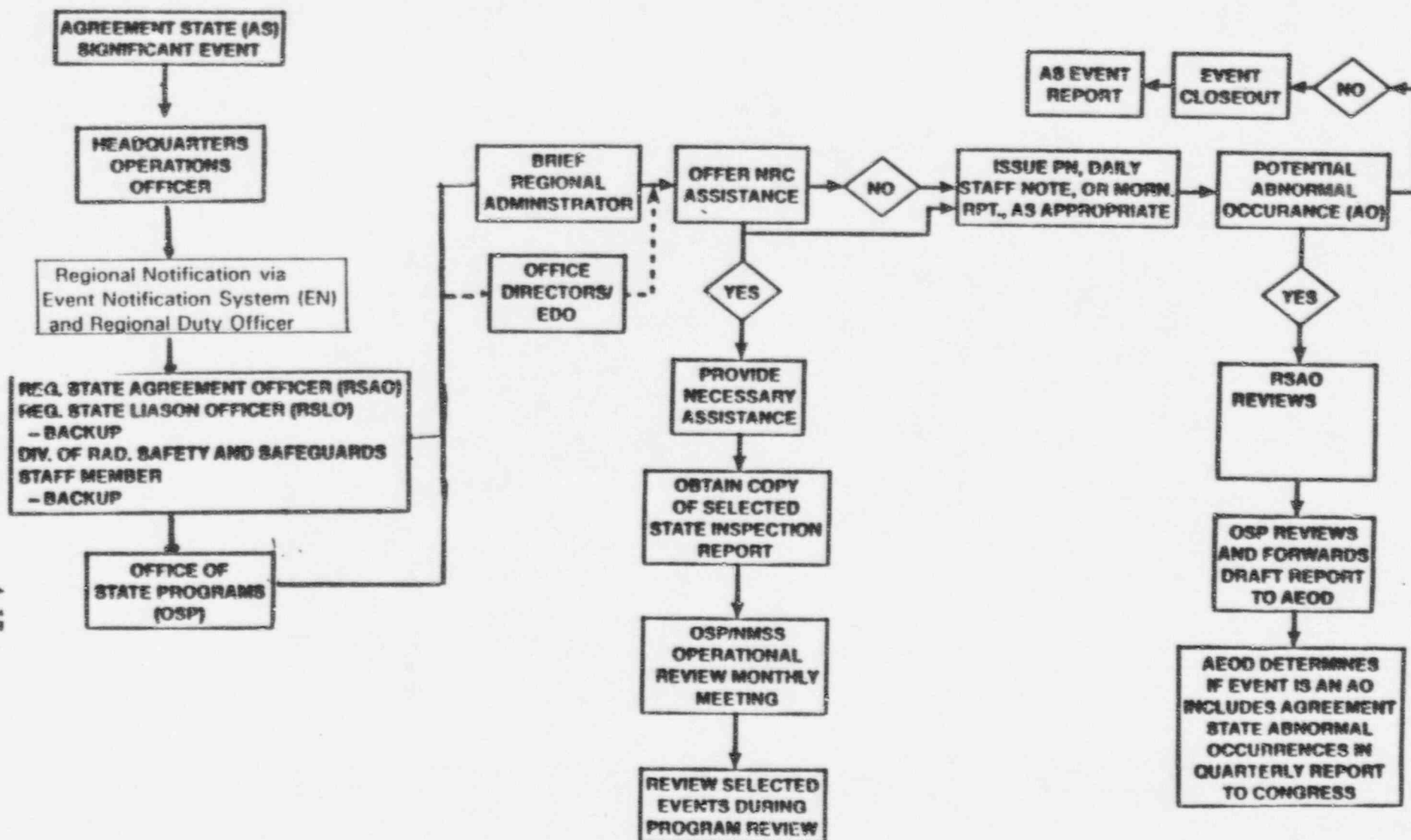


Figure 3. Reporting Process for Agreement State (AS) Incidents and Events.

Figure 4. **OSP AND REGIONAL RESPONSE TO AGREEMENT STATE SIGNIFICANT EVENTS**



AGREEMENT STATE PROGRAM



5/5/92

Figure 5. Map of the Agreement States

**COMMISSION NOTICES
REGULATORY GUIDE SERIES**

DIVISION 1 — POWER REACTORS

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
1.1	Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal System Pumps (Safety Guide 1)	—	11/70
1.2	(Withdrawn—See 56 FR 36175, 7/31/91)	—	—
1.3	Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Boiling Water Reactors	— 1 2	11/70 06/73 06/74
1.4	Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Pressurized Water Reactors	— 1 2	11/70 06/73 06/74
1.5	Assumptions Used for Evaluating the Potential Radiological Consequences of a Steam Line Break Accident for Boiling Water Reactors (Safety Guide 5)	—	03/71
1.6	Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems (Safety Guide 6)	—	03/71
1.7	Control of Combustible Gas Concentrations in Containment Following a Loss-of-Coolant Accident	— 1 2	03/71 09/76 11/78
1.8	Qualification and Training of Personnel for Nuclear Power Plants (Draft RS 807-5, Proposed Revision 2, published 2/79; Draft RS 807-5, Second Proposed Revision 2, published 9/80; Draft OL 403-5, Third Proposed Revision 2, published 1/85)	— 1 1-R 2	03/71 09/75 05/77 04/87
1.9	Selection, Design, and Qualification of Diesel-Generator Units Used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants (Draft RS 802-5, Proposed Revision 3, published 11/88)	— 1 2 3	03/71 11/78 12/79 08/93
1.10	(Withdrawn—See 46 FR 37579, 7/21/81)	—	—
1.11	Instrument Lines Penetrating Primary Reactor Containment (Safety Guide 11) Supplement to Safety Guide 11, Backfitting Considerations	—	03/71 02/72
1.12	Instrumentation for Earthquakes (Draft MS 140-5, Proposed Revision 2, published 7/81)	— 1	03/71 04/74
1.13	Spent Fuel Storage Facility Design Basis (for Comment) (Draft CE 913-5, Proposed Revision 2, published 12/81)	— 1	03/71 12/75
1.14	Reactor Coolant Pump Flywheel Integrity (for Comment)	— 1	10/71 08/75

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1.15	(Withdrawn—See 46 FR 37579, 7/21/81)	—	—
1.16	Reporting of Operating Information—Appendix A Technical Specifications (for Comment)	— 1 2 3 4	10/71 10/73 09/74 01/75 08/75
1.17	(Withdrawn—See 56 FR 30777, 7/5/91)	— —	— —
1.18	(Withdrawn—See 46 FR 37579, 7/21/81)	—	—
1.19	(Withdrawn—See 46 FR 37579, 7/21/81)	—	—
1.20	Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing	— 1 2	12/71 06/75 05/76
1.21	Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants	— 1	12/71 06/74
1.22	Periodic Testing of Protection System Actuation Functions (Safety Guide 22)	—	02/72
1.23	Onsite Meteorological Programs (Safety Guide 23) (Draft SS 926-4, Proposed Revision 1, published 9/80) (Draft ES 926-4, Second Proposed Revision 1, published 4/86)	—	02/72
1.24	Assumptions Used for Evaluating the Potential Radiological Consequences of a Pressurized Water Reactor Radioactive Gas Storage Tank Failure (Safety Guide 24)	—	03/72
1.25	Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors (Safety Guide 25)	—	03/72
1.26	Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants (for Comment)	— 1 2 3	03/72 09/74 06/75 02/76
1.27	Ultimate Heat Sink for Nuclear Power Plants (for Comment)	— 1 2	03/72 03/74 01/76
1.28	Quality Assurance Program Requirements (Design and Construction) (Draft RS 002-5, Proposed Revision 3, published 3/81)	— 1 2 3	06/72 03/78 02/79 08/85
1.29	Seismic Design Classification	— 1 2 3	06/72 08/73 02/76 09/78
1.30	Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment (Safety Guide 30)	—	08/72

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1.31	Control of Ferrite Content in Stainless Steel Weld Metal	— 1 2 3	08/72 06/73 05/77 04/78
1.32	Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants	— 1 2	08/72 03/76 02/77
1.33	Quality Assurance Program Requirements (Operation) (Draft RS 902-4, Proposed Revision 3, published 8/79) (Draft RS 902-4, Second Proposed Revision 3, published 11/80)	— 1 2	11/72 02/77 02/78
1.34	Control of Electroslag Weld Properties	—	12/72
1.35	Inservice Inspection of Ungrouted Tendons in Prestressed Concrete Containment Structures (Draft SC 810-4, Proposed Revision 3, published 4/79)	— 1 2 3	02/73 06/74 01/76 08/90
1.35.1	Determining Prestressing Forces for Inspection of Prestressed Concrete Containments	—	08/90
1.36	Nonmetallic Thermal Insulation for Austenitic Stainless Steel	—	02/73
1.37	Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants	—	03/73
1.38	Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants	— 1 2	03/73 10/76 05/77
1.39	Housekeeping Requirements for Water-Cooled Nuclear Power Plants	— 1 2	03/73 10/76 09/77
1.40	Qualification Tests of Continuous-Duty Motors Installed Inside the Containment of Water-Cooled Nuclear Power Plants	—	03/73
1.41	Preoperational Testing of Redundant On-Site Electric Power Systems To Verify Proper Load Group Assignments	—	03/73
1.42	(Withdrawn—See 41 FR 11891, 3/22/76)	—	—
1.43	Control of Stainless Steel Weld Cladding of Low-Alloy Steel Components	—	05/73
1.44	Control of the Use of Sensitized Stainless Steel	—	05/73
1.45	Reactor Coolant Pressure Boundary Leakage Detection Systems	—	05/73
1.46	(Withdrawn—See 50 FR 9732, 3/11/85)	—	—
1.47	Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems	—	05/73
1.48	(Withdrawn—See 50 FR 9732, 3/11/85)	—	—
1.49	Power Levels of Nuclear Power Plants	— 1	05/73 12/73

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1.50	Control of Preheat Temperature for Welding of Low-Alloy Steel	—	05/73
1.51	(Withdrawn—See 40 FR 30510, 7/21/75)	—	—
1.52	Design, Testing, and Maintenance Criteria for Postaccident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants	— 1 2	06/73 07/76 03/78
1.53	Application of the Single-Failure Criterion to Nuclear Power Plant Protection Systems	—	06/73
1.54	Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants	—	06/73
1.55	(Withdrawn—See 46 FR 37579, 7/21/81)	—	—
1.56	Maintenance of Water Purity in Boiling Water Reactors (for Comment)	— 1	06/73 07/78
1.57	Design Limits and Loading Combinations for Metal Primary Reactor Containment System Components	—	06/73
1.58	(Withdrawn—See 56 FR 36175, 7/31/91)	—	—
1.59	Design Basis Floods for Nuclear Power Plants (Errata published 7/30/80)	— 1 2	08/73 04/76 08/77
1.60	Design Response Spectra for Seismic Design of Nuclear Power Plants	— 1	10/73 12/73
1.61	Damping Values for Seismic Design of Nuclear Power Plants	—	10/73
1.62	Manual Initiation of Protective Actions	—	10/73
1.63	Electric Penetration Assemblies in Containment Structures for Nuclear Power Plants (Draft EE 405-4, Proposed Revision 3, published 6/86)	— 1 2 3	10/73 05/77 07/78 02/87
1.64	(Withdrawn—See 56 FR 36175, 7/31/91)	—	—
1.65	Materials and Inspections for Reactor Vessel Closure Studs	—	10/73
1.66	(Withdrawn—See 42 FR 54478, 10/6/77)	—	—
1.67	(Withdrawn—See 48 FR 19101, 4/27/83)	—	—
1.68	Initial Test Programs for Water-Cooled Nuclear Power Plants	— 1 2	11/73 01/77 08/78
1.68.1	Preoperational and Initial Startup Testing of Feedwater and Condensate Systems for Boiling Water Reactor Power Plants	— 1	12/75 01/77

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1.68.2	Initial Startup Test Program To Demonstrate Remote Shutdown Capability for Water-Cooled Nuclear Power Plants	— 1	01/77 07/78
1.68.3	Preoperational Testing of Instrument and Control Air Systems (Draft RS 709-4, a proposed revision to Regulatory Guide 1.80, published 10/80)	—	04/82
1.69	Concrete Radiation Shields for Nuclear Power Plants	—	12/73
1.70	Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)	— 1 2 3	02/72 10/72 09/75 11/78
1.71	Welder Qualification for Areas of Limited Accessibility	—	12/73
1.72	Spray Pond Piping Made from Fiberglass-Reinforced Thermosetting Resin	— 1 2	12/73 01/78 11/78
1.73	Qualification Tests of Electric Valve Operators Installed Inside the Containment of Nuclear Power Plants	—	01/74
1.75	Physical Independence of Electric Systems	— 1 2	02/74 01/75 09/78
1.76	Design Basis Tornado for Nuclear Power Plants	—	04/74
1.77	Assumptions Used for Evaluating a Control Rod Ejection Accident for Pressurized Water Reactors	—	05/74
1.78	Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release	—	06/74
1.79	Preoperational Testing of Emergency Core Cooling Systems for Pressurized Water Reactors	— 1	06/74 09/75
1.80	(Withdrawn—See 47 FR 19258, 5/4/82) Reissued as Regulatory Guide 1.68.3, a renumbered revision to this guide with an expanded scope that addresses control air systems.	—	—
1.81	Shared Emergency and Shutdown Electric Systems for Multi-Unit Nuclear Power Plants	— 1	06/74 01/75
➤ 1.82	Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident (Draft MS 203-4, Proposed Revision 1, published 5/83)	— 1 2	06/74 11/85 05/96
1.83	Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes	— 1	06/74 07/75
1.84	Design and Fabrication Code Case Acceptability—ASME Section III, Division 1 Because this guide is frequently revised, only the current revision and date are listed in the appropriate columns. Previous revisions and their publication dates follow: 0, 6/74; 1, 4/75; 2, 6/75; 3, 9/75; 4, 11/75; 5, 2/76; 6, 5/76; 7, 8/76; 8, 11/76; 9, 3/77; 10, 8/77; 11, 11/77; 12, 3/78; 13, 7/78; 14, 11/78; 15, 5/79; 16, 5/80; 17, 12/80; 18, 8/81; 19, 4/82; 20, 11/82; 21, 9/83; 22, 7/84; 23, 9/85; 24, 6/86; 25, 5/88; 26, 07/89; 27, 11/90; 28, 04/92; 29, 07/93.	30	11/94

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1.85	Materials Code Case Acceptability—ASME Section III, Division 1 Because this guide is frequently revised, only the current revision and date are listed in the appropriate columns. Previous revisions and their publication dates follow: 0, 6/74; 1, 4/75; 2, 6/75; 3, 9/75; 4, 11/75; 5, 2/76; 6, 5/76; 7, 8/76; 8, 11/76; 9, 3/77; 10, 8/77; 11, 11/77; 12, 3/78; 13, 7/78; 14, 11/78; 15, 5/79; 16, 5/80; 17, 12/80; 18, 8/81; 19, 4/82; 20, 11/82; 21, 9/83; 22, 7/84; 23, 9/85; 24, 6/86; 25, 5/88; 26, 07/89; 27, 11/90; 28, 04/92; 29, 07/93.	30	11/94
1.86	Termination of Operating Licenses for Nuclear Reactors	—	06/74
1.87	Guidance for Construction of Class 1 Components in Elevated-Temperature Reactors (Supplement to ASME Section III Code Cases 1592, 1593, 1594, 1595, and 1596)	— 1	06/74 06/75
1.88	(Withdrawn—See 56 FR 36175, 7/31/91)	—	—
1.89	Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants (Draft EE 042-2, Proposed Revision 1, published 2/82)	— 1	11/74 06/84
1.90	Inservice Inspection of Prestressed Concrete Containment Structures with Grouted Tendons	— 1	11/74 08/77
1.91	Evaluations of Explosions Postulated To Occur on Transportation Routes Near Nuclear Power Plants	— 1	01/75 02/78
1.92	Combining Modal Responses and Spatial Components in Seismic Response Analysis	— 1	12/74 02/76
1.93	Availability of Electric Power Sources	—	12/74
1.94	Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants (Draft RS 908-5, Proposed Revision 2, published 9/79)	— 1	04/75 04/76
1.95	Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release	— 1	02/75 01/77
1.96	Design of Main Steam Isolation Valve Leakage Control Systems for Boiling Water Reactor Nuclear Power Plants	— 1	05/75 06/76
1.97	Instrumentation for Light-Water-Cooled Nuclear Power Plants To Assess Plant and Environs Conditions During and Following an Accident (Errata published 7/81) (Draft RS 917-4, Proposed Revision 2, published 12/79)	— 1 2 3	12/75 08/77 12/80 05/83
1.98	Assumptions Used for Evaluating the Potential Radiological Consequences of a Radioactive Offgas System Failure in a Boiling Water Reactor (for Comment)	—	03/76
1.99	Radiation Embrittlement of Reactor Vessel Materials (Draft ME 305-4, Proposed Revision 2, published 2/86)	— 1 2	07/75 04/77 05/88
1.100	Seismic Qualification of Electric and Mechanical Equipment for Nuclear Power Plants (Draft EE 108-5, Proposed Revision 2, published 8/87)	— 1 2	03/76 08/77 06/88

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1.101	Emergency Planning and Preparedness for Nuclear Power Reactors (Revision 1 to this guide entitled "Emergency Planning for Nuclear Power Plants" was withdrawn—see 45 FR 69610, 10/21/80) (Draft DG-1022, Proposed Revision 3, published 2/92) 11/75; 1, 03/77; 2, 10/81.	3	08/92
1.102	Flood Protection for Nuclear Power Plants	— 1	10/75 09/76
1.103	(Withdrawn—See 46 FR 37579, 7/21/81)	—	—
1.104	(Withdrawn—See 44 FR 49321, 8/22/79) See NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants."	—	—
1.105	Instrument Setpoints for Safety-Related Systems (Draft IC 010-5, Proposed Revision 2, published 12/81)	— 1 2	11/75 11/76 02/86
1.106	Thermal Overload Protection for Electric Motors on Motor-Operated Valves	— 1	11/75 03/77
1.107	Qualifications for Cement Grouting for Prestressing Tendons in Containment Structures	— 1	11/75 02/77
1.108	(Withdrawn - See 58 FR 41813, 8/5/93)		
1.109	Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I	— 1	03/76 10/77
1.110	Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors (for Comment)	—	03/76
1.111	Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors	— 1	03/76 07/77
1.112	Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors	— O-R	04/76 05/77
1.113	Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I	— 1	05/76 04/77
1.114	Guidance to Operators at the Controls and to Senior Operators in the Control Room of a Nuclear Power Unit (Draft HF 601-4, Proposed Revision 2, published 12/86)	— 1 2	02/76 11/76 05/89
1.115	Protection Against Low-Trajectory Turbine Missiles	— 1	03/76 07/77
1.116	Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems	— O-R	06/76 05/77
1.117	Tornado Design Classification	— 1	06/76 04/78
1.118	Periodic Testing of Electric Power and Protection Systems	— 1 2 3	06/76 11/77 06/78 04/95

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1.119	(Withdrawn—See 42 FR 33387, 6/30/77)	—	—
1.120	Fire Protection Guidelines for Nuclear Power Plants (for Comment)	— 1	06/76 11/77
1.121	Bases for Plugging Degraded PWR Steam Generator Tubes (for Comment)	—	08/76
1.122	Development of Floor Design Response Spectra for Seismic Design of Floor-Supported Equipment or Components	— 1	09/76 02/78
1.123	(Withdrawn—See 56 FR 36175, 7/31/91)	—	—
1.124	Service Limits and Loading Combinations for Class 1 Linear-Type Component Supports	— 1	11/76 01/78
1.125	Physical Models for Design and Operation of Hydraulic Structures and Systems for Nuclear Power Plants	— 1	03/77 10/78
1.126	An Acceptable Model and Related Statistical Methods for the Analysis of Fuel Densification	— 1	03/77 03/78
1.127	Inspection of Water-Control Structures Associated with Nuclear Power Plants	— 1	04/77 03/78
1.128	Installation Design and Installation of Large Lead Storage Batteries for Nuclear Power Plants	— 1	04/77 10/78
1.129	Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Nuclear Power Plants	— 1	04/77 02/78
1.130	Service Limits and Loading Combinations for Class 1 Plate-and-Shell-Type Component Supports	— 1	07/77 10/78
1.131	Qualification Tests of Electric Cables, Field Splices, and Connections for Light-Water-Cooled Nuclear Power Plants (for Comment) (Draft RS 050-2, Proposed Revision 1, published 8/79)	—	08/77
1.132	Site Investigations for Foundations of Nuclear Power Plants	— 1	09/77 03/79
1.133	Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors	— 1	09/77 05/81
1.134	Medical Evaluation of Licensed Personnel for Nuclear Power Plants (Draft OL 401-5, Proposed Revision 2, published 11/84)	— 1 2	09/77 03/79 04/87
1.135	Normal Water Level and Discharge at Nuclear Power Plants (for Comment)	—	09/77
1.136	Materials, Construction, and Testing of Concrete Containments (Articles CC-1000, -2000, and -4000 through -6000 of the "Code for Concrete Reactor Vessels and Containments") (Draft SC 814-5, Proposed Revision 2, published 11/79)	— 1 2	11/77 10/78 06/81
1.137	Fuel-Oil Systems for Standby Diesel Generators	— 1	01/78 10/79

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1.138	Laboratory Investigations of Soils for Engineering Analysis and Design of Nuclear Power Plants (for Comment)	—	04/78
1.139	Guidance for Residual Heat Removal (for Comment)	—	05/78
1.140	Design, Testing, and Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants	— 1	03/78 10/79
1.141	Containment Isolation Provisions for Fluid Systems (for Comment)	—	04/78
1.142	Safety-Related Concrete Structures for Nuclear Power Plants (Other than Reactor Vessels and Containments)	— 1	04/78 10/81
1.143	Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants	— 1	07/78 10/79
1.144	(Withdrawn—See 56 FR 36175, 7/31/91)	—	—
1.145	Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants (Reissued 2/83 to correct page 1.145-7)	— 1	08/79 11/82
1.146	(Withdrawn—See 56 FR 36175, 7/31/91)	—	—
1.147	Inservice Inspection Code Case Acceptability—ASME Section XI, Division 1 (Draft SC 721-4 published 8/79) 0, 02/81; 1, 02/82; 2, 06/83; 3, 07/84; 4, 09/85; 5, 08/86; 6, 05/88; 7, 07/89; 8, 11/90; 9, 05/92; 10 08/93.	11	11/94
1.148	Functional Specification for Active Valve Assemblies in Systems Important to Safety in Nuclear Power Plants (Draft SC 704-5 published 2/79)	—	03/81
1.149	Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations (Draft RS 110-5 published 7/80) (Draft OL 402-5, Proposed Revision 1, published 11/84)	— 1 2	04/81 04/87 04/96
1.150	Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations (Draft SC 705-4 published 5/79)	— 1	06/81 02/83
1.151	Instrument Sensing Lines (Draft IC 126-5 published 3/82)	—	07/83
1.152	Criteria for Programmable Digital Computer System Software in Safety-Related Systems of Nuclear Power Plants (Draft IC 127-5 published 3/83), 0, 11/85	1	1/96
➤ 1.153	Criteria for Power, Instrumentation, and Control Portions of Safety Systems (Draft IC 609-5 published 12/82)	— 1	12/85 07/96
1.154	Format and Content of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors (Draft SI 502-4 published 1/86)	—	01/87

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1.155	Station Blackout (Draft SI 501-4 published 3/86) (Issued June 1988, reissued August 1988 with corrected tables)	—	08/88
1.156	Environmental Qualification of Connection Assemblies for Nuclear Power Plants (Draft EE 404-4 published 5/87)	—	11/87
1.157	Best-Estimate Calculations of Emergency Core Cooling System Performance (Draft RS 701-4 published 3/87)	—	05/89
1.158	Qualification of Safety-Related Lead Storage Batteries for Nuclear Power Plants (Draft EE 006-5 published 8/87)	—	02/89
1.159	Assuring the Availability of Funds for Decommissioning Nuclear Reactors	—	09/90
1.160	Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	— 1	06/93 01/95
1.161	Evaluation of Reactor Pressure Vessels with Charpy Upper-Shelf Energy Less than 50 Ft-lb	—	07/95
➤ 1.162	Format and Content of Report for Thermal Annealing of Reactor Pressure Vessels	—	03/96
1.163	Performance-Based Containment Leakage-Test Program	—	10/95

DIVISION 1

DRAFT REGULATORY GUIDES

Task Number	Title	Published Month/Year
CE 913-5	(Proposed Revision 2 to Regulatory Guide 1.13) Spent Fuel Storage Facility Design Basis	12/81
DG-0008	Applications for the Use of Sealed Sources in Portable Gauging Devices	07/95
DG-1001	Maintenance Programs for Nuclear Power Plants	08/89
DG-1003	Assuring the Availability of Funds for Decommissioning Nuclear Reactors	05/89
DG-1005	Standard Format and Content for Decommissioning Plans for Nuclear Reactors	—
DG-1006	Records Important for Decommissioning of Nuclear Reactors	—
DG-1008	Reactor Coolant Pump Seals	05/91
DG-1009	Standard Format and Content of Technical Information for Applications to Review Nuclear Power Plant Operating Licenses (Superseded by DG-1047)	12/90
DG-1010	Quality Assurance Program Requirements (Proposed Revision 4 to Regulatory Guide 1.28)	12/92
➤ DG-1012	Qualification and Training of Personnel for Nuclear Power Plants (Proposed Revision 3 to Regulatory Guide 1.8)	10/96
DG-1015	Identification and Characterization of Seismic Sources, Deterministic Source Earthquakes, and Ground Motion	11/92
DG-1016	Nuclear Power Plant Instrumentation for Earthquakes (Proposed Revision 2 to Regulatory Guide 1.12)	11/92
DG-1017	Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Postearthquake Actions	11/92
DG-1018	Restart of a Nuclear Power Plant Shut Down by a Seismic Event	11/92
DG-1020	Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	11/92
DG-1021	Selection, Design, Qualification, Testing, and Reliability of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants (Second Proposed Revision 3 to Regulatory Guide 1.9)	04/92
DG-1022	Emergency Planning and Preparedness for Nuclear Power Reactors	03/92
DG-1025	Calculational and Dosimetry Methods for Determining Pressure Vessel Fluence	10/93
DG-1027	Format and Content of Application for Approval for Thermal Annealing of Reactor Pressure Vessels	11/94
DG-1028	Periodic Testing of Electric Power and Protection Systems (Proposed Revision 3 to Regulatory Guide 1.118)	09/94
DG-1031	Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	06/94
DG-1033	Nuclear Power Plant Instrumentation for Earthquakes (Third Proposed Revision 2 to Regulatory Guide 1.12)	02/95
DG-1034	Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Postearthquake Actions	02/95
DG-1035	Restart of Nuclear Power Plant Shut Down by a Seismic Event	02/95

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DG-1038	Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident	07/95
DG-1039	Criteria for Digital Computers in Safety Systems of Nuclear Power Plants (proposed revision 1 to Regulatory Guide 1.152)	07/95
DG-1040	Time Response Design Criteria for Safety-Related Operator (Superseded by DG-1052)	07/95
DG-1042	Criteria for Safety Systems (Proposed Revision 1 to Regulatory Guide 1.153)	11/95
DG-1043	Nuclear Power Plant Simulation Facilities for Use in Operator License (Revision 2 to Regulatory Guide 1.149)	06/95
DG-1045	Setpoints for Safety-Related Instrumentation (Proposed Revision 3 to Regulatory Guide 1.105)	10/96
DG-1046	Guidelines for Reporting Reliability and Availability Information for Risk-Significant Systems and Equipment in Nuclear Power Plants	05/96
DG-1047	Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses (Supersedes DG-1009)	08/96
DG-1051	Monitoring the Effectiveness of Maintenance at Nuclear Power Plants (Revision 2 to Regulatory Guide 1.160)	09/96
➤ DG-1052	Time Response Design Criteria for Safety-Related Operator Actions (Supersedes DG-1040)	11/96
DG-1054	Verification, Validation, Reviews, and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	09/96
DG-1055	Configuration Management Plans for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	09/96
DG-1056	Software Test Documentation for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	09/96
DG-1057	Software Unit Testing for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	09/96
DG-1058	Software Requirements Specifications for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	09/96
DG-1059	Developing Software Life Cycle Processes for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	09/96
DG-1932	Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground motion	02/95
EM 805-5	Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants	02/79
ES 926-4	(Second Proposed Revision 1 to Regulatory Guide 1.23) Meteorological Measurement Program for Nuclear Power Plants	04/86
FP 811-4	Safety-Related Permanent Dewatering Systems for Nuclear Power Plants	09/79
IC 121-5	Response-Time Testing of Protection System Instrument Channels	01/82
IC 131-5	Installation of Transducers	03/82
MS 021-5	Containment System Leakage Testing	10/86
MS 140-5	(Proposed Revision 2 to Regulatory Guide 1.12) Nuclear Power Plant Instrumentation for Earthquakes	07/81

Task Number	Title	Published Month/Year
RS 705-4	Lightning Protection for Nuclear Power Plants	08/79
RS 802-5	(Proposed Revision 3 to Regulatory Guide 1.9) Selection, Design, Qualification, Testing, and Reliability of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants	11/88
RS 809-5	Qualification Test for Cable Penetration Fire Stops for Use in Nuclear Power Plants	07/79
RS 902-4	(Second Proposed Revision 3 to Regulatory Guide 1.33) Quality Assurance Program Requirements (Operation)	11/80
RS 908-5	(Proposed Revision 2 to Regulatory Guide 1.94) Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete, Structural Steel, Soils, and Foundations During the Construction Phase of Nuclear Power Plants	09/79
SC 521-4	LWR Core Reloads; Guidance on Applications for Amendments to Operating Licenses and on Refueling and Startup Tests	09/79
SC 708-4	(Withdrawn--See 54 FR 16030, 4/20/89)	—
SC 807-4	(Proposed Regulatory Guide 1.35.1) Determining Prestressing Forces for Inspection of Prestressed Concrete Containments	04/79
SC 810-4	(Proposed Revision 3 to Regulatory Guide 1.35) Inservice Inspection of Ungrouted Tendons in Prestressed Concrete Containments	04/79

REGULATORY GUIDE SERIES

DIVISION 2 — RESEARCH AND TEST REACTORS

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
2.1	Shield Test Program for Evaluation of Installed Biological Shielding in Research and Training Reactors	—	05/73
2.2	Development of Technical Specifications for Experiments in Research Reactors	—	11/73
2.3	Quality Verification for Plate-Type Uranium-Aluminum Fuel Elements for Use in Research Reactors	— 1	09/75 07/76
2.4	Review of Experiments for Research Reactors	— O-R	07/76 05/77
2.5	Quality Assurance Program Requirements for Research Reactors	— O-R	05/77 10/77
2.6	Emergency Planning for Research and Test Reactors (Draft HF 201-4, Proposed Revision 1, published 3/82)	— 1	01/79 03/83

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DIVISION 3 — FUELS AND MATERIALS FACILITIES

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
3.1	Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material (Draft FP 027-5, Proposed Revision 1, published 5/81) (Draft CE 602-4, Proposed Revision 2, published 3/87)	—	01/73
		1	01/82
		2	09/87
3.2	Efficiency Testing of Air-Cleaning Systems Containing Devices for Removal of Particles	—	01/73
3.3	Quality Assurance Program Requirements for Fuel Reprocessing Plants and for Plutonium Processing and Fuel Fabrication Plants	—	01/73
		1	03/74
3.4	Nuclear Criticality Safety in Operations with Fissionable Materials at Fuels and Materials Facilities (Draft CE 404-4, Proposed Revision 2, published 4/85)	—	01/73
		1	08/77
		1-R	02/78
		2	03/86
3.5	Standard Format and Content of License Applications for Uranium Mills (for Comment) (Draft WM 039-4, Proposed Revision 2, published 8/81)	—	02/73
		1	11/77
3.6	Content of Technical Specifications for Fuel Reprocessing Plants	—	04/73
3.7	Monitoring of Combustible Gases and Vapors in Plutonium Processing and Fuel Fabrication Plants	—	03/73
3.8	Preparation of Environmental Reports for Uranium Mills	—	04/73
		1	09/78
		2	10/82
3.9	Concrete Radiation Shields	—	06/73
3.10	Liquid Waste Treatment System Design Guide for Plutonium Processing and Fuel Fabrication Plants	—	06/73
3.11	Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills	—	06/73
		1	03/77
		2	12/77
3.11.1	Operational Inspection and Surveillance of Embankment Retention Systems for Uranium Mill Tailings	—	04/79
		1	10/80
3.12	General Design Guide for Ventilation Systems of Plutonium Processing and Fuel Fabrication Plants	—	08/73
3.13	Guide for Acceptable Waste Storage Methods at UF ₆ Production Plants	—	10/73
3.14	Seismic Design Classification for Plutonium Processing and Fuel Fabrication Plants	—	10/73
3.15	Standard Format and Content of License Applications for Storage Only of Unirradiated Power Reactor Fuel and Associated Radioactive Material (Draft CE 219-4, Proposed Revision 1, published 8/82)	—	10/73
		1	04/83

Guide Number	Title	Rev.	Published Month/Year
3.16	General Fire Protection Guide for Plutonium Processing and Fuel Fabrication Plants	—	01/74
3.17	Earthquake Instrumentation for Fuel Reprocessing Plants	—	02/74
3.18	Confinement Barriers and Systems for Fuel Reprocessing Plants	—	02/74
3.19	Reporting of Operating Information for Fuel Reprocessing Plants	—	02/74
3.20	Process Offgas Systems for Fuel Reprocessing Plants	—	02/74
3.21	Quality Assurance Requirements for Protective Coatings Applied to Fuel Reprocessing and to Plutonium Processing and Fuel Fabrication Plants	—	03/74
3.22	Periodic Testing of Fuel Reprocessing Plant Protection System Actuation Functions	—	06/74
3.23	(Withdrawn—See 45 FR 71876, 10/30/80)	—	—
3.24	(Withdrawn—See 46 FR 14507, 2/27/81)	—	—
3.25	Standard Format and Content of Safety Analysis Reports for Uranium Enrichment Facilities	—	12/74
3.26	Standard Format and Content of Safety Analysis Reports for Fuel Reprocessing Plants	—	02/75
3.27	Nondestructive Examination of Welds in the Liners of Concrete Barriers in Fuel Reprocessing Plants	— 1	05/75 05/77
3.28	Welder Qualification for Welding in Areas of Limited Accessibility in Fuel Reprocessing Plants and in Plutonium Processing and Fuel Fabrication Plants	—	05/75
3.29	Preheat and Interpass Temperature Control for the Welding of Low-Alloy Steel for Use in Fuel Reprocessing Plants and in Plutonium Processing and Fuel Fabrication Plants	—	05/75
3.30	Selection, Application, and Inspection of Protective Coatings (Paints) for Fuel Reprocessing Plants	— O-R	06/75 05/77
3.31	Emergency Water Supply Systems for Fuel Reprocessing Plants	— O-R	09/75 05/77
3.32	General Design Guide for Ventilation Systems for Fuel Reprocessing Plants (for Comment)	—	09/75
3.33	Assumptions Used for Evaluating the Potential Radiological Consequences of Accidental Nuclear Criticality in a Fuel Reprocessing Plant (for Comment)	—	04/77
3.34	Assumptions Used for Evaluating the Potential Radiological Consequences of Accidental Nuclear Criticality in a Uranium Fuel Fabrication Plant	— 1	04/77 07/79
3.35	Assumptions Used for Evaluating the Potential Radiological Consequences of Accidental Nuclear Criticality in a Plutonium Processing and Fuel Fabrication Plant	— 1	05/77 07/79
3.36	(Withdrawn—See 44 FR 6535, 2/1/79)	—	—

Guide Number	Title	Rev.	Published Month/Year
3.37	Guidance for Avoiding Intergranular Corrosion and Stress Corrosion in Austenitic Stainless Steel Components of Fuel Reprocessing Plants (for Comment)	—	09/75
3.38	General Fire Protection Guide for Fuel Reprocessing Plants (for Comment)	—	06/76
3.39	Standard Format and Content of License Applications for Plutonium Processing and Fuel Fabrication Plants	—	01/76
3.40	Design Basis Floods for Fuel Reprocessing Plants and for Plutonium Processing and Fuel Fabrication Plants	— 1	11/76 12/77
3.41	(Withdrawn—See 51 FR 11660, 4/4/86)	—	—
3.42	Emergency Planning for Fuel Cycle Facilities and Plants Licensed Under 10 CFR Parts 50 and 70	— 1	08/77 09/79
3.43	Nuclear Criticality Safety in the Storage of Fissile Materials	— 1	08/78 04/79
3.44	Standard Format and Content for the Safety Analysis Report for an Independent Spent Fuel Storage Installation (Water-Basin Type) (Draft CE 403-4, Proposed Revision 2, published 11/86)	— 1 2	12/78 11/80 01/89
3.45	Nuclear Criticality Safety for Steel-Pipe Intersections Containing Aqueous Solutions of Fissile Materials (Draft FP 925-5 published 1/80) (Draft CE 802-5, Proposed Revision 1, published 5/88)	— 1	11/80 04/89
3.46	Standard Format and Content of License Applications, Including Environmental Reports, for In Situ Uranium Solution Mining (Draft FP 818-4 published 7/80)	—	06/82
3.47	Nuclear Criticality Control and Safety of Homogeneous Plutonium-Uranium Fuel Mixtures Outside Reactors (Draft FP 026-5 published 12/80)	—	07/81
3.48	Standard Format and Content for the Safety Analysis Report for an Independent Spent Fuel Storage Installation or Monitored Retrievable Storage Installation (Dry Storage) (Draft FP 029-4 published 12/80) (Draft CE 406-4, Proposed Revision 1, published 10/86)	1	08/89
3.49	Design of an Independent Spent Fuel Storage Installation (Water-Basin Type) (Draft FP 806-6 published 1/81)	—	12/81
3.50	Guidance on Preparing a License Application To Store Spent Fuel in an Independent Spent Fuel Storage Installation (Draft FP 907-4 published 3/81) (Draft CE 402-4, Proposed Revision 1, published 9/86)	1	09/89
3.51	Calculational Models for Estimating Radiation Doses to Man from Airborne Radioactive Materials Resulting from Uranium Milling Operations (Draft RH 802-4 published 5/79) (Errata published August 1982)	—	03/82
3.52	Standard Format and Content for the Health and Safety Sections of License Renewal Applications for Uranium Processing and Fuel Fabrication (Draft FP 716-4 published 10/80) (Draft CE 308-4, Proposed Revision 1, published 7/85)	— 1	07/82 11/86
3.53	Applicability of Existing Regulatory Guides to the Design and Operation of an Independent Spent Fuel Storage Installation (Draft CE 037-4 published 11/81)	—	07/82
3.54	Spent Fuel Heat Generation in an Independent Spent Fuel Storage Installation (Draft FP 034-4 published 12/80) (Second Draft CE 034-4 published 1/83)	—	09/84

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3.55	Standard Format and Content for the Health and Safety Sections of License Renewal Applications for Uranium Hexafluoride Production (Draft CE 227-4 published 1/84)	—	04/85
3.56	General Guidance for Designing, Testing, Operating, and Maintaining Emission Control Devices at Uranium Mills (Draft CE 309-4 published 5/85)	—	05/86
3.57	Administrative Practices for Nuclear Criticality Safety at Fuels and Materials Facilities (Draft CE 501-4 published 2/86)	—	10/86
3.58	Criticality Safety for Handling, Storing, and Transporting LWR Fuel at Fuels and Materials Facilities (Draft CE 407-4 published 7/85)	—	10/86
3.59	Methods for Estimating Radioactive and Toxic Airborne Source Terms for Uranium Milling Operations (Draft WM 407-4 published 4/86)	—	03/87
3.60	Design of an Independent Spent Fuel Storage Installation (Dry Storage) (Draft CE 410-4 published 11/85)	—	03/87
3.61	Standard Format and Content for a Topical Safety Analysis Report for a Spent Fuel Dry Storage Cask (Draft CE 306-4 published 4/86)	—	02/89
3.62	Standard Format and Content for the Safety Analysis Report for Onsite Storage of Spent Fuel Storage Casks (Draft CE 301-4 published 4/86)	—	02/89
3.63	Onsite Meteorological Measurement Program for Uranium Recovery Facilities—Data Acquisition and Reporting (Draft ES 401-4 published 9/85)	—	03/88
3.64	Calculation of Radon Flux Attenuation by Earthen Uranium Mill Tailings Covers (Draft WM 503-4 published 5/87)	—	06/89
3.65	Standard Format and Content of Decommissioning Plans for Licensees Under 10 CFR Parts 30, 40, and 70 (Task CE 304-4)	—	08/89
3.66	Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72 (DG-3002-1/90)	—	07/90
3.67	Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities	—	01/92
3.68	Nuclear Criticality Safety Training 04/94	—	—
➤ 3.69	Topical Guidelines for the Licensing Support System		09/96

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Task Number	Title	Published Month/Year
CE 304-4	Standard Format and Content of Decommissioning Plans for 10 CFR Parts 30, 40, and 70 Licensees	12/85
CE 402-4	(Proposed Revision 1 to Regulatory Guide 3.50) Guidance on Preparing a License Application To Store Spent Fuel and High-Level Radioactive Waste	09/86
CE 406-4	(Proposed Revision 1 to Regulatory Guide 3.48) Standard Format and Content for the Safety Analysis Report for an Independent Spent Fuel Storage Installation or Monitored Retrievable Storage Installation (Dry Storage)	10/86
DG-3001	Records Important for Decommissioning for Licensees Under 10 CFR Parts 30, 40, 70, and 72	07/89
DG-3002	Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning	01/90
DG-3003	Format and Content for the License Application for the High-Level Waste Repository	11/90
DG-3004	Criticality Safety for Handling, Storing, and Transporting LWR Fuel at Fuels and Materials Facilities	05/90
DG-3005	Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities	10/90
DG-3006	Standard Format and Content for Fire Protection Sections of License Applications for Fuel Cycle Facilities	04/93
DG-3008	Nuclear Criticality Safety Training	01/93
DG-3009	Topical Guidelines for the Licensing Support System	07/93
ES 114-4	Guidelines for Ground-Water Monitoring at In Situ Uranium Solution Mines	06/83
ES 115-4	Guidelines for Modeling Ground-Water Transport of Radioactive and Nonradioactive Contaminants at Tailings Disposal Sites	05/83
HF 608-4	Training and Certification of Independent Spent Fuel Storage Installation Operators	03/82
MS 146-4	Design, Installation, and Inspection of Seepage Control Liners at Uranium Recovery Facilities	11/82
WM 039-4	(Proposed Revision 2 to Regulatory Guide 3.5) Standard Format and Content of License Applications for Uranium Mills	08/81

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DIVISION 4 — ENVIRONMENTAL AND SITING

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
4.1	Programs for Monitoring Radioactivity in the Environs of Nuclear Power Plants	— 1	01/73 04/75
4.2	Preparation of Environmental Reports for Nuclear Power Stations	— 1 2	02/71 01/75 07/76
4.3	(Withdrawn—See 41 FR 53870, 12/9/76)	—	—
4.4	Reporting Procedure for Mathematical Models Selected To Predict Heated Effluent Dispersion in Natural Water Bodies	—	05/74
4.5	Measurements of Radionuclides in the Environment—Sampling and Analysis of Plutonium in Soil	—	05/74
4.6	Measurements of Radionuclides in the Environment—Strontium-89 and Strontium-90 Analyses	—	05/74
4.7	General Site Suitability Criteria for Nuclear Power Stations	— 1	09/74 11/75
4.8	Environmental Technical Specifications for Nuclear Power Plants (for Comment)	—	12/75
4.9	Preparation of Environmental Reports for Commercial Uranium Enrichment Facilities	— 1	12/74 10/75
4.10	(Withdrawn—See 42 FR 59436, 11/17/77)	—	—
4.11	Terrestrial Environmental Studies for Nuclear Power Stations	— 1	07/76 08/77
4.12	(Not published)	—	—
4.13	Performance, Testing, and Procedural Specifications for Thermoluminescence Dosimetry: Environmental Applications	— 1	11/76 07/77
4.14	Radiological Effluent and Environmental Monitoring at Uranium Mills	— 1	06/77 04/80
4.15	Quality Assurance for Radiological Monitoring Programs (Normal Operations)—Effluent Streams and the Environment	— 1	12/77 02/79
4.16	Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants (Draft CE 401-4, Proposed Revision 1, published 9/84) (Errata published 8/86)	— 1	03/78 12/85
4.17	Standard Format and Content of Site Characterization Plans for High-Level-Waste Geologic Repositories (Draft GS 027-4 published 4/81) (Draft WM 404-4, Proposed Revision 1, published 2/85)	— 1	07/82 03/87

Guide Number	Title	Rev.	Published Month/Year
4.18	Standard Format and Content of Environmental Reports for Near-Surface Disposal of Radioactive Waste (Draft WM 013-4 published 4/82)	—	06/83
4.19	Guidance for Selecting Sites for Near-Surface Disposal of Low-Level Radioactive Waste (Draft WM 408-4 published 3/87)	—	08/88
➤ 4.20	Constraint on Releases of Airborne Radioactive Materials to the Environment for Licensees Other than Power Reactors (Draft Regulatory Guide, DG-8016, was removed 12/96)	—	12/96

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DRAFT REGULATORY GUIDES

Task Number	Title	Published Month/Year
DG-4002	Guidance for the Preparation of Supplemental Environmental Reports in Support of an Application to Renew a Nuclear Power Plant Operating License.	09/91
DG-4003	General Site Suitability Criteria for Nuclear Power Stations (Proposed Revision 2 to Regulatory Guide 4.7)	11/92
DG-4004	General Site Suitability Criteria for Nuclear Power Station (Second Proposed Revision to Regulatory Guide 4.7)	02/95

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DIVISION 5 — MATERIALS AND PLANT PROTECTION

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
5.1	Serial Numbering of Fuel Assemblies for Light-Water-Cooled Nuclear Power Reactors	—	12/72
5.2	(Withdrawn—See 44 FR 57542, 10/5/79)	—	—
5.3	Statistical Terminology and Notation for Special Nuclear Materials Control and Accountability	—	02/73
5.4	Standard Analytical Methods for the Measurement of Uranium Tetrafluoride (UF ₄) and Uranium Hexafluoride (UF ₆)	—	02/73
5.5	Standard Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets	—	02/73
5.6	(Withdrawn—See 50 FR 25364, 6/18/85)	—	—
5.7	Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas (Draft SG 909-4, Proposed Revision 1, published 5/79)	— 1	06/73 05/80
5.8	Design Considerations for Minimizing Residual Holdup of Special Nuclear Material in Drying and Fluidized Bed Operations	— 1	06/73 05/74
5.9	Guidelines for Germanium Spectroscopy Systems for Measurement of Special Nuclear Material (Draft SG 042-2, Proposed Revision 2, published 7/82)	— 1 2	06/73 05/74 12/83
5.10	Selection and Use of Pressure-Sensitive Seals on Containers for Onsite Storage of Special Nuclear Material	—	07/73
5.11	Nondestructive Assay of Special Nuclear Material Contained in Scrap and Waste (Draft SG 043-4, Proposed Revision 1, published 11/82)	— 1	10/73 04/84
5.12	General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials	—	11/73
5.13	Conduct of Nuclear Material Physical Inventories	—	11/73
5.14	Use of Observation (Visual Surveillance) Techniques in Material Access Areas (Draft SG 910-4, Proposed Revision 1, published 5/79)	— 1	11/73 05/80
5.15	Security Seals for the Protection and Control of Special Nuclear Material	—	01/74
5.16	(Withdrawn—See 50 FR 25364, 6/18/85)	—	—
5.17	Truck Identification Markings	—	01/74
5.18	Limit of Error Concepts and Principles of Calculation in Nuclear Materials Control	—	01/74
5.19	(Withdrawn—See 50 FR 25364, 6/18/85)	—	—

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5.20	Training, Equipping, and Qualifying of Guards and Watchmen	—	01/74
5.21	Nondestructive Uranium-235 Enrichment Assay by Gamma Ray Spectrometry (Draft SG 044-4, Proposed Revision 1, published 6/82)	— 1	04/74 12/83
5.22	Assessment of the Assumption of Normality (Employing Individual Observed Values)	—	04/74
5.23	In Situ Assay of Plutonium Residual Holdup (Draft SG 045-4, Proposed Revision 1, published 10/82)	— 1	05/74 02/84
5.24	Analysis and Use of Process Data for the Protection of Special Nuclear Material	—	06/74
5.25	Design Considerations for Minimizing Residual Holdup of Special Nuclear Material in Equipment for Wet Process Operations	—	06/74
5.26	Selection of Material Balance Areas and Item Control Areas	— 1	06/74 04/75
5.27	Special Nuclear Material Doorway Monitors	—	06/74
5.28	Evaluation of Shipper-Receiver Differences in the Transfer of Special Nuclear Materials	—	06/74
5.29	Nuclear Material Control Systems for Nuclear Power Plants	— 1	06/74 06/75
5.30	Materials Protection Contingency Measures for Uranium and Plutonium Fuel Manufacturing Plants	—	06/74
5.31	Specially Designed Vehicle with Armed Guards for Road Shipment of Special Nuclear Material	— 1	06/74 04/75
5.32	Communication with Transport Vehicles	— 1	06/74 05/75
5.33	Statistical Evaluation of Material Unaccounted For	—	06/74
5.34	Nondestructive Assay for Plutonium in Scrap Material by Spontaneous Fission Detection (Draft SG 046-4, Proposed Revision 1, published 6/82)	— 1	06/74 05/84
5.35	(Withdrawn—See 42 FR 41677, 8/18/77)	—	—
5.36	Recommended Practice for Dealing with Outlying Observations	—	06/74
5.37	In Situ Assay of Enriched Uranium Residual Holdup (Draft SG 047-4, Proposed Revision 1, published 8/82)	— 1	08/74 10/83
5.38	Nondestructive Assay of High-Enrichment Uranium Fuel Plates by Gamma Ray Spectrometry (Draft SG 048-4, Proposed Revision 1, published 8/82)	— 1	09/74 10/83
5.39	General Methods for the Analysis of Uranyl Nitrate Solutions for Assay, Isotopic Distribution, and Impurity Determinations	—	12/74
5.40	(Withdrawn—See 50 FR 25364, 6/18/85)	—	—
5.41	(Not issued)	—	—

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5.42	Design Considerations for Minimizing Residual Holdup of Special Nuclear Material in Equipment for Dry Process Operations	—	01/75
5.43	Plant Security Force Duties	—	01/75
5.44	Perimeter Intrusion Alarm Systems (Draft SG 479-4, Proposed Revision 2, published 5/79)	— 1 2	01/75 06/76 05/80
5.45	Standard Format and Content for the Special Nuclear Material Control and Accounting Section of a Special Nuclear Material License Application (Including That for a Uranium Enrichment Facility)	—	12/74
5.46	(Not issued)	—	—
5.47	(Withdrawn—See 50 FR 25364, 6/18/85)	—	—
5.48	Design Considerations—Systems for Measuring the Mass of Liquids	—	02/75
5.49	Internal Transfers of Special Nuclear Material (for Comment)	—	03/75
5.50	(Not issued)	—	—
5.51	Management Review of Nuclear Material Control and Accounting Systems (for Comment)	—	06/75
5.52	Standard Format and Content of a Licensee Physical Protection Plan for Strategic Special Nuclear Material at Fixed Sites (Other than Nuclear Power Plants)	— 1 2 3	05/75 06/76 07/80 01/95
5.53	Qualification, Calibration, and Error Estimation Methods for Nondestructive Assay (Draft SG 049-4, Proposed Revision 1, published 6/82)	— 1	08/75 02/84
5.54	Standard Format and Content of Safeguards Contingency Plans for Nuclear Power Plants (for Comment)	—	03/78
5.55	Standard Format and Content of Safeguards Contingency Plans for Fuel Cycle Facilities (for Comment)	—	03/78
5.56	Standard Format and Content of Safeguards Contingency Plans for Transportation (for Comment)	—	03/78
5.57	Shipping and Receiving Control of Strategic Special Nuclear Material (Draft SG 908-4, Proposed Revision 1, published 5/79)	— 1	06/76 06/80
5.58	Considerations for Establishing Traceability of Special Nuclear Material Accounting Measurements	— 1	11/78 02/80
5.59	Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate or Low Strategic Significance (Draft MP 711-4 published 7/79) (Draft SG 229-4, Proposed Revision 1, published 9/82)	— 1	01/80 02/83

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5.60	Standard Format and Content of a Licensee Physical Protection Plan for Strategic Special Nuclear Material in Transit	—	04/80
5.61	Intent and Scope of the Physical Protection Upgrade Rule Requirements for Fixed Sites	—	06/80
5.62	Reporting of Safeguards Events (Draft SG 901-4 published 10/79) (Draft SG 901-4, Proposed Revision 1, published 10/85)	— 1	02/81 11/87
5.63	Physical Protection for Transient Shipments (Draft SG 126-4 published 9/81)	—	07/82
5.64	(Not issued)	—	—
5.65	Vital Area Access Controls, Protection of Physical Security Equipment, and Key and Lock Controls (Draft SG 302-4 published 1/85)	—	09/86
5.66	Access Authorization Program for Nuclear Power Plants	—	07/91
5.67	Material Control and Accounting for Uranium Enrichment Facilities Authorized to Produce Special Nuclear Material of Low Strategic Significance	—	01/94
5.68	Protection Against Malevolent Use of Vehicles at Nuclear Power Plants (DG-5006 Protection Against Malevolent Use of vehicles at Nuclear Power Plants 12/93)	—	08/94

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DRAFT REGULATORY GUIDES

Task Number	Title	Published Month/Year
DG-5002	Material Control and Accounting for Uranium Enrichment Facilities Authorized to Produce Special Nuclear Material of Low Strategic Significance	02/91
DG-5004	Standard Format and Content of a Licensee Physical Protection Plan for Strategic Special Nuclear Material at Fixed Sites (Other Than Nuclear Power Plants)	05/94
DG-5005	Tamper-Indicating Seals for the Protection and Control of Special Nuclear Material	01/96
DG-5007	Perimeter Intrusion Alarm Systems (Proposed Revision 3 to Regulatory Guide 5.44)	04/96
SG 301-4	(Withdrawn—See 56 FR 36175, 7/31/91)	—

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DIVISION 6 — PRODUCTS

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
6.1	Leak Testing Radioactive Brachytherapy Sources	— 1	02/74 07/74
6.2	Integrity and Test Specifications for Selected Brachytherapy Sources	— 1	02/74 07/74
6.3	Design, Construction, and Use of Radioisotopic Power Generators for Certain Land and Sea Applications	—	03/74
6.4	Classification of Containment Properties of Sealed Radioactive Sources	— 1 2	03/74 05/75 08/80
6.5	General Safety Standard for Installations Using Nonmedical Sealed Gamma-Ray Sources	—	06/74
6.6	Acceptance Sampling Procedures for Exempted and Generally Licensed Items Containing Byproduct Material	—	06/74
6.7	Preparation of an Environmental Report To Support a Rule Making Petition Seeking an Exemption for a Radionuclide-Containing Product	— 1	10/75 06/76
6.8	Identification Plaque for Irretrievable Well-Logging Sources (for Comment)	—	10/78
6.9	Establishing Quality Assurance Programs for the Manufacture and Distribution of Sealed Sources and Devices Containing Byproduct Material	—	03/95

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DRAFT REGULATORY GUIDES

Task Number	Title	Published Month/Year
DG-6002	Establishing Quality Assurance Programs for the Manufacture and Distribution of Sealed Sources and Devices Containing Byproduct Material	06/94
TP 102-5	Safety Features of Gauges Containing Radioactive Material	11/80

REGULATORY GUIDE SERIES
DIVISION 7 — TRANSPORTATION
ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
7.1	Administrative Guide for Packaging and Transporting Radioactive Material	—	06/74
7.2	Packaging and Transportation of Radioactively Contaminated Biological Materials	—	06/74
7.3	Procedures for Picking Up and Receiving Packages of Radioactive Material (for Comment)	—	05/75
7.4	Leakage Tests on Packages for Shipment of Radioactive Materials (for Comment)	—	06/75
7.5	Administrative Guide for Obtaining Exemptions from Certain NRC Requirements over Radioactive Material Shipments	— O-R	06/75 05/77
7.6	Design Criteria for the Structural Analysis of Shipping Cask Containment Vessels	— 1	02/77 03/78
7.7	Administrative Guide for Verifying Compliance with Packaging Requirements for Shipments of Radioactive Materials (for Comment)	—	08/77
7.8	Load Combinations for the Structural Analysis of Shipping Casks for Radioactive Material (Draft MS 527-4, Proposed Revision 1, published 7/87) (Draft MS 804-4, Second Proposed Revision 1, published 9/88)	— 1	05/77 03/89
7.9	Standard Format and Content of Part 71 Applications for Approval of Packaging of Type B, Large Quantity, and Fissile Radioactive Material (Draft FC 416-4, Proposed Revision 2, published 5/86)	— 1	03/79 01/80
7.10	Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material (Combined Draft TP 019-4, published 6/81, and Draft TP 020-4, published 3/81)	— 1	01/83 06/86
7.11	Fracture Toughness Criteria of Base Material for Ferritic Steel Shipping Cask Containment Vessels with a Maximum Wall Thickness of 4 Inches (0.1 m)	—	07/91
7.12	Fracture Toughness Criteria of Base Material for Ferritic Steel Shipping Cask Containment Vessels with a Wall Thickness Greater than 4 Inches (0.1 m) But Not Exceeding 12 Inches (0.3 m)	—	07/91

DIVISION 7

DRAFT REGULATORY GUIDES

Task Number	Title	Published Month/Year
DG-7001	Fracture Toughness Criteria for Ferritic Steel Shipping Cask Containment Vessels with a Maximum Wall Thickness of Four Inches (0.1 m) (Previously issued as Task MS 144-4)	07/89
DG-7002	Fracture Toughness Criteria for Ferritic Steel Shipping Cask Containment Vessels with a Wall Thickness Greater than Four Inches (0.1 m) (Previously issued as Task MS 501-4)	07/89
FC 416-4	(Proposed Revision 2 to Regulatory Guide 7.9) Standard Format and Content of Part 71 Applications for Approval of Packaging for Radioactive Material	05/86
TP 914-4	Measurement of Radiation Levels on Surfaces of Packages of Radioactive Materials	12/79

REGULATORY GUIDE SERIES

DIVISION 8 -- OCCUPATIONAL HEALTH

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
8.1	Radiation Symbol	—	02/73
8.2	Guide for Administrative Practices in Radiation Monitoring	—	02/73
8.3	Film Badge Performance Criteria	—	02/73
8.4	Direct-Reading and Indirect-Reading Pocket Dosimeters	—	02/73
8.5	Criticality and Other Interior Evacuation Signals	— 1	02/73 03/81
8.6	Standard Test Procedure for Geiger-Muller Counters	—	05/73
8.7	Instructions for Recording and Reporting Occupational Radiation Exposure Data; 05/73	1	07/92
8.8	Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable (Draft OH 507-4, Proposed Revision 4, published 3/79) (Draft OP 618-4, Second Proposed Revision 4, published 5/82)	— 1 2 3	07/73 09/75 03/77 06/78
8.9	Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program	— 1	09/73 08/93
8.10	Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable	— 1 1-R	04/74 09/75 05/77
8.11	Applications of Bioassay for Uranium	—	06/74
8.12	Criticality Accident Alarm Systems (Draft OH 015-4, Proposed Revision 1, published 5/80) (Draft CE 801-5, Proposed Revision 2, published 5/88)	— 1 2	12/74 01/81 10/88
8.13	Instruction Concerning Prenatal Radiation Exposure (Draft OP 031-4, Proposed Revision 2, published 8/81)	— 1 2	03/75 11/75 12/87
8.14	Personnel Neutron Dosimeters (Draft OH 940-4, Proposed Revision 2, published 2/80)	— 1	06/76 08/77
8.15	Acceptable Programs for Respiratory Protection	—	10/76
8.16	(Not issued)	—	—
8.17	(Not issued)	—	—
8.18	Information Relevant to Ensuring that Occupational Radiation Exposures at Medical Institutions Will Be As Low As Reasonably Achievable	— 1	12/77 10/82
8.19	Occupational Radiation Dose Assessment in Light-Water Reactor Power Plants—Design Stage Man-Rem Estimates	— 1	05/78 06/79

Guide Number	Title	Rev.	Published Month/Year
8.20	Applications of Bioassay for I-125 and I-131	— 1	04/78 09/79
8.21	Health Physics Surveys for Byproduct Material at NRC-Licensed Processing and Manufacturing Plants	— 1	05/78 10/79
8.22	Bioassay at Uranium Mills (Draft OP 013-4, Proposed Revision 1, published 1/87)	— 1	07/78 08/88
8.23	Radiation Safety Surveys at Medical Institutions	— 1	02/79 01/81
8.24	Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication	— 1	11/78 10/79
8.25	Calibration and Error Limits of Air Sampling Instruments for Total Volume of Air Sampled (Draft OH 905-4 published 10/79); 08/80	1	07/92
8.26	Applications of Bioassay for Fission and Activation Products (Draft OH 714-4 published 8/79)	—	09/80
8.27	Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants (Draft OH 717-4 published 8/79)	—	03/81
8.28	Audible-Alarm Dosimeters (Draft OH 804-4 published 8/79)	—	08/81
8.29	Instruction Concerning Risks from Occupational Radiation Exposure (Draft OH 902-4 published 5/80)	— 1	07/81 03/96
8.30	Health Physics Surveys in Uranium Mills (Draft OH 710-4 published 8/80)	—	06/83
8.31	Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Mills Will Be As Low As Is Reasonably Achievable (Draft OH 941-4 published 8/80)	—	05/83
8.32	Criteria for Establishing a Tritium Bioassay Program (Draft OP 713-4 published 6/83)	—	07/88
8.33	Quality Management Program	—	11/91
8.34	Monitoring Criteria and Methods to Calculate Occupational Radiation Doses	—	08/92
8.35	Planned Special Exposures	—	07/92
8.36	Radiation Dose to the Embryo/Fetus	—	08/92
8.37	ALARA Levels of Effluents from Materials Facilities	—	08/93
8.38	Control of Access to High and Very High Radiation Areas in Nuclear Power Plants	—	07/93

DIVISION 8

DRAFT REGULATORY GUIDES

Task Number	Title	Published Month/Year
DG-8001	Basic Quality Assurance Program for Medical Use	01/90
DG-8003	Air Sampling in the Workplace (Proposed Revision 1 to Regulatory Guide 8.25)	10/91
DG-8004	Radiation Protection Programs for Nuclear Power Plants	11/91
DG-8006	Control of Access to High and Very High Radiation Areas in Nuclear Power Plants	11/91
DG-8007	Instructions for Recording and Reporting Occupational Radiation Exposure Data	12/91
DG-8008	Planned Special Exposures	01/92
DG-8009	Interpretation of Bioassay Measurements (Proposed Revision to Regulatory Guide 8.9)	01/92
DG-8010	Criteria for Monitoring and Methods for Summation of Internal and External Occupational Doses	03/92
DG-8011	Radiation Dose to the Embryo/Fetus	03/92
DG-8012	Instruction Concerning Risks from Occupational Radiation Exposure (Proposed Revision 1 to Regulatory Guide 8.29)	01/95
DG-8013	ALARA Levels for Effluents from Materials Facilities	11/92
DG-8014	Instruction Concerning Prenatal Radiation Exposure (Proposed Revision to Regulatory Guide 8.14)	10/94
DG-8015	Release of Patients Administered Radioactive Materials	06/94
DG-8016	Constraints for Air Effluents for Licensees Other than Power Reactors (Proposed Revision 1 to Regulatory Guide 8.37)	01/96
OH 940-4	(Proposed Revision 2 to Regulatory Guide 8.14) Personnel Neutron Dosimeters	02/80
OP 032-5	Test and Calibration of Radiation Protection Instrumentation	09/84
OP 212-4	Radiation Protection Training for Personnel Employed in Medical Facilities	01/84
OP 618-4	(Second Proposed Revision 4 to Regulatory Guide 8.8) Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable (ALARA)	05/82
OP 722-4	Qualifications for the Radiation Safety Officer in a Large-Scale Non-Fuel-Cycle Radionuclide Program	04/82

REGULATORY GUIDE SERIES

DIVISION 9 — ANTITRUST AND FINANCIAL REVIEW

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
9.1	Regulatory Staff Position Statement on Antitrust Matters	—	12/73
9.2	Information Needed by the NRC Staff in Connection with Its Antitrust Review of Construction Permit Applications for Nuclear Power Plants	— 1	10/74 06/76
9.3	Information Needed by the AEC Regulatory Staff in Connection with Its Antitrust Review of Operating License Applications for Nuclear Power Plants	—	10/74
9.4	Suggested Format for Cash Flow Statements Submitted as Guarantees of Payment of Retrospective Premiums (for Comment)	—	09/78

REGULATORY GUIDE SERIES

DIVISION 10 — GENERAL

ACTIVE REGULATORY GUIDES

Guide Number	Title	Rev.	Published Month/Year
10.1	Compilation of Reporting Requirements for Persons Subject to NRC Regulations	—	01/75
		1	07/75
		2	08/75
		3	05/77
		4	10/81
10.2	Guidance to Academic Institutions Applying for Specific Byproduct Material Licenses of Limited Scope (Errata published 7/84)	—	03/76
		1	12/76
10.3	Guide for the Preparation of Applications for Special Nuclear Material Licenses of Less than Critical Mass Quantities	—	07/76
		1	04/77
10.4	Guide for the Preparation of Applications for Licenses to Process Source Material (Errata published 7/84) (Draft FC 409-4, Proposed Revision 2, published 4/85)	—	07/76
		1	03/77
		2	12/87
10.5	Applications for Type A Licenses of Broad Scope (Errata published 7/84) (Draft FC 408-4, Proposed Revision 2, published 2/85; a second Proposed Revision 2, published 11/94)	—	09/76
		1	12/80
10.6	Guide for the Preparation of Applications for Use of Sealed Sources and Devices for Performing Industrial Radiography (Draft TP 602-4, Proposed Revision 1, published 6/80) (Errata published 7/84) (Draft FC 401-4, Proposed Revision 2, published 10/84)	—	09/76
		1	12/81
10.7	Guide for the Preparation of Applications for Licenses for Laboratory and Industrial Use of Small Quantities of Byproduct Material (Errata published 7/84)	—	02/77
		1	08/79
10.8	Guide for the Preparation of Applications for Medical Use Programs (Draft FC 415-4, Proposed Revision 2, published 8/85) (Appendix X, "Guidance on Complying with New Part 20 Requirements," 07/92)	—	01/79
		1	10/80
		2	08/87
10.9	Guide for the Preparation of Applications for Licenses for the Use of Self-Contained Dry Source-Storage Gamma Irradiators (Draft OH 706-4 published 2/79) (Draft OP 706-4, Proposed Revision 1, published 4/82) (Errata published 7/84) (Draft FC 402-4, Second Proposed Revision 1, published 10/84)	—	04/80
		1	12/88
10.10	Guide for the Preparation of Applications for Radiation Safety Evaluation and Registration of Devices Containing Byproduct Material (Draft FC 601-4 published 8/86)	—	03/87
10.11	Guide for the Preparation of Applications for Radiation Safety Evaluation and Registration of Sealed Sources Containing Byproduct Material (Draft FC 603-4 published 12/86)	—	06/87

DIVISION 10
DRAFT REGULATORY GUIDES

Task Number	Title	Published Month/Year
DG-0002	Guidance on Complying with New Part 20 Requirements (Proposed Appendix X to Regulatory Guide 10.8)	01/92
DG-0003	Guide for the Preparation of Applications for Licenses for Non-Self-Contained Irradiators	02/94
DG-0005	Applications for Licenses of Broad Scope (First Proposed Revision 2 was published in 2/85)	11/94
➤ DG-0010	Preparation of Petitions for Rulemaking Under 10 CFR 2.802 and Preparation and Submission of Proposals for Regulatory Guide Documents	08/96
FC 401-4	(Proposed Revision 2 to Regulatory Guide 10.6) Guide for the Preparation of Applications for the Use of Sealed Sources and Devices for Performing Industrial Radiography	10/84
FC 403-4	Guide for the Preparation of Applications for Licenses for the Use of Panoramic Dry Source-Storage Irradiators, Self-Contained Wet Source-Storage Irradiators, and Panoramic Wet Source-Storage Irradiators	01/85
FC 404-4	Guide for the Preparation of Applications for Licenses for the Use of Sealed Sources in Nonportable Gauging Devices	01/85
FC 405-4	Guide for the Preparation of Applications for Licenses for the Use of Sealed Sources in Gas Chromatography Devices and X-Ray Fluorescence Analyzers	02/85
FC 406-4	Guide for the Preparation of Applications for Licenses and Approvals To Authorize Distribution of Various Items to Group Medical Licensees	02/85
FC 407-4	Guide for the Preparation of Applications for Licenses for the Use of Sealed Sources in Portable Gauging Devices	01/85
FC 408-4	(Proposed Revision 2 to Regulatory Guide 10.5) Guide for the Preparation of Applications for Type A Licenses of Broad Scope	02/85
FC 410-4	Guide for the Preparation of Applications for Nuclear Pharmacy Licenses	08/85
FC 411-4	Guide for the Preparation of Applications for Licenses for the Use of Radioactive Materials in Servicing Preregistered Gauges, Measuring Devices, and Sealed Sources Used in Such Devices	06/85
FC 412-4	Guide for the Preparation of Applications for Licenses for the Use of Radioactive Materials in Leak-Testing Services	06/85
FC 413-4	Guide for the Preparation of Applications for Licenses for the Use of Radioactive Materials in Calibrating Radiation Survey and Monitoring Instruments	06/85
FC 414-4	Guide for the Preparation of Applications for Licenses for Medical Teletherapy Programs (Second draft, previously issued as TM 608-4, 3/82; Errata published 7/84)	12/85

CHRONOLOGY

Amendments to be Considered by Agreement States
(from September 1971 thru March 20, 1997)

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
Sept. 24, 1971	20 30	Part C, Sch. B Part D, App. B	*Addition of an exempt quantity for Ba-133.
March 26, 1971	20 30 40 70 71	A.3 C.40 C.100 D.207	*Addition and modification of transport and packaging procedures.
Nov. 2, 1972	20	Part D, App. A	*Changes in values of radionuclides of all concentrations in air and water.
Sept. 17, 1973	19	Part J	*Requirements for notices, instructions and reports by licensees to workers, and options available to workers with regard to inspections.
Oct. 24, 1973	20 30 32	A.2(i) Part C, Sch. A Part D, App. A and App. B	*Change to abbreviations for "curie" and "micro-curie," and addition of definition for "milli-curie."
Jan. 10, 1974	31 32	C.22(i) C.28(h)	Authorization to use C-14 in <u>in vitro</u> clinical or laboratory tests.
March 11, 1974	30 31 40 70 150	C.40	*Requirement that suppliers must verify that customers are authorized to receive the material shipped.
July 29, 1974	20	A.2(i) Part D, App. A	*Special curie definitions and concentration values for U and Th.

*Compatibility Item.

¹ Refers to the Suggested State Regulations for Control of Radiation prepared by the Conference of Radiation Control Program Directors, Inc.

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
Aug. 16, 1974	31 32 35	C.22(h) C.26(c) C.28(h) C.28(j)	Addition of H-3 and Fe-59 to <u>in vitro</u> tests and extension of Medical Group licensing.
Jan. 15, 1975	31 32	C.22(d) C.28(d)	*Modification of requirements for distribution of 31.5 GL devices.
Jan. 19, 1975	--	A.3(c)	*Clarification of AEC contractors exemption pursuant to Energy Reorganization Act.
June 25, 1975	20	D.206	*Requirements for control of licensed material in unrestricted areas and <u>not</u> in storage.
June 25, 1975	35	Part C, Sch. C	Addition of I-125 seeds for interstitial treatment of cancer to Group VI.
Jan. 19, 1976	20	D.1(a)	*Incorporation of "As Low As Is Reasonably Achievable (ALARA)" wording.
Jan 29, 1976	20	Part D, App. A	*Modification of occupational exposure limit for Rn-222.
Feb. 23, 1976	35	Part C, Sch. C	Addition of Sn-113/In-113m generators to Group III.
April 19, 1976	35	Part C, Sch. C	Addition of Yb-169 DTPA for cisternography to Group II.
June 2, 1976	20 31 32 35 40 70 150	Parts C, D and E	Requirements for preservation of certain records required by the regulations

*Compatibility Item.

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
Aug. 4, 1976	34	E.203	Personnel monitoring requirements for industrial radiographers.
Aug. 16, 1976	35	Part C, Sch. C	Addition of I-125 fibrinogen for detection of deep vein thrombosis to Group II.
Dec. 29, 1976	20	D.103	*Authorizes use of respirators. Bases internal exposure limits on intake into the body.
Jan. 5, 1977	40	C.21(d)	Establishes GL for depleted uranium products.
March 7, 1977	40	C.3(c)	*Exemption for personnel neutron dosimeters containing thorium.
May 31, 1977	31 32	C.22(i) C.28(h)	Addition of Se-75 to <u>in vitro</u> GL.
June 27, 1977	31 32	C.22(i) C.28(h)	Addition of Mock Iodine-125 calibration sources to <u>in vitro</u> GL.
Aug. 15, 1977	35	C.26(b)	Modification of requirements for individual physician use of radioactive material for human use.
Jan. 6, 1978	40	C.21(a)	Extends small quantity source material GL to Federal, State and local governments for operational purposes.
Jan 16, 1978	35	Part C, Sch. C	Addition of Tc-99m human serum albumin for heart blood pool imaging to Group III.
Feb. 7, 1978	35	Part C, Sch. C	Addition of Tc-99m medronate sodium for bone imaging to group III.

*Compatibility Item.

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
Feb. 16, 1978	30	C.4(c)	*Exemption for spark gap irradiators containing Co-60.
March 14, 1978	20	D.203(c)	*Additional requirements for controlling areas in which radiation levels in excess of 500 rems/hr exist.
June 16, 1978	35	Part C, Sch. C	Addition of Tc-99m gluceptate sodium for brain and renal perfusion imaging to Group III.
June 23, 1978	20	D.203(f)	*Removal or defacing of radioactive material labels on empty containers.
Sept. 7, 1978	35	Part C, Sch. C	Addition of Tc-99m human serum albumin microspheres for venography to Group III.
Dec. 28, 1978	35	G.3(c)	Requirement to perform survey of patients to confirm that implants have been removed.
March 22, 1979	35	Part C, Sch. C	Deletion of diagnostic procedures from medical groups.
June 5, 1979	30 40 70	C.31(d)	Notice of discontinued licensed operations.
July 9, 1979	35	G.3(d), (e), (f), (g), (h)	Teletherapy calibrations
Aug. 20, 1979	19 20	D.1, D.101, D.102 J.13	*Control of radiation to transient workers.
Sept. 27, 1979	71	C.100	*Modification of transportation requirements.

*Compatibility Item.

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
March 3, 1980	34	Part E C.26(e)	Amendments to industrial radiography requirements.
March 28, 1980	71	A.3(b) C.101	*Correction to reference to Postal Service regulations.
Sept. 2, 1980	35	C.26(c)	Testing of radioisotope generators.
Sept. 19, 1980	40	C.21(a)	Deletion of GL for source material medicinals.
Nov. 10, 1980	35	D.409	Medical misadministration reporting.
Nov. 17, 1980	40	A.2 C.25(e),(f) (g), (h) C.29 Part C, Sch. E	*Requirements to implement the Uranium Mill Tailings Act.
Dec. 1, 1980	20	D.106(g)	*Reference to 40 CFR 190 for uranium fuel cycle operations.
Jan. 28, 1981	20	D.304	*Deletion of waste burial authorization.
March 6, 1981	35	Part C, Sch. C	Addition of Tc-99m oxidronate sodium to Group III.
March 13, 1981	34	E.203(b)	Disposal of dosimeter records.
March 31, 1981	20	D.306	Biomedical waste rule.
May 13, 1981	30	C.4(c)	*Exemption for survey instrument calibration sources.
Sept. 23, 1981	30	C.4(c)	*Addition of Am-241 to exemption for survey instrument calibration sources.

*Compatibility Item.

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
Nov. 30, 1981	20	D.201	*Radiation protection survey requirement.
Dec. 24, 1981	40	C.3(c)(6)	*Clarification of exemption for uranium shielding in shipping containers.
March 26, 1982	35	Part C, Sch. C	Addition of Tc-99m labeled disofenin to Group III.
April 15, 1982	20	D.103	Placement of provisions of Reg. Guide 8.15 in regulations.
June 29, 1982	35	Part C, Sch. C	Addition of Tc-99m labeled succimer to Group III.
July 6, 1982	71	C.104	*Advance notification of transport of waste.
Sept. 13, 1982	35	C.26(a)	Change medical isotope committee to radiation safety committee.
Jan. 26, 1983	61	Part M D.307 D.308 D.309	*Licensing requirements for land disposal of radioactive waste, and waste classification.
Dec. 27, 1983**	20	D.311	*Transfer for disposal and manifests.
March 4, 1983	35	G.4(h),(i)	Teletherapy room monitors and servicing of source exposure mechanisms.
March 7, 1983	35	C.26(c)	Exemption from requirements for use of approved radiopharmaceuticals for unapproved procedures.

¹*Compatibility Item.

**Published in conjunction with Part 61.

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
June 28, 1983	35	Part C, Sch. C	Addition of I-125 sealed source in portable device to Group VI.
Aug. 15, 1983	30 40 70	C.32	Expiration and termination of licenses.
Sept. 6, 1983	71	Part T	*Transportation regs compatibility with IAEA.
Sept. 28, 1983	30 70 150	W.501	Irretrievable well logging source.
Sept. 11, 1984	40	C.3(c)	*Elimination of exemption for glass enamel and glass enamel frit.
Sept. 10, 1985	35	C.26(c)	Addition of T-99m labeled pharmaceuticals for gastro esophageal imaging and other clinical procedures.
Nov. 15, 1985	40 Appendix A 150	Part U (proposed)	*Uranium Mill Tailings EPA Standards
July 16, 1986	34	Part E	*Industrial radiography storage surveys and quarterly audits
Feb. 11, 1987	30 40 61 70	Part C,M,U	*Bankruptcy notification
March 24, 1987	35	Part G, Part C	Exemption for use of aerosols.
April 1, 1987	35	Part G, Part C	Revision for medical use. *Medical misadministration reporting
July 14, 1987	39	Part W	*Requirements for well logging.

*Compatibility Item.

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
Feb. 12, 1988	20	Part D	*NVLAP certification of dosimetry processors.
July 27, 1988	30, 40, 70	Part C	*Decommissioning
June 26, 1989	61	Part D	Greater than Class C
July 17, 1989	39	Part W	Exemption-Authorized to use sealed sources in well logging.
October 12, 1989	35	Part G	Addition of Palladium-103 for Interstitial Treatment of cancer.
April 7, 1990 54 FR 14051***	30, 40, 70	Part C	*Emergency Plan.
August 23, 1990 August 23, 1993 55 FR 34513 58 FR 39130	35	Part G	Use of Radiopharmaceuticals for therapy.
January 10, 1991 55 FR 843	34	Part E	*Safety requirements for radiographic equipment.
April 18, 1991 56 FR 11504	34	Part E	ASNT Certification of Radiographers.
June 20, 1991 56 FR 23360 56 FR 61352 57 FR 57877 58 FR 67656 59 FR 41641 60 FR 20183	20	Part D	*Standards for Protection Against Radiation.
October 15, 1991 56 FR 64980	20, 30, 31 34, 39, 40 70	Part C, D	*Notification of Incidents.
January 27, 1992 56 FR 34104	35	Part G	*Quality Management Program and Misadministrations.

*Compatibility Item.

***Federal Register Notice citations have been added for regulations effective in 1990.

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
October 2, 1992 57 FR 45566	30 35	Part G	Eliminating the recordkeeping requirements for departures from manufacturer's instructions.
July 1, 1993 58 FR 7715	36	Parts C, D	*Licensing and Radiation Safety Requirements for Irradiators.
July 22, 1993 58 FR 33886	61	Part M	*Definition of land disposal and waste site QA program.
October 25, 1993 58 FR 39628	30, 40	Part C	*Decommissioning recordkeeping documentation of restricted areas and spill sites.
January 28, 1994 58 FR 68726 59 FR 1618	30, 40 70	Part C	*Self-Guarantee as an additional financial mechanism.
July 1, 1994 59 FR 28220	40	Part C	*Uranium Mill Tailings Regulations: Conforming NRC Requirements to EPA Standards.
August 15, 1994 59 FR 36026	30, 40 70	Part C	*Timeliness in Decommissioning of material facilities.
January 1, 1995 59 FR 61767 59 FR 65243 60 FR 322	30, 32 35	Part C, G	*Preparation, Transfer for Commercial Distribution, and Use of Byproduct Material for Medical Use.
March 13, 1995 60 FR 7900	20	Part D	*Frequency of Medical Examinations for Use of Respiratory Protection Equipment.
March 1, 1998 60 FR 15649 60 FR 25983	20, 61	Part D, M	*Low-Level Waste Shipment Manifest Information and Reporting. ****
June 30, 1995 60 FR 28323	34	Part E	*Performance Requirements for Radiography Equipment.

¹*Compatibility Item.

****Agreement States should promulgate no later than March 1, 1998 (See SP-95-086)

<u>Effective Date</u>	<u>10 CFR Part</u>	<u>Regulations¹</u>	<u>Summary</u>
August 14, 1995 60 FR 36038	19.20	Part D, J	*Radiation Protection Requirements: Amended Definitions and Criteria.
November 24, 1995 60 FR 38235	30.40 70	Part C	*Clarification of Decommissioning Funding Requirements.
April 1, 1996 60 FR 50248 61 FR 28724	71	Part T	*10 CFR Part 71: Compatibility with the International Atomic Energy Agency.
October 20, 1995 FR 48623	20.35	Part A, D G	*Medical Administration of Radiation and Radioactive Materials.
January 16, 1996 61 FR 1109	30.40 70	Part C	One Time Extension of Certain Byproduct, Source and Special Nuclear Materials Licenses.
May 16, 1996 61 FR 24669	20.30 40.61 70	Part C, D M	*Termination or Transfer of Licensed Activities: Recordkeeping Requirements.
January 9, 1997 61 FR 65119	20	Part D	*Resolution of Dual Regulation of Airborne Effluents of Radioactive Materials: Clean Air Act
January 13, 1997 62 FR 1662	150	Part C	*Recognition of Agreement State Licenses in Areas Under Exclusive Federal Jurisdiction Within an Agreement State
January 29, 1997 62 FR 4120	20.35	Part D, G	*Criteria for the Release of Individuals Administred Radioactive Material

¹*Compatibility Item.

Review Process for Low-Level Radioactive Waste Disposal License Application Under Low-Level Radioactive Waste Policy Amendments Act

**U.S. Nuclear Regulatory
Commission**

Office of Nuclear Material Safety and Safeguards

C. L. Pittiglio, Jr.



Reprinted April 1991

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Review Process for Low-Level Radioactive Waste Disposal License Application Under Low-Level Radioactive Waste Policy Amendments Act

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C. L. Pittiglio, Jr.

Division of Low-Level Waste Management and Decommissioning
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555



ABSTRACT

This document describes the U.S. Nuclear Regulatory Commission's (NRC's) process for licensing a low-level radioactive waste disposal facility within the time required by the Low-Level Radioactive Waste Policy Amendments Act of 1985. This document also estimates the level of effort and expertise that is needed to review a license application within the required time. It is intended to be used by the NRC staff as well as States and interested parties to provide a better understanding of what the NRC envisions will be involved in licensing a low-level radioactive waste disposal facility.

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1 INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) is the Federal agency that has the responsibility for licensing commercial low-level radioactive waste disposal facilities for Non-Agreement States. In addition, the Low-Level Radioactive Waste Policy Amendments Act (LLRWPA) of 1985 requires that the NRC establish procedures and develop the technical capability to process the license application for a low-level radioactive waste disposal facility and to complete the review (except licensing hearing) of the application, to the extent practicable, within 15 months of its receipt. This 15-month period begins once the application has been found acceptable for docketing (see Figure 1). The NRC staff's review includes (1) the evaluation of an applicant's Safety Analysis Report (SAR) and the issuance of a draft and final Safety Evaluation Report (SER) and (2) the evaluation of an applicant's Environmental Report (ER) and the issuance of a draft and final Environmental Impact Statement (EIS). The preparation of the SER and EIS will take place concurrently.

This document (1) identifies the resources, personnel, and disciplines that the staff believes are needed to evaluate both the SAR and the ER and (2) defines the stages necessary to complete the review within the required 15 months. The 15-month review required by the LLRWPA begins with the docketing of the license application. To meet the 15-month mandatory review of the license application, the applicant will also be required to provide a timely response to NRC's requests. This includes the exchange of information between the staff and the applicant that starts as soon as the review begins and continues for the entire 15 months as well as the formal request for additional information. The 15-month review does not take into consideration any special licensing steps or additional time that might be necessary if joint permitting and licensing are required. In addition, this NUREG provides the rationale and regulatory basis for the various license review stages.

For Agreement States, a State agency performs this regulatory function. The appendix provides a discussion of the role of Agreement States in the licensing process. Parts 2 and 61 of Title 10 of the Code of Federal Regulations (10 CFR) define the licensing process for the NRC. For Agreement States, regulations compatible with 10 CFR 61 must be developed; however, the administrative procedure for processing a license application is not a matter of compatibility and may differ from the process presented herein.

2 TENDERED APPLICATION

The licensing process begins when the applicant submits a license application to the NRC for review; one signed original and two copies of the license application must be provided. Along with the required copies of the license application, remittance of the applicant's fee as directed by 10 CFR 170 is required. The license application initially will be treated as a tendered document and will be assigned a tentative docket number. A copy will be available for public inspection in the Commission's Public Document Room 15 at

1717 H Street NW., Washington, DC (10 CFR 2.101(g)). In addition, on receipt of a tendered application, the NRC will publish, in the Federal Register, a notice of the filed application (10 CFR 2.101(g)(1)(i)). The Federal Register notice provides an opportunity for interested persons to submit views and comments on the tendered application for consideration by both the NRC and the applicant. At the same time, the NRC will notify appropriate Federal, State, tribal, and local officials and governing bodies (10 CFR 2.101(g)(1)(ii)). The NRC is also required (10 CFR 2.101(g)(1)(ii)) to post a public notice in general-circulation newspapers in the affected States and regions summarizing the information in the tendered application and noting the opportunity to submit public views and comments.

Once an application has been tendered, it will be judged for completeness on the basis of the minimum information required to begin a detailed review. The determination of completeness will be made within a 30-day period; the administrative process is defined in 10 CFR 2.101(a)(2). Completeness will be determined, as part of the acceptance review, by a rapid "reading/screening" of the entire application and by comparing the submitted application with (1) the subject headings in Subpart B of 10 CFR 61 and NUREG-1199, "Standard Format and Content of a License Application for a Low-Level Radioactive Waste Disposal Facility," and Regulatory Guide (RG) 4.18, "Standard Format and Content of Environmental Reports for Near-Surface Disposal of Radioactive Waste," and (2) the tables of contents in NUREG-1200, "Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility," and NUREG-1300, "Environmental Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility." Although such a review is preliminary in nature, it will be performed by the technical experts who later will participate in the more detailed review.

Whether or not the tendered application is acceptable depends primarily on whether pertinent matters have been addressed and not on whether the applicant's approach to resolving these matters is acceptable. Making determinations about the latter is the primary objective of the review and evaluation process after the application has been accepted. The acceptance review is performed on all documentation included in the application.

After the application has been reviewed for completeness and has been found acceptable for docketing, a docket number will be assigned and the applicant will be notified by the Director of the Office of Nuclear Material Safety and Safeguards (NMSS), NRC. However, if it is determined that any part of the tendered application is incomplete and unacceptable for docketing, the applicant will be so informed and will be provided with a listing of the deficient areas (10 CFR 2.101(g)(iii)).

3 DOCKETING OF APPLICATION

Once the staff has determined that a license application is acceptable for docketing, the applicant will be required to provide a copy to the chief executive of the municipality where the disposal facility is to be located, and distribute additional copies to Federal, State, local, and Indian tribe officials including chief executives of governing bodies of municipalities or counties that have been identified in the application as the alternative site locations. The applicant will have 10 days after formal docketing to submit to the Director of NMSS a

written statement that the above additional copies have been distributed (see Figure 2).

At the time of formal docketing, the Director of NMSS will publish in the Federal Register a notice of docketing that will identify the State and location of the proposed waste disposal facility and will give notice to the Governor of that State and other officials as required by 10 CFR 2.101(g)(3).

4 REQUEST TO PARTICIPATE IN NRC'S LICENSE REVIEW

Once an application has been formally docketed, the 15-month review required by LLRWPA will begin, and at the same time a State or tribal governing body whose interests will be affected by a disposal facility at the proposed site may submit to the Director of NMSS a proposal for participation in the review of the license application. The proposal must be submitted in writing and signed by the Governor of the State or the official otherwise designated by the State or tribal law. For the State in which the disposal facility will be located, or any State that is a member of an interstate compact that includes the State in which the proposed facility will be located, a participation proposal must be submitted no later than 45 days following publication in the Federal Register of the notice of the tendering of an application (10 CFR 61.72). For any other State, or for a tribal governing body, a proposal must be submitted no later than 120 days following publication in the Federal Register of the notice of the tendering of the application. The time allowed for submitting proposals to participate in the review process will allow all parties to wait until the NRC staff has determined that an application is complete before they formally request to participate in its review. The minimum information that must be contained in a request to participate in a license application review is listed in 10 CFR 61.72(c). Once the Director of NMSS has received a proposal submitted in accordance with 10 CFR 61.72, that official will arrange a meeting with representatives of the State and tribal governing bodies to discuss the proposal and to ensure full and effective participation in the NRC's license review process. NRC approval of the proposal to participate in the review will be made by the Director of NMSS, and the decision by the Director will be transmitted in writing to the Governor or the designated official of the tribal governing body as required by 10 CFR 61.73.

5 SAFETY EVALUATION REPORT AND ENVIRONMENTAL IMPACT STATEMENT

Once the application has been formally docketed, the NRC staff will begin its review of the license application, which includes both the Safety Analysis Report (SAR) and the Environmental Report (ER). The reviews of the SAR and ER will be conducted concurrently, and the review procedures as well as the content of the SAR and ER are dictated by technical requirements. The NRC staff has developed NUREG-1200 and NUREG-1300, which provide specific guidance on the type and format of the information to be presented in both the SAR and ER. NUREG-1199 and RG 4.18 provide additional guidance on what should be included in the documents. If the principal reviewers have not been able to visit the proposed site, a site visit will be scheduled shortly after the application has been docketed.

It is currently estimated that the concurrent review of both of these documents will require an NRC staff effort of approximately 8 staff-years encompassing approximately 22 technical disciplines. Although it is not necessary that the

entire staff have licensing experience, it is necessary that the principal reviewers have licensing experience in addition to their required technical expertise. The technical staff should have expertise in geology, hydrology, surface water hydrology, seismology, nuclear engineering, materials engineering, biology, sociology, meteorology, soils engineering, structural engineering, operations/construction engineering, health physics, geochemistry, performance assessment, environmental engineering, quality assurance, financial assurance, law, and licensing project management. Although not all of the participants will be working on the review continuously over the entire 15-month period and some specialists may only require a few staff-weeks of effort, at various stages all of the technical specialists in the various disciplines will have to work on the review concurrently. Table 1 provides a detailed listing of the disciplines and the basis for the estimated level of effort of 8 staff-years.

These estimates are based on the assumption that the license application will adhere closely to the guidelines provided in the NUREG reports discussed above and that the NRC staff will have low-level waste regulatory experience before it starts its review. Any change from the NRC-recommended format or content will require an evaluation to determine the effect on the staff's ability to process the license application in 15 months.

To be able to make a determination that the 10 CFR 61 requirements are being met, the staff estimates that 70 individual findings must be made for the safety review alone. These findings are listed in NUREG-1200. A similar number of findings must be made for the environmental review. The estimated number of findings for the safety review is based on each technical area for which a finding must be made; for each area a principal reviewer with a specific expertise will be assigned. Some of the findings of a particular section will be used in other areas of the review and must be completed before the other reviews are initiated. In addition, although a primary reviewer will be assigned to review a particular SAR/SRP section, that reviewer may also have secondary review responsibilities for other sections of the SAR/SRP. This type of organization is typical for both the safety and environmental reviews.

Once both the SAR and ER have been reviewed, the NRC staff will issue the results in a draft and final Safety Evaluation Report (SER) and a draft and final Environmental Impact Statement (EIS), respectively. The total amount of time allowed for both the SAR and ER reviews is 15 months as mandated by the Low-Level Radioactive Waste Policy Amendments Act (LLRWPA) of 1985.

5.1 Preparation for Review

To ensure that it is ready to review the applicant's SAR and ER, the NRC staff will undertake the following activities well in advance, if possible, of the actual receipt of an application: (1) obtain a working knowledge of NUREG-1199 and Regulatory Guide 4.18, the standard format and content guides for the SAR and ER, respectively, and NUREG-1200 and NUREG-1300, the standard review plans for the SAR and ER, respectively, in the areas of their technical responsibility; (2) contact Federal, State, local, and tribal officials who also will be involved in the SAR and ER review process; (3) identify and review any new and/or additional data determined to be potentially significant to NRC's review; and (4) to the extent practicable become familiar with the contents and issues of the SAR and ER before the documents are received through early and ongoing interaction with the applicant. To the extent practicable, the primary reviewers will visit the proposed disposal site.

5.2 Safety Evaluation Report

In the SER the staff will address and make determinations on issues such as (1) long-term radiation doses, (2) conformance with site suitability requirements, (3) conformance with site design, (4) conformance with facility operations and closure requirements, and (5) any additional information provided by the applicant in response to NRC written requests. In addition, the staff will include determinations of the following: (1) acceptability of land ownership, (2) acceptability of institutional controls, (3) acceptability of financial assurances, and (4) license conditions. In the SER the staff will provide its view on the extent to which the application complies with 10 CFR 61.

The NRC staff's assessment will be contained in a DSER that will be issued approximately 8 months after the license application is docketed and will be noted in the Federal Register with an accompanying request for comments within 45 days.

Because the staff will not issue the DSER until 8 months after the application is docketed, those parties who waited the 120 days from the time the application was tendered before they submitted a request to participate in the license review will have adequate time to ensure that they will be able to actively participate in the review. A 45-day public comment period has been established to allow any member of the public to comment on the staff's analysis of the SAR. Following the analysis of public comments, the NRC staff may request that the applicant provide any additional information necessary to respond to these comments. The NRC staff will make its request for additional information, if necessary, within 45 days after the close of the comment period. The applicant will have 30 days to respond to this request for additional information and to provide additional site analysis data, if required.

The NRC staff will also make formal written requests for additional information from the applicant 2 and 5 months after the application is docketed. Additional requests may also be made if the applicant's responses are inadequate. The NRC staff will require a timely response (30 days) to these written requests in order to ensure that major issues are addressed and the DSER is on schedule.

Approximately 90 days after closure of the comment period on the DSER, the NRC staff will begin preparing a final SER. In summary, the SER will contain the staff's findings on the applicant's (1) qualifications, (2) compliance with the performance objectives of 10 CFR 61, (3) compliance with the technical requirements of 10 CFR 61, (4) compliance with financial and institutional standards, (5) compliance with the requirements of 10 CFR 70 and 73 regarding special nuclear material and safeguards, and (6) license conditions. NUREG-1200 provides guidance on the type of findings the NRC staff will make.

Although the above estimated time periods for review are not mandated in the regulations, they represent NRC's "best" estimates for each phase of the review so that the license review can be completed within 15 months as dictated by the LLRWPA (see Figure 3).

5.3 Environmental Impact Statement

The NRC staff's issuance of a license for a low-level radioactive waste disposal facility is considered to be a major Federal action significantly affecting the

quality of the human environment and therefore requires the preparation of an Environmental Impact Statement (EIS) as mandated by the National Environmental Policy Act of 1969 (NEPA). In the EIS, the NRC staff will assess the environmental effect of the proposed disposal facility on its surroundings and examine potential alternative actions. The procedures for the preparation of an EIS are specified by NRC's regulations on environmental protection (10 CFR 51), which are based on the Council on Environmental Quality's regulations (40 CFR 1500-1508).

Before the EIS is prepared, the Director of NMSS will issue a Notice of Intent that will be published in the Federal Register as directed by 10 CFR 51.26. The content of the Notice of Intent is dictated by 10 CFR 51.27. At the same time, the NRC staff will begin its scoping activity to identify the issues as set forth in 10 CFR 51.29. 10 CFR 51.28 defines who will participate in the scoping process with the NRC staff. The NRC staff will then prepare an analysis of the effects of licensing the disposal facility and of alternative actions. For this analysis, the staff will use the information and analyses in the applicant's Environmental Report, but because the NRC staff must make an independent assessment, information and analyses from other sources may also be considered. The NRC staff may also formally request in writing additional information from the applicant if required to prepare the DEIS.

The NRC staff's assessment will be contained in a DEIS that will be issued 8 months after the application is docketed and will be noted in the Federal Register with an accompanying request for comments within 45 days as directed by 10 CFR 51.73. The DEIS is issued for review by the public and other agencies, States, and groups. The content of the DEIS is directed by 10 CFR 51.70 and 51.71. Regulatory Guide 4.18 and NUREG-1300 provide additional guidance on what will be included in the DEIS. The DEIS and the DSER will be developed at the same time.

On the basis of the comments that will be received on the DEIS, the NRC staff will revise the document and issue a final EIS, which will contain the NRC staff's conclusions and recommendations regarding the proposed action. The NRC staff may formally request in writing additional information from the applicant if required to resolve issues raised during the comment period.

Just as with the development of the DSER and the SER, the development of the DEIS and the EIS will require continuous communication and exchange of information with the applicant from the initiation of the review. To complete the review in the mandated 15 months, a timely response by the applicant to the NRC staff's requests will be required.

6 PUBLIC HEARING PROCESS

NRC's licensing process offers several opportunities for interested parties to request a hearing (10 CFR 2.104). If no requests are received, the NRC has the option of holding hearings or evaluating the license solely on the basis of administrative review (10 CFR 2.105(e)(1)). The procedures for issuance or denial of a license without a hearing are defined in 10 CFR 2.108.

The purpose of the public hearing process is to provide those parties who have met the requirements for participation in the hearing an opportunity to present their views on specific areas of the proposed licensing action as well as to provide a forum where the applicant and the NRC staff can present their findings and conclusions. Also, intervenors can present their evidence that challenges or supports the applicant's and the NRC staff's conclusions. In addition, the hearing offers other members of the public an opportunity to present a statement regarding the licensing action.

The process that occurs before a public hearing determines the scope of hearings and who may participate. Following a notice of a public hearing in the Federal Register as required by 10 CFR 2.105(d), any person whose interest is affected by the proceeding and who has a desire to participate can file a written petition to intervene (10 CFR 2.105(d)(2)). To be admitted to the hearing process, a party must have a valid issue. Parties admitted to the hearing have a right to generate evidence through various methods of discovery. The discovery process is the seeking of information, directly related to the staff's review and evaluation of the application, through the deposition, interrogatory, and document production routes. Intervenors are provided copies of correspondence to the applicant during the course of the proceeding.

It is the Commission's policy and practice to begin the public hearing in the vicinity of the site of the proposed facility. However, if all parties agree, all hearing sessions can be held in Washington, DC.

Each party will have an opportunity to present its views and/or present any evidence it may have in support of those views before the Atomic Safety and Licensing Board (ASLB). The ASLB appointed to conduct the hearing consists of three members, one of whom is qualified in the conduct of administrative procedures, and two of whom have qualifications appropriate to the issues to be decided. The ASLB will make the initial decision on the basis of the evidence presented and the hearing record. Appeals of the initial decision can be made within a specified period and will be considered by the Atomic Safety and Licensing Appeal Board and alternatively by the NRC.

7 ISSUANCE OF A LICENSE

Following a favorable decision by the ASLB if a hearing is held, the Director of NMSS will issue a Notice of Intent to issue a license in the Federal Register. If there is no hearing, the Director of NMSS will also issue a Notice of Intent to issue a license in the Federal Register. The notice will summarize the conclusions of both the SER and EIS and provide access to all documents and records associated with the decision. Thirty days following publication of the notice, a Notice of Issuance summarizing the licensing action will be published in the Federal Register concurrently with the actual issuance of the license.

License approval will necessarily require that (1) appropriate news releases are made, (2) copies of the license are provided to the appropriate chief executives and State and tribal officials, and (3) copies are provided to the U.S. Environmental Protection Agency and other appropriate Federal agencies. Finally, the Director of NMSS will issue a license, which must be expressly authorized by the Commission (10 CFR 2.765), to the disposal site operator for the receipt, possession, and disposal of low-level radioactive wastes.

8 REFERENCES

Code of Federal Regulations, Title 10, "Energy," Chapter 1, Nuclear Regulatory Commission, Parts 0 to 199, U.S. Government Printing Office, Washington, DC, revised annually.

U.S. Nuclear Regulatory Commission, NUREG-1199, "Standard Format and Content of a License Application for a Low-Level Radioactive Waste Disposal Facility," January 1987.

---, NUREG-1200, "Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility," January 1987.

---, NUREG-1300, "Environmental Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility," April 1987.

---, Regulatory Guide 4.18, "Standard Format and Content of Environmental Reports for Near-Surface Disposal of Radioactive Waste," June 1983.

**FIGURE 1: NRC PROCEDURES FOR REVIEWING A
LICENSE APPLICATION FOR A LOW-LEVEL RADIOACTIVE
WASTE DISPOSAL FACILITY UNDER LLRWPA**

(time in calendar days)

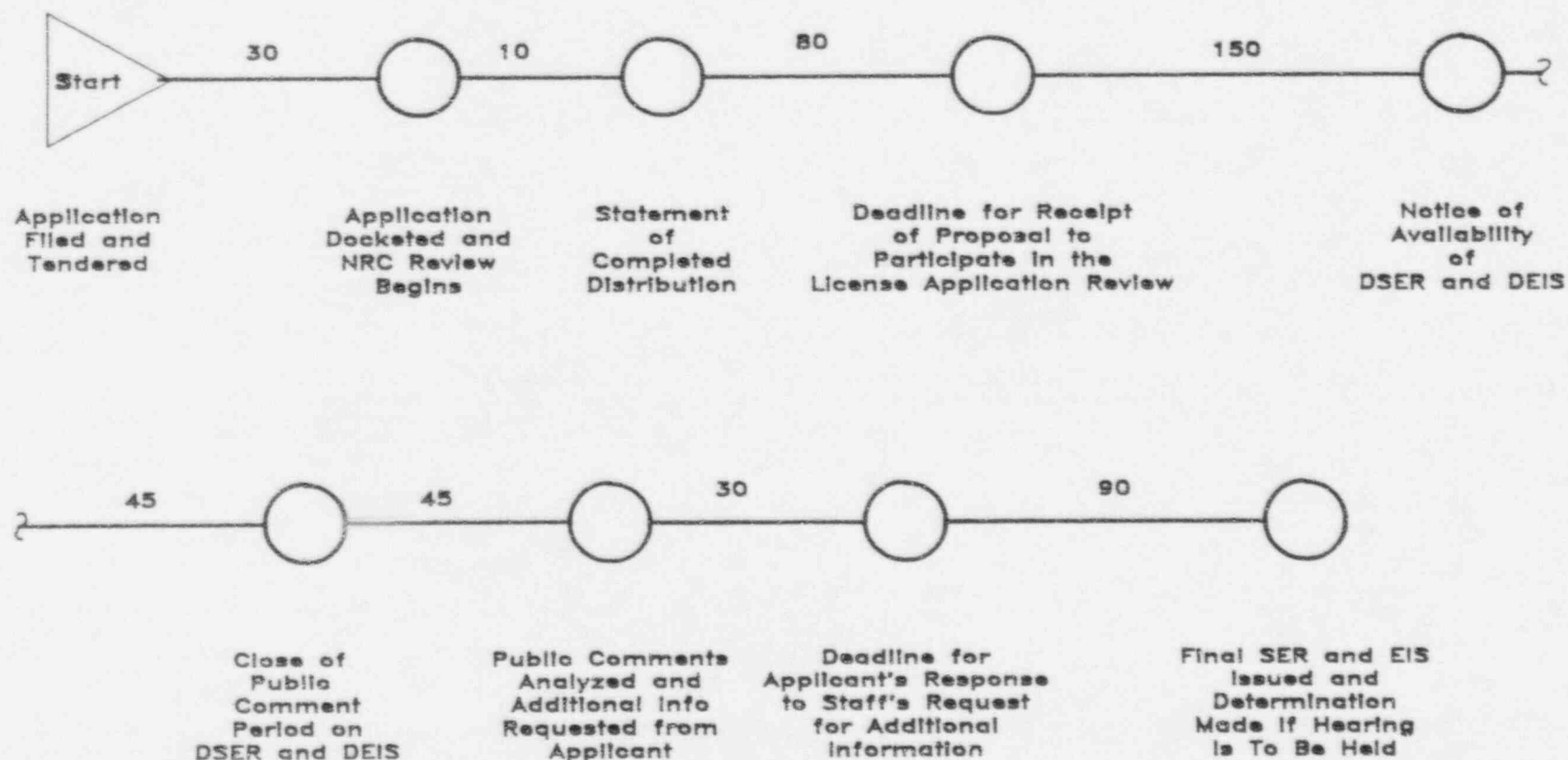
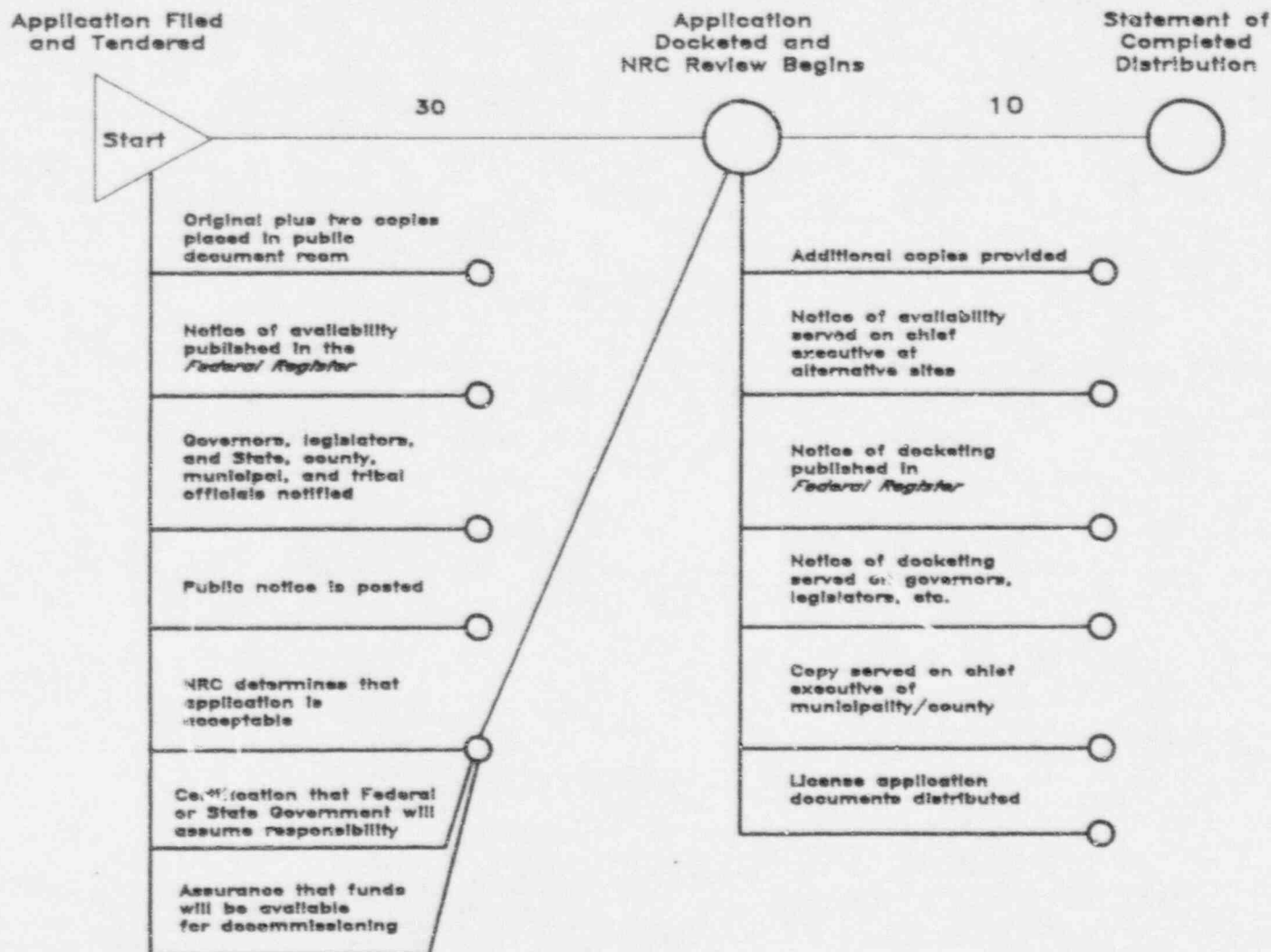


FIGURE 2: NRC PROCEDURES FOR TENDERING AND DOCKETING A LICENSE APPLICATION FOR A LOW-LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY

(time in calendar days)



**FIGURE 3: OVERVIEW OF NRC'S INTERNAL
STEPS FOR REVIEWING A LICENSE APPLICATION
AND ISSUING A SAFETY EVALUATION REPORT (SER)
AND AN ENVIRONMENTAL IMPACT STATEMENT (EIS)**

(Time in calendar days)

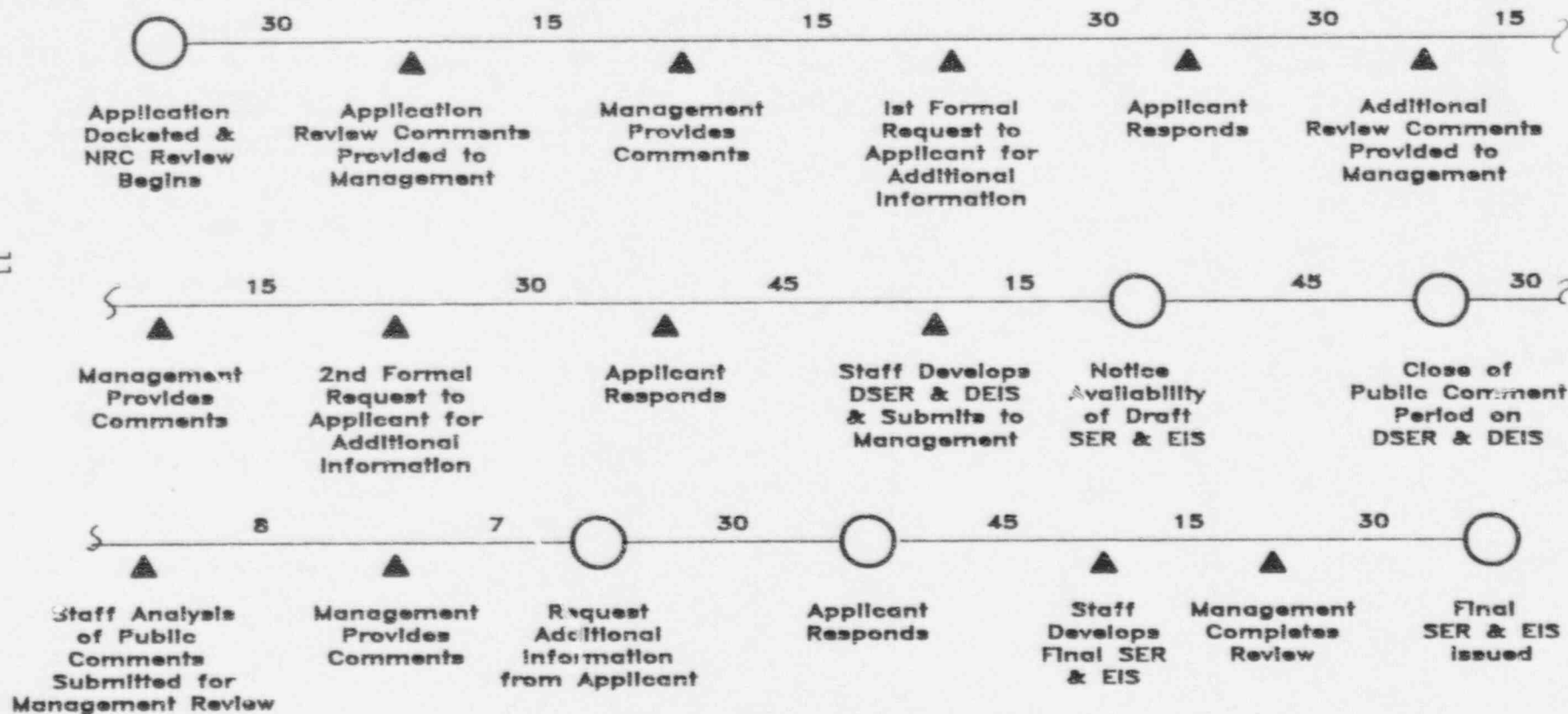


Table 1 Staffing requirements for license review (in staff-weeks)

Staff	Issue draft SER and EIS*	Analyze public comments and work with applicant on additional informa- tion required**	Issue final SER and EIS†	Total
Licensing Project Manager (SER)	32	13	16	61
Licensing Project Manager (EIS)	32	13	16	61
Geologists	8	1	7	16
Hydrogeologists	8	1	7	16
Surface Water Hydrogeologists	11	2	10	23
Soils Engineers	8	2	5	15
Structural Engineers	6	1	4	11
Operations/Construction Engineers	6	1	4	11
Health Physicists	14	2	8	24
Environmental Engineers	14	2	8	24
Materials Engineers	10	2	7	19
Nuclear Engineers	7	1	4	12
Seismologists	8	1	6	15
Biologists	3	1	2	6
Climatologists/Meteorologists	4	1	3	8
Sociologists	3	1	2	6
Quality Assurance Specialists	7	2	5	14
Geochemists	5	1	4	10
Performance Assessment Specialists	21	5	13	39
Financial Assurance Specialists	8	1	6	15
Lawyers	5	2	3	10
Total staff effort (staff-weeks)	220	56	140	416

*Length of time - 32 weeks

**Length of time - 13 weeks

†Length of time - 16 weeks

APPENDIX

SUMMARY OF REGULATORY ROLE OF AGREEMENT STATES IN LICENSING A LOW-LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY

In 1959, Section 274 of the Atomic Energy Act was amended to provide a role for States in the regulation of nuclear materials and a statutory basis under which the NRC would discontinue and the States could assume, through agreements, certain NRC regulatory authority. The 1959 amendment made it possible for the States to regulate byproduct material, source material, and small quantities of special nuclear material, including the disposal of such material.

The mechanism for the discontinuance of the Commission's regulatory authority is an agreement between the Governor of a State and the Commission. To participate in the Agreement State program, a State must establish authority to conduct a radiation control program in the form of legislation and must implement the authority through State regulations. An interested State must promulgate regulations that will provide the standards and rules for licensing, inspection, and enforcement. It must establish a radiation control program within the overall State organization. The program must be able to effectively compete with other health and safety programs for budget and staff. The staff to conduct the program must consist of a sufficient number of trained personnel. The State must also establish an acceptable licensing and compliance program. Before entering into an agreement, the Commission is required to make a finding that the State's radiation control program is compatible with that of the Commission and is adequate to protect the public health and safety. Under an agreement, the State has the authority to regulate the materials covered by the agreement and may opt whether or not to regulate low-level waste disposal in permanent disposal facilities. The NRC retains no regulatory authority over the specific activities authorized by an individual Agreement State license.

The NRC conducts onsite, indepth reviews of each State program at intervals of 12 to 18 months, which cover organization, administration, personnel, regulations and legislation, licensing, compliance, and enforcement. In addition, the NRC provides radiation safety training and technical assistance to the States. At the present time there are 29 Agreement States.

As part of the Agreement State program, the NRC identifies which of its new regulations or revisions are considered matters of compatibility. On December 27, 1982, the NRC promulgated its regulations on low-level waste, 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste." 10 CFR 61 provides licensing procedures, performance objectives, and technical requirements for the issuance of licenses for the land disposal of low-level radioactive waste. The performance objectives and the technical aspects of this regulation are considered matters of compatibility. Thus, the Agreement States and the NRC are implementing a consistent nationwide regulatory program for low-level waste disposal.

The requirements of the National Environmental Policy Act of 1969 (NEPA) are not a matter of compatibility. However, each Agreement State will prepare an assessment that will evaluate environmental issues on the basis of its own equivalent to NEPA.

The licensing process will differ from Agreement State to Agreement State because this aspect of 10 CFR 2 and 61 is not a matter of compatibility. It should be noted, however, that Section 9 of the Low-Level Radioactive Waste Policy Amendments Act required that the regulatory agencies (either the NRC or, as appropriate, the Agreement State) establish procedures and develop the technical capability for processing license applications by January 15, 1987. These procedures were to provide, to the extent practicable, for the completion of all processing and reviews, except for the licensing hearing, within 15 months after receipt of an application. During the reviews of Agreement State programs, the NRC will evaluate the procedures, staffing, regulations, and technical capability of host States or those that anticipate becoming host States.

BIBLIOGRAPHIC DATA SHEET

NUREG-1274

SEE INSTRUCTIONS ON THE REVERSE

2. TITLE AND SUBTITLE

Review Process for Low-Level Radioactive Waste
Disposal License Application Under Low-Level
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5. AUTHOR(S)

C. L. Pittiglio, Jr.

7. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Division of Low-Level Waste Management & Decommissioning
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

8. PROJECT/TASK/WORK UNIT NUMBER

9. FIN OR GRANT NUMBER

10. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Same as 7. above.

11a. TYPE OF REPORT

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b. PERIOD COVERED (Inclusive Dates)

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13. ABSTRACT (200 words or less)

This document identifies and describes the U.S. Nuclear Regulatory Commission's (NRC's) process for licensing a low-level radioactive waste disposal facility within the time required by the Low-Level Radioactive Waste Policy Amendments Act of 1985. This document also estimates the level of effort and expertise that is needed to review a license application within the required time. It is intended to be used by the NRC staff as well as States and interested parties to provide a better understanding of what the NRC envisions will be involved in licensing a low-level radioactive waste disposal facility.

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U.S. Water Resources Council

**FLOODPLAIN
MANAGEMENT
GUIDELINES**

For Implementing

E.O. 11988

For Further Information Contact:

U.S. Water Resources Council

2120 L Street, N.W.

Washington, D.C. 20037

(202) 254-6352

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WATER RESOURCES COUNCIL

FLOODPLAIN MANAGEMENT

Guidelines for Implementing Executive Order 11988

AGENCY: Water Resources Council.

ACTION: Notice of Guidelines Adoption.

SUMMARY: This notice incorporates the Guidelines for Implementing Executive Order 11988—Floodplain Management adopted by the Water Resources Council on January 25, 1978 to assist Federal agencies in preparation of their regulations and procedures for implementing the Order.

FOR FURTHER INFORMATION CONTACT:

Frank H. Thomas, Floodplain Management Specialist, Policy Division, U.S. Water Resources Council, 2120 L Street NW., Washington, D.C. 20037, phone 202-254-6352.

SUPPLEMENTARY INFORMATION: These guidelines provide: (1) explanation of key terms and floodplain management concepts; (2) section-by-section analyses of the Order; and (3) procedures in the form of a decisionmaking process leading from the determination that a proposed action is or is not located in the base floodplain, through the implementation of agency actions.

Dated: February 3, 1978.

LEO M. EISEL,
Director.

PREFACE

These guidelines result from recognition in two Executive Orders that the Nation's floodplains are the scene of: (1) unacceptable and increasing flood losses and (2) degradation of natural and beneficial values. The 1966 Executive Order 11296—

Flood Hazard Evaluation, represented Presidential recognition that structural flood control measures alone were inadequate to stem rising flood losses. It was followed by establishment of flood insurance, disaster assistance and related Federal programs, and some State and local government floodplain management programs. Yet, a decade later, annual flood losses were estimated to approach \$3 billion and continuing to rise.

In the decade following Executive Order 11296, there developed widespread recognition that the natural and beneficial values of floodplains, wetlands and coastal barrier islands must be restored and preserved. Thus, on May 24, 1977, the President issued a comprehensive environmental message accompanied by Executive Order 11988—*Floodplain Management*, to replace the 1966 Order. The new order is a significant policy initiative tying together the need to protect lives and property with the need to restore and preserve natural and beneficial floodplain values. The *Unified National Program for Floodplain Management* (1976) of the Water Resources Council is cited by the Order to provide direction. Federal agencies are directed to lead the Nation by exemplary demonstration of a comprehensive approach to floodplain management and to prepare procedures for achieving the goals of the Order.

The objective of these guidelines is to provide broad guidance in the interpretation of the Order to assist each agency which will be developing its own individual procedures for compliance with the Order. It is recognized that agency procedures will necessarily vary to meet legislatively prescribed missions as well as the requirements of the Order. This guidance should prove useful to State and local governments and interested members of the public.

The guidelines have been developed over a 12-month period by the

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efforts of an interagency task force of floodplain specialists. Comments and suggestions for improvement are welcomed.

GUY R. MARTIN,
Alternate to the Chairman.

EXECUTIVE SUMMARY

THE OBJECTIVE OF EXECUTIVE ORDER 11988 IS:

- "• • • to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative • • •"

THE ORDER APPLIES TO:

- ALL AGENCIES that: (1) acquire, manage, or dispose of Federal lands and facilities; (2) undertake finance, or assist construction and improvements; and (3) conduct activities and programs affecting land use, including planning, regulating, and licensing.
- ALL FEDERAL ACTIONS: described in the preceding sentence.
- ALL FLOODPLAIN LOCATIONS: whether they are along or near to rivers, streams, oceans, ponds, or related water bodies—as a minimum, areas subject to inundation by a flood with a one percent chance of occurring in any year (i.e., "100-year or base flood").

THE ORDER REQUIRES THAT AGENCIES:

- AVOID THE BASE FLOODPLAIN: unless it is the only practicable alternative.
- ADJUST TO THE BASE FLOODPLAIN: If the base floodplain cannot be avoided, adjust to it in order to: (1) reduce the hazard and the risk of flood loss; (2) minimize the impact of floods on human safety, health, and welfare; and (3)

restore and preserve the natural and beneficial floodplain values. The framework for meeting these requirements is the Water Resources Council's *Unified National Program for Flood Plain Management*.

- EVALUATE, DESIGN, AND IMPLEMENT ALL AGENCY ACTIONS: to meet the policies of the Order.
- NOTIFY THE PUBLIC: If the head of an agency finds there is no practicable alternative. This will usually occur after there has been early notice to the public on plans and proposals and alternative courses of action.
- AMEND OR ISSUE REGULATIONS AND PROCEDURES: (1) to avoid the base floodplain if at all practicable; (2) to provide for actions to ADJUST TO THE BASE FLOODPLAIN, if it cannot be avoided; and (3) to keep the public informed of proposed actions in the base floodplain and encourage participation in floodplain decisionmaking. Each agency shall issue or amend existing regulations within one year to comply with this Order. Agencies shall prepare their procedures in consultation with the Water Resources Council, the Federal Insurance Administration and the Council on Environmental Quality, and shall update such procedures as necessary.

THESE GUIDELINES ARE INTENDED:

- TO BE USED BY AGENCIES: in preparing their procedures in consultation with the WRC, CEQ, and FIA.
- TO FURNISH: (1) explanations of key terms and floodplain management concepts; (2) analyses of the Order, section by section, for agency use in developing their regulations and procedures for complying with the intent of each section; and (3) procedures in the

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form of a decision-making process leading from the determination that a proposed action is or is not located in the base floodplain through the implementation of agency action.

- TO ASSIST AGENCIES: by providing broad guidance in the implementation of the Order for use in the preparation of individual agency procedures. It is recognized that agency procedures will necessarily vary to meet legislatively prescribed missions as well as the requirements of the Order.

ACKNOWLEDGEMENT

Preparation of these Guidelines began in December 1976 by a work group of the Floodplain Management Technical Committee of the Water Resources Council, in anticipation of an Executive Order. In October 1977 when the Water Resources Council's technical committees were abolished as part of a restructuring of the Council, a first draft of the Guidelines had been completed. In November 1977, a 60-day task force of essentially the same membership as the work group was appointed to complete the Guidelines.

The members of these two groups and colleagues who provided specialized assistance are listed below. We are indebted to all of these persons for their professional dedication and especially to the members of the drafting team whose overtime efforts secured completion of the Guidelines.

LEO M. EISEL,
Director.

WATER RESOURCES COUNCIL

*Frank Thomas (Task Force and Technical Committee Chairman)

DEPARTMENT OF AGRICULTURE

*Richard Leisher (SCS)

DEPARTMENT OF THE ARMY

*George Phippen (COE)
*Robert Plott (COE)

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OFFICE OF MANAGEMENT AND BUDGET

Bruce Long

COUNCIL ON ENVIRONMENTAL QUALITY

Robert Smythe
Zell Steever

TENNESSEE VALLEY AUTHORITY

*Glenn Wall

DELAWARE RIVER BASIN COMMISSION

Robert Goodell

GREAT LAKES RIVER BASIN COMMISSION

Leonard Crook

MISSOURI RIVER BASIN COMMISSION

Al Mathews

NEW ENGLAND RIVER BASINS COMMISSION

Thomas Klock

OHIO RIVER BASIN COMMISSION

Edward Hood

SUSQUEHANNA RIVER BASIN COMMISSION

Paul Ebright

*Members of the drafting team.

NOTICES

Marshall Goulding
Rose McLeod

UPPER MISSISSIPPI RIVER BASIN COMMISSION

Roy Peterson

ARKANSAS-WHITE-RED BASINS INTER- AGENCY COMMITTEE

Betty Raught

SOUTHEAST BASINS INTER-AGENCY COMMITTEE

Gary Mathews
Steve Sutterfield

STATE REPRESENTATIVES

Jack Pardee (California)
*James Wright (Minnesota)

INTRA-STATE REPRESENTATIVE

Robert Reemelin (Miami Conservancy
District, Ohio)

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GLOSSARY

Throughout this document, the
following basic definitions shall
apply:

- **Action**—any Federal activity in-
cluding: "... (1) acquiring, man-
aging, and disposing of Federal
lands and facilities; (2) providing
federally undertaken, financed, or
assisted construction and improve-
ments; and (3) conducting Federal
activities and programs affecting
land use, including but not limited
to water and related land resources
planning, regulating, and licensing
activities.
- **Agency**—an executive department,
a government corporation, or an
independent establishment and in-
cludes the military departments.
- **Base Flood**—is that flood which
has a one percent chance of occur-
rence in any given year (also
known as a 100-year flood). This
term is used in the National Flood
Insurance Program (NFIP) to indi-
cate the minimum level of flooding
to be used by a community in its
floodplain management regula-
tions.
- **Base Floodplain**—the 100-year
floodplain (one percent chance
floodplain). Also see definition of
floodplain.
- **Channel**—a natural or artificial
watercourse of perceptible extent,
with a definite bed and banks to
confine and conduct continuously
or periodically flowing water.
- **Critical Action**—any activity for
which even a slight chance of
flooding would be too great.
- **Facility**—any man-made or man-
placed item other than a structure.
- **Flood or Flooding**—a general and
temporary condition of partial or
complete inundation of normally
dry land areas from the overflow
of inland and/or tidal waters, and/
or the unusual and rapid accumu-
lation or runoff of surface waters
from any source.
- **Flood Fringe**—that portion of the
floodplain outside of the regula-

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tory floodway (often referred to as
"floodway fringe").

- **Floodplain**—the lowland and rela-
tively flat areas adjoining inland
and coastal waters including flood-
prone areas of offshore islands, in-
cluding at a minimum, that area
subject to a one percent or greater
chance of flooding in any given
year. The base floodplain shall be
used to designate the 100-year
floodplain (one percent chance
floodplain). The critical action
floodplain is defined as the 500-
year floodplain (0.2 percent chance
floodplain).
- **Floodproofing**—the modification
of individual structures and facili-
ties, their sites, and their contents
to protect against structural fail-
ure, to keep water out or to reduce
effects of water entry.
- **Minimize**—to reduce to the small-
est possible amount or degree.
- **One Percent Chance Flood**—the
flood having one chance in 100 of
being exceeded in any one-year
period (a large flood). The likeli-
hood of exceeding this magnitude
increases in a time period longer
than one year. For example, there
are two chances in three of a
larger flood exceeding the one per-
cent chance flood in a 100-year
period.
- **Practicable**—capable of being
done within existing constraints.
The test of what is practicable de-
pends upon the situation and in-
cludes consideration of the perti-
nent factors, such as environment,
cost or technology.
- **Preserve**—to prevent modification
to the natural floodplain environ-
ment or to maintain it as closely as
possible to its natural state.
- **Regulatory Floodway**—the area
regulated by Federal, State or
local requirements; the channel of
a river or other watercourse and
the adjacent land areas that must

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be reserved in an open manner, i.e., unconfined or unobstructed either horizontally or vertically, to provide for the discharge of the base flood so the cumulative increase in water surface elevation is no more than a designated amount (not to exceed one foot as set by the NFIP).

- **Restore**—to re-establish a setting or environment in which the natural functions of the floodplain can again operate.
- **Structures**—walled or roofed buildings, including mobile homes and gas or liquid storage tanks that are primarily above ground (as set by the NFIP).
- **Wetlands**—"those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds" (as defined in Executive Order 11990, *Protection of Wetlands*).

INTRODUCTION

Executive Order 11988—*Floodplain Management*, signed May 24, 1977, revokes and replaces Executive Order 11296, issued August 10, 1966. It establishes a new general policy and cites specific requirements for compliance by Federal executive agencies (hereafter referred to as agencies). Executive Order 11988 (hereafter referred to as the Order) requires agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid the direct or indirect support of floodplain devel-

opment whenever there is a practicable alternative. The preferred method for satisfying this requirement is to avoid sites on the base floodplain. If an action must be located on the base floodplain, the Order requires that agencies minimize potential harm to people and property and to natural and beneficial floodplain values.

Executive Order 11988 is based in part on the National Environmental Policy Act of 1969, and adds new prominence to the environmental aspects of floodplain management which were not present in the old Executive order. To achieve this, the Order requires that decision-making by Federal agencies clearly recognize that floodplains have unique and significant public values. Consideration must be given, therefore, to natural and beneficial floodplain values and to the public benefit to be derived from their restoration or preservation.

Throughout these guidelines the concept of the floodplain is expressed using varying terminology depending on the context of the discussion. When referring to the floodplain in a descriptive sense, such as in the discussion of natural values (Part II—Step 4.C.), the term floodplain refers to any land area susceptible to being inundated from any source of flooding. When referring to the floodplain from the standpoint of the Order's mandatory provisions, the terms used in these guidelines are "base floodplain," in most cases, and "500-year floodplain" when referring to critical actions (Part II—Step 1.C.). The base floodplain is the area subject to inundation from a flood having a one percent chance of occurring in any given year (100-year flood). The critical action floodplain is the area subject to inundation from a flood having a 0.2 percent chance of occurring in any given year (500-year flood).

Executive Order 11988 directs implementation of the *Unified Nation-*

al Program for Flood Plain Management (U.S. Water Resources Council, 1976) which sets forth a conceptual framework and recommends Federal and State actions for a continuing unified program for planning and action at all levels of government to reduce the risk of flood losses through floodplain management. The Unified National Program includes a broad Federal effort, both directly and by example, to pursue the wise and nonhazardous use of floodplains including recognition of natural and beneficial floodplain values.

To assure compliance with the Order, provision is made for both public and Federal review of proposed actions. Early public notice, Office of Management and Budget (OMB) Circular A-95 Notice, an environmental impact statement or its equivalent, and notice of findings are specified vehicles for providing information and opportunity for public participation. Budgetary review of compliance with the Order and periodic review of agency procedures by the Water Resources Council provide for further review. In providing opportunity for these reviews, the potential for withholding of budget approval should be minimized.

Agency procedures are required to be prepared in consultation with the Council on Environmental Quality (CEQ), the Water Resources Council (WRC), and the Federal Insurance Administration (FIA). These guidelines provide a basis for this consultation.

These guidelines have been prepared to provide broad guidance in the implementation of the Order and to offer a common point of reference for each agency to prepare implementing procedures for compliance with the Order. The interpretations in the guidelines are built upon a strong Executive Order and directed at development of demonstrable Federal leadership in floodplain

management in the immediate future. In preparing these guidelines, the Water Resources Council recognized: (1) the impossibility of anticipating the full range of individual program situations affected by the Order, and (2) the responsibility for individual agencies to tailor their procedures to meet both their legislatively prescribed missions and the requirements of the Order.

Because these guidelines are advisory and the agencies will draft their own rules and regulations, there is some concern that reasonable consistency will exist among agencies. Therefore, by October 1, 1978, the WRC will: (1) review the rules and regulations promulgated by the various agencies with respect to consistency with the guidelines and reasonable consistency among agencies, and (2) make recommendations for suggested actions.

These guidelines are presented in two parts. Part I provides a section-by-section interpretation basic on an overall understanding of the Order. Part II discusses the decision-making process required by Section 2 of the Order and is critical to the development of agency procedures. The guidelines do not intend to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances.

Appended to the guidelines are descriptions of agency programs providing floodplain information, related programs and references, and the President's Policy Statement and copies of the complete Executive orders, *Floodplain Management*, *Protection of Wetlands*, and *Protection and Enhancement of Environmental Quality*.

Executive Order 11990—*Protection of Wetlands* has been included because most of the Nation's wetlands are located on floodplains. Also, both the floodplain and wetland orders were issued as part of the

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President's Message on the Environment, May 24, 1977. Thus the guidance provided in this document and the agency procedures for floodplain management will frequently apply to wetlands. Agencies may wish to develop a single set of procedures for these orders.

Executive Order 11514—*Protection and Enhancement of Environmental Quality* has been included to clarify the public notice aspects of the Order.

PART I—INTERPRETATION OF EXECUTIVE ORDER 11988

This part of the guidelines provides detailed section-by-section discussion of the Order as interpreted by CEQ, WRC, and HUD/FIA. Key concepts are discussed and reference is made to the decision-making process (Part II).

INTRODUCTION

By virtue of the authority vested in me by the Constitution and statutes of the United States of America, and as President of the United States of America, in furtherance of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), the National Flood Insurance Act of 1968, as amended (42 U.S.C. 4001 *et seq.*), and the Flood Disaster Protection Act of 1973 (Pub. L. 93-234, 87 Stat 975), in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative, it is hereby ordered as follows:

The Introduction establishes the broad scope of the Order derived from NEPA and the flood insurance legislation. (Part II—Step 4, discusses impacts associated with the occupancy and modification of floodplains and support of floodplain development. Part II—Step 3 discusses the practicability of alternatives.)

SECTION 1

Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

The basic concepts expressed in Section 1 of the Order are: (1) all agencies are covered; (2) all actions are covered; (3) all agencies are to affirmatively carry out efforts to, and provide a good example of, sound floodplain management practices; and (4) all agencies are required to act, not merely consider, reducing risk, minimizing adverse impacts, and restoring and preserving floodplain values.

The comprehensiveness of the Order recognizes that each agency, in carrying out the various types of actions enumerated in this section, can affect the floodplain through any of its actions. The mandate that the agencies take a leadership role places them in a unique position relative to state, regional and local levels of government in carrying out actions which affect the floodplain. This role requires the agencies to lead other public and private entities in achieving the goals of the Order by setting a good example. (The concepts of reducing risk, minimizing impact, and restoring and preserving floodplain values are discussed in Part II—Step 5.)

SECTION 2

In carrying out the activities described in Section 1 of this Order, each agency has a responsibility to evaluate the potential effects of any actions it may take in a

floodplain; to ensure that its planning programs and budget requests reflect consideration of flood hazards and floodplain management; and to prescribe procedures to implement the policies and requirements of this Order, as follows:

Three concepts are introduced in this section: evaluation, construction vs. planning programs, and implementation. Evaluation as discussed in these guidelines goes beyond identifying the impacts of a specific proposal and includes an ongoing analysis of the effects of agency policies and programs and the development of new or improved policies and programs to carry out this Order. (The analysis of the full range of their effects is discussed in Part II—Step 4.A.) By including planning programs as a separate item, the Order emphasizes that all actions, even those which do not result in a physical change, must be evaluated for their impacts to or within the floodplain. Implementation means that agencies must adopt and carry out evaluation procedures. The results of this evaluation should be included in any environmental assessment prepared under NEPA. (See Part II—Step 7.)

SECTION 2(a)(1)

Before taking an action, each agency shall determine whether the proposed action will occur in a floodplain—for major Federal actions significantly affecting the quality of the human environment, the evaluation required below will be included in any statement prepared under Section 102(2)(C) of the National Environmental Policy Act. This determination shall be made according to a Department of Housing and Urban Development (HUD) floodplain map or a more detailed map of an area, if available. If such maps are not available, the agency shall make a determination of the location of the floodplain based on the best available information. The Water Resources Council shall issue guidance on this information not later than October 1, 1977.

The intent of this subsection is that agencies use the best available

information in determining whether a proposed action will be located in a floodplain. HUD/FIA floodplain maps are established as the minimum standards for making this determination. Even if no map data exists, the intent is that the agency proposing the action perform, or have performed a determination of whether a proposed action is located in a floodplain. Guidance for this determination was published in the FEDERAL REGISTER, (Vol. 42, No. 190, Friday, September 30, 1977) entitled "Guidance for Floodplain Management." (See Part II—Step 1.)

SECTION 2(a)(2)

If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of this Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain.

The major issues here include: (1) consideration of alternatives which will avoid the floodplain, wherever practicable, and alternatives which will avoid adverse effects and incompatible development (development which has adverse effects); (2) minimization of harm to or within the floodplain resulting from proposed actions; and (3) circulation of a notice ("finding")—to the general public and affected agencies that siting in the floodplain is the only practicable alternative. The notice requirement introduced in this subsection is part of a larger concern for public notice and review carrying through to Section 4.

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This section does not provide a standard for minimizing harm because of the great variety of actions and environments subject to the requirement. Instead, the Order expressly recognizes that it is more appropriate for agency procedures to spell this out for specific programs and activities.

Two important points should be noted about the standards to be embodied in agency procedures. First, while minimize means reduce to the smallest amount or degree, there is an implicit acceptance of practical limitations. Agencies are required to use all practicable means and measures to minimize harm. The Order does not expect agencies to employ unworkable means to meet this goal. Second, agency procedures are intended to be consistent with the standards in the Flood Insurance Program of the Federal Insurance Administration (FIA). For this reason, agencies are required to consult with FIA before issuing their procedures, and agencies with control over Federal property are required to follow the standards in FIA's regulations unless they are demonstrably inappropriate.

(Avoidance is discussed in Part II—Steps 3 and 4. Minimization is discussed in Part II—Step 5. Findings and public notice are discussed in Part II—Steps 2 and 7.)

SECTION 2(a)(3)

For programs subject to the Office of Management and Budget Circular A-95, the agency shall send the notice, not to exceed three pages in length including a location map, to the state and areawide A-95 clearinghouses for the geographic areas affected. The notice shall include: (i) the reasons why the action is proposed to be located in a floodplain; (ii) a statement indicating whether the action conforms to applicable state or local floodplain protection standards and (iii) a list of the alternatives considered. Agencies shall endeavor to allow a brief comment period prior to taking any action.

Items (i), (ii), and (iii) are the minimum to be included in the notice. (The notice requirements set out in this subsection are discussed in Part II—Step 7.)

SECTION 2(a)(4)

Each agency shall also provide opportunity for early public review of any plans or proposals for actions in floodplains, in accordance with Section 2(b) of Executive Order No. 11514, as amended, including the development of procedures to accomplish this objective for Federal actions whose impact is not significant enough to require the preparation of an environmental impact statement under Section 102(2)(C) of the National Environmental Policy Act of 1969, as amended.

This section requires public notice much earlier than the finding requirement, including notice for actions which do not require environmental impact statements. (The notice requirements set out in this subsection are discussed in Part II—Step 2.)

SECTION 2(b)

Any requests for new authorizations or appropriations transmitted to the Office of Management and Budget shall indicate, if an action to be proposed will be located in a floodplain, whether the proposed action is in accord with this Order.

This subsection complements the public review element in the Order (Subsections 2(a) (2), (3), and (4)). It provides for Federal review and raises the possibility that agency funds may be withheld from proposed actions which are not in accord with the intent of the Order. "In accord with" means in compliance with the policy and mandatory provisions (the letter and spirit) of the Order.

SECTION 2(c)

Each agency shall take floodplain management into account when formulating or evaluating any water and land use

plans and shall require land and water resources use appropriate to the degree of hazard involved. Agencies shall include adequate provision for the evaluation and consideration of flood hazards in the regulations and operating procedures for the licenses, permits, loan or grants-in-aid programs that they administer. Agencies shall also encourage and provide appropriate guidance to applicants to evaluate the effects of their proposals in floodplains prior to submitting applications for Federal licenses, permits, loans or grants.

Each agency shall take floodplain management, as provided for in Section 2(d), into account when: (1) formulating its own water and land use plans, and (2) evaluating the water and land use plans of others.

In the operation of a license, permit, loan, or grant-in-aid program, each agency must make adequate provision for the evaluation and consideration of flood hazards. These provisions shall be included in agency's regulations and procedures. When the action involves more than one Federal agency, the "lead agency" will be responsible and will obtain input from all agencies. In all cases, as a minimum, the "practicability" and "minimization" standards of Section 2(a) of the Order apply. Therefore, as a pre-condition for an agency's approval of an application for a license, permit, loan, or grant-in-aid, the agency must assure that the requirements of Section 2(a) have been met. To the extent that an agency deems the requirements of Section 2(a) not to constitute adequate provision for evaluation and consideration of the flood hazard, the agency shall impose additional requirements.

The flood hazard aspects and to the degree they are quantifiable, the floodplain value aspects should be expressed in terms of: (1) potential (or residuals) for monetary loss; (2) human safety, health, and welfare; (3) shifting of costs or damage to others; and (4) potential for affecting the natural and beneficial floodplain values.

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Agencies shall encourage and provide appropriate guidance to applicants to enable them to evaluate the effects of their proposals in floodplains prior to submitting applications for Federal licenses, permits, loans, or grants. It is important that applicants be made aware early in their planning process of the floodplain management parameters which the agency must consider when reviewing the proposed action. In this way, applicants will not go to the trouble of putting together completed plans and submitting them formally before being made aware of the standards to which the agency is subject in reviewing such plans. Agencies are encouraged to refer applicants to the agencies listed in Part II—Table 1 for guidance on floodplain management matters.

SECTION 2(d)

As allowed by law, each agency shall issue or amend existing regulations and procedures within one year to comply with this Order. These procedures shall incorporate the Unified National Program for Floodplain Management of the Water Resources Council, and shall explain the means that the agency will employ to pursue the nonhazardous use of riverine, coastal and other floodplains in connection with the activities under its authority. To the extent possible, existing processes, such as those of the Council on Environmental Quality and the Water Resources Council, shall be utilized to fulfill the requirements of this Order. Agencies shall prepare their procedures in consultation with the Water Resources Council, the Federal Insurance Administration, and the Council on Environmental Quality, and shall update such procedures as necessary.

Agency regulations and procedures will systematically address each section of the Order, and their procedures will define the extent to which responsibility for compliance is to be delegated by the agency head.

Each agency is to reflect the conceptual framework of floodplain management as set out in the Uni-

fied National Program for Flood Plain Management in its regulations and procedures developed in response to provisions of the Order. Floodplain management according to the Unified National Program has as its goals the "wise use, conservation, development, and utilization of interrelated land and water resources to serve objectives of economic efficiency, environmental quality, and social well-being is consonant with responsibilities" This concept requires that the floodplain be viewed as having a role to play in the future of its surroundings. Within it, further adjustments in the way floodplain land is used or in the way floods behave must be made in a manner that is supportive of this future. From the standpoint of this Order, the Federal posture in floodplain management would be one of overcoming the apparent inertia in environmental value recognition when the appropriate floodplain role is being determined, as well as one of avoiding hazardous and uneconomic uses as part of this future role. The term "uneconomic" also includes the concept of costs shifted by floodplain users to others, both directly and indirectly.

In order to comply with the requirement that the means to be employed to pursue nonhazardous use be identified, each agency will be required to assess the degree of hazard associated with its program activities under a possible range of flood conditions. Then the agency must state the specific kinds of actions or adjustments that would be employed to comply with this section.

To the extent possible, agencies will utilize existing processes established under the NEPA directives of CEQ and WRC's Principles and Standards in addition to these guidelines.

Each agency shall consult with WRC, CEQ, and FIA in the preparation of their regulations and procedures in response to the Order. This

consultation will, of course, include any issue relevant to compliance with the Order. WRC will be the point of contact, and will arrange for consultation as needed with an inter-agency panel including members from the three agencies cited. Contact WRC Policy Office, 202-254-6352, for arrangements. Each agency's procedures should identify those actions, if any, which: (1) typically do not create adverse effects or incompatible development, or (2) normally will not require specific agency and public review under the Order.

To ensure that the public will be informed of agency procedures, the proposed agency regulations and procedures should be published in the *FEDERAL REGISTER* within a minimum 30-day review period provided. However, each agency must consult with CEQ, WRC and FIA prior to making procedures available for public review or prior to publishing them in the *FEDERAL REGISTER*.

Agency regulations or procedures should include relevant material in the following areas: (1) *mechanical requirements* that an agency will use to meet the procedural requirements of the Executive Order, such as timing, routing of documents, preparation and circulation of findings and notices, and specific links between the Order and other planning decision-making processes and requirements (e.g., budget process, NEPA, P&S, A-95); (2) *substantive requirements*, such as the standards for determining which alternatives are practicable, and the criteria and methods for minimizing harm (using FIA regulations as a guide wherever applicable); (3) *policy direction*, such as incorporation by reference of the Executive Order, Unified Program, NEPA, and other relevant requirements; general policies on the agency's approach to implementing the Order; program-specific policies; and commitments to research monitoring and evaluation; and (4) *other infor-*

mation, such as appendices identifying the agency contacts in Washington and in the field who are principally responsible for implementing the Order, cross-references to other relevant agency procedures and manuals, and other material that will assist agencies and the public to understand just what the agency is doing to comply with the Order.

SECTION 3

In addition to the requirements of Section 2, agencies with responsibilities for Federal real property and facilities shall take the following measures:

The requirements of this section of the Order are *supplemental* to those of Sections 1 and 2, and must be met by agencies having responsibilities for Federal real property, structures and facilities.

SECTION 3(a)

The regulations and procedures established under Section 2(d) of this Order shall, at a minimum, require the construction of Federal structures and facilities to be in accordance with the standards and criteria and to be consistent with the intent of those promulgated under the National Flood Insurance Program. They shall deviate only to the extent that the standards of the Flood Insurance Program are demonstrably inappropriate for a given type of structure or facility.

There are three key concepts expressed in this subsection: (1) the relationship of the NFIP requirements to the Order's minimization requirement; (2) the scope and nature of the NFIP requirements; and (3) situations where the NFIP requirements are not applicable to the agency actions.

The intent of this subsection is twofold; first, to assure that the Federal government will require itself no less than it requires of non-Federal entities for the protection of property from flood hazards, and second, to assure that the NFIP is not un-

determined by the actions of the Federal agencies. Both the positioning of the reference to the NFIP requirements following the avoidance and minimization responsibilities set out in Section 2, as well as the emphasis on the NFIP as the *minimum*, is most significant in that it recognizes the precedence of the requirements of Section 2 and limited scope of the NFIP requirements. Of the three areas of concern which the Order addresses (minimization of harm to lives, property and floodplain values), the NFIP requirements are primarily directed towards the protection of property. Thus, an agency's application of the NFIP requirements to proposed actions does not comprise full compliance with the minimization responsibilities of the Order.

The standards and criteria of the NFIP are directed towards the protection of structures and facilities from the flood hazard and the protection of existing development from the effects of new development. Under the NFIP, residential structures (including basements) are required to be elevated to or above the base flood level. Nonresidential structures may be elevated as described above, or floodproofed watertight to or above the base flood level. For the protection of existing development, the NFIP standards and criteria rely on a regulatory floodway (see Glossary).

Under the NFIP, actions involving the placement of facilities are subject to the requirements that the cumulative effect of the proposed action, when combined with all existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community wherein the action is proposed. It should be noted that the NFIP's one foot stage rise standard is a minimum standard, and more restrictive stage rise standards that are in effect in States and local

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communities take precedence over the NFIP standard as set out in Section 1910.1(d) of the NFIP regulations.

This subsection allows deviation from the NFIP requirements only to the extent that its standards and criteria are "demonstrably inappropriate" for a given type of structure or facility. Where this can be demonstrated, the proposed structure or facility must satisfy the requirements of Section 2, and must not endanger existing development, encourage development which would result in harm to or within the floodplain, or itself be vulnerable to flood damage.

SECTION 3(b)

If, after compliance with the requirements of this Order, new construction of structures or facilities are to be located in a floodplain, accepted floodproofing and other flood protection measures shall be applied to new construction or rehabilitation. To achieve flood protection, agencies shall, wherever practicable, elevate structures above the base flood level rather than filling in land.

The key concepts in this subsection are: (1) requirements for new construction and existing structures; (2) accepted floodproofing measures and other flood protection measures; and (3) the requirement to achieve flood protection for structures, wherever practicable, without the use of fill.

For the purposes of the Order, the term "new construction" includes construction associated with: (1) new structures and facilities; (2) the reconstruction of existing structures and facilities following damage caused by fire, flood or other hazard; and (3) the improvement of existing structures and facilities by rehabilitation, repair, alteration or addition. The application of the Order's requirements to existing structures is emphasized in this section.

Floodplain management approaches have in the past set varying thresholds for what constitutes a

major improvement. In most cases a market value threshold has been relied on which varies from 50 percent to 80 percent of the pre-improvement value of the structure or facility (see, for instance, the NFIP definition of substantial improvement (24 CFR 1909.1). In the case of major improvements, agencies are offered an opportunity to compensate for previous siting and design decisions which did not reflect the intent of the Order. In meeting the responsibility to apply the Order's requirement to existing structures, the agencies shall consider whether the proposed action would: (1) result in an increase in the useful life of the structure or facility in question; (2) maintain the investment at risk and the exposure of lives to the flood hazard; or (3) eliminate an opportunity to restore the natural and beneficial floodplain values.

Accepted floodproofing measures for structures are defined under the NFIP regulations and are set out in the discussion under Subsection 3(a), above. The Order further limits what constitutes accepted floodproofing for structures through additional language in this subsection which requires that, wherever practicable, all structures shall be elevated using open works, e.g., columns, walls, piles, piers, etc., rather than fill (see Appendix B). Accepted floodproofing measures for facilities vary considerably, since the scope of the term facility, as defined in the Glossary, is extremely broad. Floodproofing measures for certain types of facilities, e.g., sewer interceptor lines and other types of piping, and bridges and roads have been developed, and are familiar to agencies having responsibilities in those areas. Other flood protection measures including warning and evacuation plans, etc. are discussed in the *Unified National Program for Flood Plain Management*.

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SECTION 3(c)

If property used by the general public has suffered flood damage or is located in an identified flood hazard area, the responsible agency shall provide on structures, and other places where appropriate, conspicuous delineation of past and probable flood height in order to enhance public awareness of and knowledge about flood hazards.

The conspicuous delineation of past and probable flood heights is required on property which has been or could be subjected to flooding and is used by the general public. This delineation responsibility applies to all types of property (land, structures and facilities). Agencies must identify in their regulations and procedures the areas where this requirement will be most effective in minimizing the adverse impacts of floods, especially on human safety. The 100-year flood level and the flood of record should be shown where available. The 500-year flood should also be shown where appropriate.

SECTION 3(d)

When property in floodplains is proposed for lease, easement, right-of-way, or disposal to non-Federal public or private parties, the Federal agency shall (1) reference in the conveyance those uses that are restricted under identified Federal, State, or local floodplain regulations; and (2) attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successors, except where prohibited by law; or (3) withhold such properties from conveyance.

Three requirements are set out for agencies which dispose of Federal properties (land, structures or facilities) in the base floodplain. Of these three, the agencies must meet both requirements 3(d)(1) and 3(d)(2), or they must meet Section 3(d)(3). That is, if both 3(d)(1) and (2) cannot be satisfied, or if the agency does not choose to implement both, then the property must be withheld from conveyance.

Under Section 3(d)(1), the agencies' regulations or procedures must

provide for the identification of those uses that are restricted, and how they are restricted under state and local floodplain regulations. Such restrictions are generally set out in state shoreline or coastal management plans or regulations, local plans and building codes, zoning and subdivision ordinances. If no such restrictions exist, the agency must note this when it implements the finding and public notice procedures (see Part II—Step 7). Then it still must satisfy either 3(d)(2) or 3(d)(3).

Under Section 3(d)(2), the agencies are required to provide appropriate restrictions to the uses of properties by the grantee or purchaser and any successors, which would augment those restrictions referred to in (d)(1), above, or if none, adequately stand on their own. For the purpose of this Order, the term "appropriate" as it refers to restrictions, means restrictions equal in scope and strictness to those of this Order. Since the property in question is located in the floodplain, then the agency must assure through these restrictions that harm to lives and property and to floodplain values is identified, and such harm is minimized and floodplain values are restored and preserved. Section 3(d)(2) recognizes that these additional restrictions need not be applied to the conveyance where prohibited by law.

Section 3(d)(3) requires that where an agency cannot or does not choose to meet the requirements of either 3(d)(1) or (2), or both, it is prohibited from making the conveyance. Even where the option is open to meet 3(d)(1) or (2), withholding the conveyance may be the most appropriate approach to meeting the Order's intent. Where, for instance, the existing use is not compatible with the intent of the Order, or the area in question is not subject to meaningful floodplain management requirements, withholding the land or facility from conveyance may be required.

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This section makes it clear that each agency now has a mandate to condition or withhold the conveyance of Federal property, unless a specific law expressly prohibits such activity.

SECTION 4

In addition to any responsibilities under this Order and Sections 202 and 205 of the Flood Disaster Protection Act of 1973, as amended (42 U.S.C. 4106 and 4128), agencies which guarantee, approve, regulate, or insure any financial transaction which is related to an area located in a floodplain shall, prior to completing action on such transaction, inform any private parties participating in the transaction of the hazards of locating structures in the floodplain.

This section applies to the Federal Housing Administration, the Veterans Administration, and the six agencies enumerated in the Flood Disaster Protection Act of 1973: the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Comptroller of the Currency, the Federal Home Loan Bank Board, the Federal Savings and Loan Insurance Corporation, and the National Credit Union Administration (to the extent that an Executive Order may be binding on them). Other agencies that have responsibilities similar to those described in this section are also subject to its requirements. The notice requirements of this section are in addition to the other responsibilities of these agencies under the Order and under Sections 202 and 205 of the Flood Disaster Protection Act of 1973, as amended (42 U.S.C. 4106 and 4128).

This section covers any financial transaction guaranteed, approved, regulated or insured by a Federal agency which is and which pertains to an area located in a floodplain. If an agency does not operate on an individual transaction basis with private parties, but rather guarantees, approves, regulates or insures the in-

stitutions conducting such transactions, then it is the agency's responsibility to require that the institution provide the requisite notice.

The private parties must be informed of the hazards of locating in the base floodplain. Such notice should be given in a way which: (1) explains the chances of being flooded in language readily understandable to the private party; (2) indicates if the property is in a floodway or coastal high hazard area; (3) indicates if there is a flood insurance purchase requirement; and (4) indicates if the transaction involves the sale of unimproved real estate, that the property may be subject to floodplain management regulations which dictate the manner, and in some cases the location of new construction.

SECTION 5

The head of each agency shall submit a report to the Council on Environmental Quality and to the Water Resources Council on June 30, 1978, regarding the status of their procedures and the impact of this Order on the agency's operations. Thereafter, the Water Resources Council shall periodically evaluate agency procedures and their effectiveness.

Agencies may be called on to furnish documentation covering revisions or special applications of procedures in years subsequent to 1978. WRC will involve interested and affected agencies in the review.

SECTION 6

As used in this Order:

(a) The term "agency" shall have the same meaning as the term "Executive agency" in Section 105 of Title 5 of the United States Code and shall include the military departments; the directives contained in this Order, however, are meant to apply only to those agencies which perform the activities described in Section 1 which are located in or affecting floodplains.

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(b) The term "base flood" shall mean that flood which has a one percent or greater chance of occurrence in any given year.

(c) The term "floodplain" shall mean the lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

The terms "agency," "base flood," and "floodplain" are defined in the Glossary. The 100-year floodplain is used as the base or minimum floodplain for these guidelines.

SECTION 7

Executive Order No. 11296 of August 10, 1966, is hereby revoked. All actions, procedures, and issuances taken under that Order and still in effect shall remain in effect until modified by appropriate authority under the terms of this Order.

The previous Executive Order 11296 is revoked, but agencies are allowed to operate under existing procedures until they can be revised to reflect this Order. At the latest, this revision must be accomplished by May 24, 1978.

SECTION 8

Nothing in this Order shall apply to assistance provided for emergency work essential to save lives and protect property and public health and safety, performed pursuant to Sections 305 and 306 of the Disaster Relief Act of 1974 (88 Stat. 148, 42 U.S.C. 5145 and 5146).

Although Section 8 exempts flood-related and other emergency activities "essential to save lives and protect property and public health and safety" from the provisions of the Order, (e.g., the requirement to prepare and circulate notice of proposed activity), it doesn't exempt them from the spirit of the Order expressed in Section 1. Activities under portions of legislatively directed emergency programs, (e.g., under P.L. 84-99), covering the same kinds

of situations as those sections specifically cited in the Order, are clearly within the meaning and intent of Section 8, and therefore are subject to the same interpretation.

SECTION 9

To the extent the provisions of Section 2(a) of this Order are applicable to projects covered by Section 104(h) of the Housing and Community Development Act of 1974, as amended (88 Stat. 640, 42 U.S.C. 5304(h)), the responsibilities under those provisions may be assumed by the appropriate applicant, if the applicant has also assumed, with respect to such projects, all of the responsibilities for environmental review, decisionmaking, and action pursuant to the National Environmental Policy Act of 1969, as amended.

This section allows units of general purpose, local government which may assume the status of Federal agencies for purposes of NEPA compliance under the HUD Community Development Block Grant (CDBG) Program to assume the responsibility for carrying out the provisions of Section 2(a) of this Order for specific projects under CDBG as part of their overall NEPA responsibilities. Thus, the provisions of Section 2(a) of this Order will be carried out in conjunction with NEPA compliance, and one responsibility may not be assumed without the other also being assumed by a grantee. Compliance with Section 2(a) of the Order will be completed prior to the grantee's certification of compliance with NEPA.

PART II—DECISION-MAKING PROCESS

This part of the guidelines is structured in eight steps to reflect the decision-making process (Figure 1) required in Section 2(a) of the Order. The eight steps are summarized below.

1. The first step of the decision process is to determine if a proposed agency action is located in the base*

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floodplain. (As reflected in Figure 2, the base* floodplain is the 100-year floodplain. Also, the term 500-year floodplain should be substituted for base* floodplain for critical actions—see Step 1.C.) This discussion identifies various types of floodplains and their boundaries. If the proposed action is not in the base* floodplain, proceed to Step 4.

2. The agency must make public its intent to locate a proposed action in the base* floodplain. This notice must provide a description of the proposed action with ample lead time for meaningful input from the public.

3. If the action is in the base* floodplain, the third step is to identify and value the practicable alternatives to locating in the base* floodplain. This determination requires the agency to consider whether the base* floodplain can be avoided either through alternative siting; through alternate actions which would perform the intended function but would minimize harm to or within the floodplain; or by taking no action.

4. For the proposed alternative, the agency must identify if the action has impacts in the base* floodplain or directly or indirectly supports floodplain development that has additional impacts. If the proposed action is outside the base* floodplain and has no identifiable impacts or

support, the action can be implemented, Step 8.

5. If the proposed action has identifiable impacts or support, these effects must be minimized. Further, natural and beneficial floodplain values must be restored and preserved.

6. The proposed alternative can now be reevaluated taking into account the identified impacts, the steps necessary to minimize these impacts and opportunities to restore and preserve floodplain values.

In the base floodplain:* If this reevaluation shows that the proposed action is no longer feasible, consider limiting the action to make a non-floodplain site practicable or taking no action.

Outside the base floodplain:* If the action has impacts or support, consider modifying or relocating the action to eliminate or reduce these effects or taking no action.

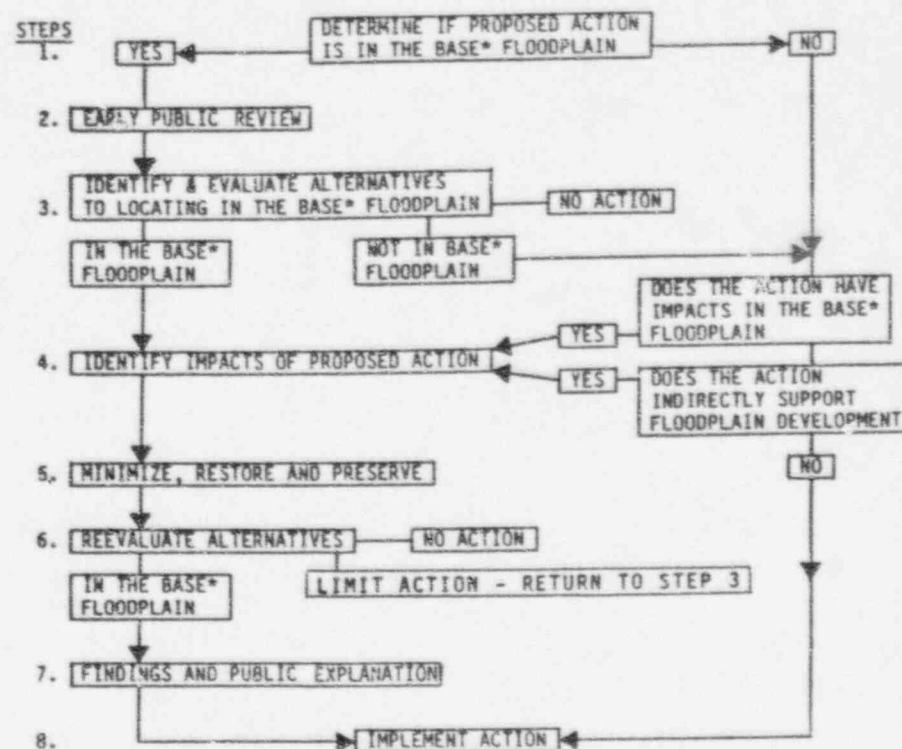
7. If the agency head finds that the only practicable alternative is locating in the base* floodplain, public notice of the reasons must be given for this finding (including the alternatives considered).

8. After a reasonable period to allow for public response, the proposed action can be implemented.

Note that depending on the situation, this process may be carried out with fewer steps if all of the objectives of the decision-making process can be achieved.

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DECISION-MAKING PROCESS FOR E.O. 11988
FIGURE 1



* FOR CRITICAL ACTIONS SUBSTITUTE "500 YEAR" FOR "BASE*."

STEP 1—DETERMINE IF A PROPOSED ACTION IS IN THE BASE FLOOD-PLAIN

The first step in complying with the Order is to determine whether or not a proposed action is located in the base floodplain. This procedure was published in the FEDERAL REGISTER (Vol. 42, No. 190, Friday, September 30, 1977). The following discussion includes types of floodplains (1.A.), limits of flooding (1.B.) and critical action (1.C.).

1.A. Types of Floodplain

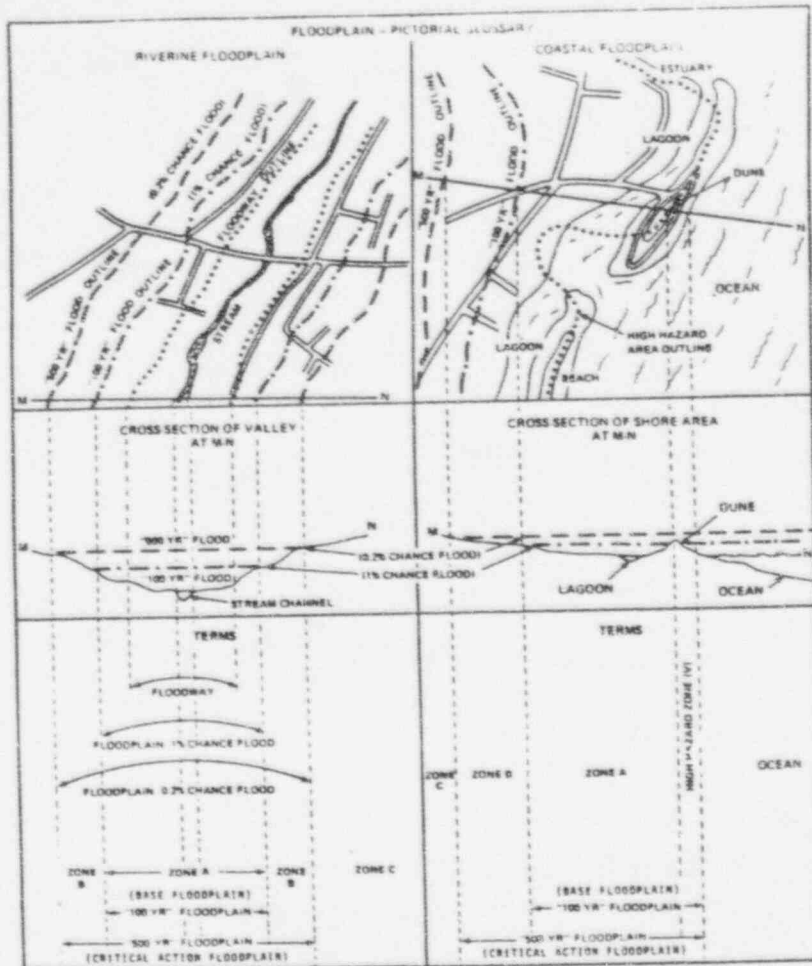
The general types of land area where flood hazards are encountered are riverine floodplains and coastal floodplains. The term floodplain is not limited only to areas surrounding large bodies of water such as coastal areas and the shores of large rivers. In this document, the term floodplain refers to any land area susceptible to being inundated from any source of flooding including

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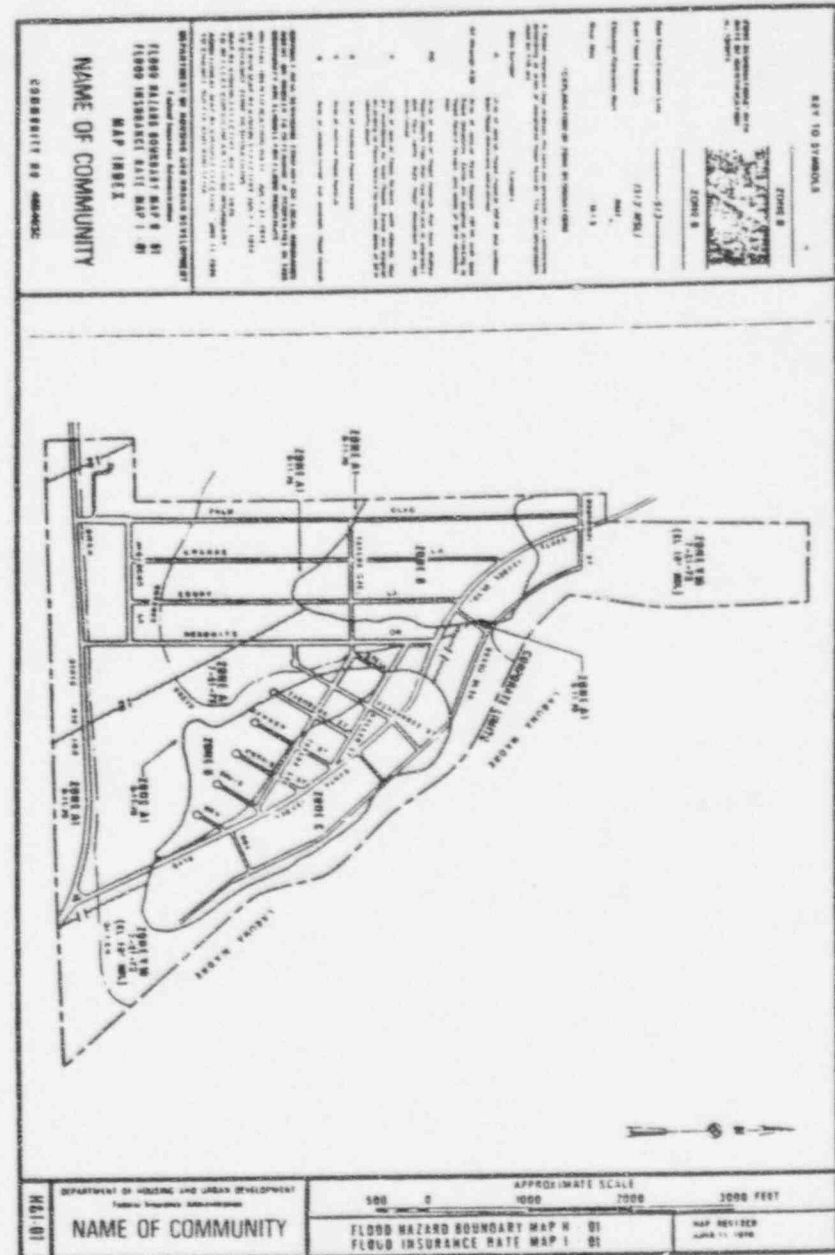
those which can be flooded from small and often dry watercourses. Small watercourses can become sources of major flood damage when their watersheds experience rapid runoff from intense rain or melting snow. At some locations the flood hazard results from several sources.

Aggravating factors contribute to the flood hazard in many riverine, coastal, and sheet flow areas. This is particularly true in riverine situa-

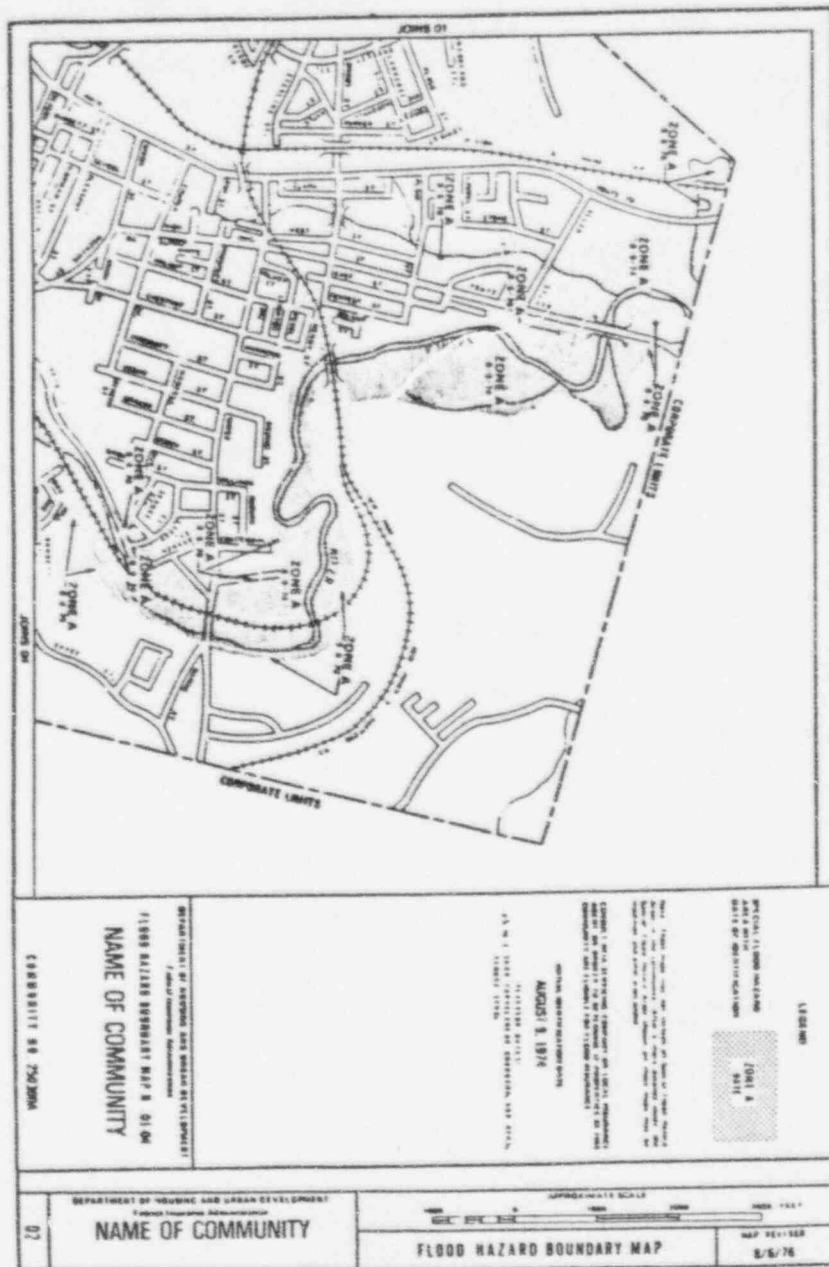
tions where high velocity flow causes flood-related erosion. In other areas where sheet flow has high velocity, sheet flow erosion may occur. Unusually high waves and tides are the most frequent agents of coastal erosion. Ice also contributes to structural damages. Land subsidence may occur with extensive withdrawals of ground water or other substances producing a relative increase in flood levels.



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1.A.1. RIVERINE FLOODPLAINS

Riverine floodplains are valley areas adjacent to any size stream or river which can be covered by floodwaters (Figure 2). Flooding in these areas results from excessive rainfall, snowmelt, or a combination thereof. If runoff is increased to the point that the carrying capacity of the channel is exceeded, flooding occurs. Flooding also occurs when the capacity of the stream channel is reduced by natural obstructions (ice or debris dams, sediment, and vegetation) and man-placed obstruction (structures and facilities). Some areas flood either from tributary stream overflow, backwater from a major stream, or from both simultaneously.

1.A.2. COASTAL FLOODPLAINS

Coastal floodplains border lakes, estuaries, oceans, or similar bodies of standing water (Figure 2). Flooding in these areas is due to landward flows caused by unusually high tides, waves from high winds, storm surges, tsunamis (large waves in the sea associated with very strong earthquakes or other impulsive disturbances), or by a combination of these causes.

1.A.3. SPECIAL FLOODPLAIN AREAS

Special floodplain areas encompass sheet flow or shallow flooding areas, wetlands, and sinkholes. Sheet flow occurs where a clearly defined channel is absent and where the path of flooding is unpredictable and indeterminate. In some cases, high velocity flow may occur with sheet flow, as it does commonly on debris cone floodplains (alluvial fans). These cones build up from eroded geological debris that is carried by mountain streams and deposited when the stream encounters an abrupt decrease in slope. Other flood problems are caused when development occurs in areas drained by sinkholes which often become plugged.

1.B. Limits of Flooding

For purposes of the Order, all agency heads will be concerned at a minimum with the floodplain area which would be inundated by a flood having a one percent chance of occurring in any year—the so-called "100-year or base flood"—because they must support any decision to conduct, support, or allow an action (i.e., "structure", "facility" or "activity") to be located within this area. The pictorial glossary (Figure 2) depicts and defines the 100-year or base floodplain and other portions of floodplains. The base floodplain is delineated by Zone A on the examples of flood insurance maps shown in Figures 3 and 4.

Within the base floodplain, extreme hazard is associated with those portions of riverine and coastal floodplains nearest to flood sources, where depths and velocities of flood waters are greatest. These areas are usually referred to as a "floodway" and "coastal high hazard area", and with few exceptions, are locations to be avoided. These are the floodplain areas where flooding is not only most frequent and damaging, but where natural and beneficial values of the land and water interface are at their maximum.

In addition, agency heads should consider the implications of the occurrence of a flood larger than the base flood on the economics and safety of a proposed floodplain action. If a proposed action would be especially dangerous when exposed to larger floods, consideration must be given to the larger floodplain area. (See Step 1.C. "Critical Actions".) Herein, such larger floodplains are identified as those of a flood with a 0.2 percent chance of occurring in any year—the so-called "500-year flood"—shown as Zone B on the Flood Insurance Rate Maps issued by the Federal Insurance Administration. Larger floods are also

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used to delineate floodplains in flood hazard studies by other agencies. (Examples are the Standard Project Flood (SPF) used in the U.S. Army Corps of Engineers' studies, and the Maximum Probable Flood (MPF) used in Tennessee Valley Authority (TVA) studies which are computed from basin runoff potentials rather than through statistical analyses of flow frequencies.) In summary, the key question is: How does the agency decision-maker ascertain if his decision involves a floodplain location, particularly a site within the floodplain of the one percent chance flood?

1.B.1. PROCEDURES FOR DETERMINING A FLOODPLAIN LOCATION

The Order states that "this determination shall be made according to a Department of Housing and Urban Development (HUD) floodplain map or a more detailed map of an area, if available." Two cautions are suggested in using flood insurance maps: (1) they generally do not delineate portions of the floodplain less than 200 feet wide where headwater flooding may be a concern, and (2) possible adverse consequences from future urbanization are difficult to infer from the maps. Thus, technical assistance may be desirable for interpreting flood insurance maps. In addition, decision-makers seeking flood insurance maps may find them unavailable for areas of extensive public land holdings.

The following is a guide for obtaining the floodplain information needed to make a determination.

Areas of Predominantly Private Land Ownership: If a decision involves a publicly or privately owned site within an area of predominantly private ownership, a map showing the flood hazard areas will usually be available from the National Flood Insurance Program administered by the Federal Insurance Administration (FIA), HUD. Detailed maps

showing the elevations and boundaries of the "100-year" (Zones A and V) and "500-year" (Zone B) floodplains are known as "Flood Insurance Rate Maps" (FIRM). A sample is shown as Figure 3. Such maps have been published by the FIA for over 1,300 communities and maps for more communities continue to be published for FIA's program to provide maps of all flood prone areas by 1983. Many of the communities which have a FIRM also have a Flood Insurance Study Report (FIS) containing detailed flood information. Some 13,000 less detailed maps showing the approximate areas of the base (Zone A) floodplain are available for most of the remaining communities. These are called "Flood Hazard Boundary Maps" (FHBM). A sample is shown as Figure 4. Similar information, some very detailed, is also available from the agencies described in Appendix A. The search for flood hazard information should follow the sequence below.

- The detailed map (FIRM) or the Flood Insurance Study (FIS) report should be consulted first. Information on how to request single maps, FIS reports, and how to be placed on the FIA mailing list to receive new or revised FIRM's, FHBM's, and FIS reports is detailed in Appendix A.
- If a detailed map (FIRM) is not available—obtain an approximate boundary map (FHBM) from the same source as in the preceding step. If the proposed site is at or near the "100-year" boundary, if data on flood elevations are needed, or if the map does not delineate the flood hazard boundaries in the vicinity of the proposed site—seek detailed information and assistance from the agencies listed in Table 1. (There are additional agencies with professional competence not listed in Table 1 which can perform their

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own floodplain studies when needed.)

- If an approximate boundary map (FHBM) is not available or if the map does not delineate the flood hazard boundaries in the vicinity of the proposed site—seek detailed information and assistance from the agencies listed in Table 1.
- If the agencies listed do not have or know of detailed information and are unable to assist in determining whether or not the proposed site is in the base floodplain—seek the services of a licensed consulting engineer experienced in this type of work. The quality of information obtained from the consulting engineer must be comparable to that required of flood insurance study contractors for the FIA. A list of experienced consulting engineers from which a selection can be made may be provided by the agencies in Table 1.

Areas of Predominantly Federal and State Land Holdings: If a deci-

sion involves an area or location within extensive Federal or State holdings, it is unlikely that FIS reports and FIRM or FHBM maps would be available. In this event, information should be sought from the land administering agency before information and/or assistance is sought from the agencies listed in Table 1. If none of these agencies has information or can provide assistance, the services of an experienced consulting engineer should be sought as described above.

1.B.2. PROCEDURES IF SITE IS OUT OF THE BASE FLOODPLAIN

Actions located out of the base floodplain as shown on either the FIRM or FHBM would meet the minimum requirements and no further action is required for compliance with the Order, unless the action impacts the base floodplain (Step 4), indirectly supports floodplain development (Step 4.A.), or is a critical action (Step 3.C.).

TABLE 1.—Sources of floodplain information and technical assistance services for determining whether a location is in a floodplain

Agency*	Floodplain maps and profiles		Technical assistance services
	Riverine	Coastal	
Department of Agriculture: Soil Conservation Service	•	•	•
Department of the Army: Corps of Engineers	•	•	•
Department of Commerce: National Oceanic and Atmospheric Administration		•	•
Department of Housing and Urban Development: Federal Housing Administration			•
Federal Insurance Administration	•	•	•
Department of the Interior: Geological Survey	•	•	•
Bureau of Land Management	•	•	
Bureau of Reclamation	•		•
Tennessee Valley Authority	•		•
Delaware River Basin Commission	•	•	•
Susquehanna River Basin Commission	•		•
States	Varies from State to State.		

*See app. A for detailed description.

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1.B.3. PROCEDURES IF SITE IS IN THE BASE FLOODPLAIN

If the location is within Zones A or V as shown on a FIRM, or in Zone A on a FFBM, as verified by other detailed information, alternative sites outside of these zones and alternative actions are to be identified and evaluated (Step 3.) in an initial attempt to avoid the floodplain.

1.C. Critical Actions

As indicated previously, the minimum floodplain of concern for certain critical actions is the area subject to inundation from a flood having a 0.2 percent chance of occurring in any given year (500-year floodplain). This floodplain includes both Zones A and B as shown on FIRM's. Critical actions are those for which even a slight change of flooding would be too great. Some key questions in this regard are:

- If flooded, would the proposed action create an added dimension to the disaster as could be the case for liquefied natural gas terminals and facilities producing and storing highly volatile, toxic, or water-reactive materials?
- Given the flood warning lead-time available, would the occupants of buildings such as hospitals, schools, and nursing homes be insufficiently mobile to avoid loss of life and injury?
- Would essential and irreplaceable records, utilities, and/or emergency services be lost or become inoperative if flooded?

If the answer to questions such as these is "yes", an alternative location must be sought completely outside the larger floodplain. Agencies listed in Table 1 may be in a position to provide information and assistance in evaluation of proposed locations for critical actions. If neither the base floodplain nor larger floodplain for certain critical actions can

be avoided, the next responsibility (Step 2) is to provide an opportunity for public review and comment on the proposed floodplain location.

STEP 2—EARLY PUBLIC REVIEW

Early public review is one of several requirements of the Order directed at the objective of public involvement. It should be considered in the context of the whole public involvement process.

The objective of public involvement is to provide sufficient information early enough in the process of making decisions affecting floodplains so that the public can have impact on the decision outcome. The order includes requirements that the public be provided adequate information, opportunity for review and comment, and an accounting for the rationale for proposed actions affecting floodplains. These requirements are stated in Section 2 of the order, which:

- requires agencies to provide opportunity for early public review of any plans or proposals for actions in floodplains;
- requires agencies subject to the OMB A-95 Budget Circular to provide notice explaining a proposed action;
- requires preparation and circulation of a notice of findings and explanation prior to taking an action.

An overview of these sections suggests that agency procedures should provide an integrated procedure for involvement of the public in the floodplain management decision-making process. Thus, to insure that adequate information and opportunities are provided for the public to effectively participate in floodplain decisions, and to meet the requirements of the Order, the following elements should be incorporated in agency public involvement procedures:

- A description of the overall audi-

ence, including specific segments to whom public notice information will be targeted (e.g., floodplain residents, elected officials, basin residents, interest groups, other agencies, etc.). The responsibility is to reach as broad an audience as possible.

- A description of the vehicles or public information mechanism which will be utilized to reach the target audience (e.g., public hearings, newsletters, workshops, advisory groups, etc.). The responsibility is to provide continuous interaction and involvement opportunities for the public during the floodplain decision-making process.
- A description of the purpose for which various public notice actions will be undertaken and assurance that public input will be integrated into the decision-making process (e.g., specific efforts to provide one-way information dissemination, two-way public communication or interaction, etc.). The responsibility is to provide information which promotes the fullest understanding of the proposed plan or action.
- A statement explaining the timing of public notice actions to promote public understanding and provide opportunities for the public to affect a proposed action or plan before alternative actions have been precluded.

It is recognized that the public involvement process must be tailored to specific program types (permits, direct and federally assisted projects, etc.) and will vary. Nevertheless, agency procedures must be compatible with Section 2(b) of Executive Order 11514 (Appendix E), and must also apply to actions which do not require preparation of an EIS under Section 102(2)(C) of NEPA.

If there is a reasonable likelihood

that a plan or proposed action or its alternatives will impact a floodplain, then it should be announced as early as that is known, and not delayed until much more detailed information is developed.

It is recognized that variations in program types will determine the earliest time in the floodplain decision-making process when the public can be notified. For example, in the case of a private developer applying for a permit to construct a housing complex with floodplain impact, the earliest public notice may not come until a point very late in the decision-making process. At that point, the only options may be no project, or the project as designed and proposed. In another example, a major facility such as a proposed regional wastewater treatment facility requires considerable expenditure for site evaluation, engineering and design. Public notice must precede major site identification and analysis so the public can have an input early in the decision-making process of preliminary site screening and selection. If not, public choice options may be foreclosed, or decisions will not be based on similarly detailed information bases.

Early public notice is the first in a series of public information and involvement activities. This would logically be followed by continuing public communication at Step 4, in identifying impacts, Step 6, reevaluating alternatives through the environmental review process, and at Step 7, in the issuance of findings and explanation of why the proposed plan or action must impact the floodplain.

STEP 3—IDENTIFY AND EVALUATE PRACTICABLE ALTERNATIVES TO LOCATING IN THE BASE FLOOD-PLAIN

Having determined that a proposed action is located in the base

floodplain, the agency is required by the Order to identify and evaluate practicable alternatives to locating in the base floodplain. Alternatives to be evaluated include: (1) carrying out the proposed action at a location outside the base floodplain (alternative sites); (2) other means which accomplish the same purpose as the proposed action (alternative actions); and (3) no action.

3.A. Alternative Sites

Alternative sites must be identified and the practicability of such sites evaluated. If a practicable site exists outside the base floodplain, the proposed action must not be located in the base floodplain. Whenever a floodplain site is the only practicable alternative, the agency analysis leading to this conclusion should be fully documented. In determining the practicability of a non-floodplain site, the general concepts of site feasibility apply. At a minimum, site practicability shall be addressed in the light of the following:

- natural (topography, habitat, hazards, etc.);
- social (aesthetics, historic and cultural values, land use patterns, etc.);
- economic (cost of space, construction, services, relocation); and
- legal (deeds, leases, etc.).

3.B Alternative Actions

Alternative actions must be considered before a decision is made to carry out an action in the base floodplain. These are actions which substitute for the proposed action in that they comprise new solutions or approaches which serve the same function or purpose as that proposed, but which have less potential for harm. For example, where an agency has proposed the construc-

tion of a document storage facility within the floodplain to handle expanding record keeping needs, the alternative of microfilming the documents could allay the need for a new structure. Similarly, rather than providing expanded waste treatment capacity for an area by constructing a new or larger facility in the floodplain, the alternative of using surplus capacity in a neighboring locale could serve the need for a new or expanded facility.

3.C No Action

No action is also an alternative, and assessment of this course is required. The alternative of no action probably can not be fully evaluated until a determination has been made in Step 4 of the harm to or within the floodplain resulting from the proposed action.

STEP 4—IDENTIFY IMPACTS OF THE PROPOSED ACTION

If the agency has determined that the only practicable alternative is locating in the base floodplain, the impacts of the proposed action must be identified. Similarly, where actions proposed to be located out of the floodplain will affect the base floodplain, impacts resulting from these actions must be identified. Since the Order is based primarily on NEPA, the agencies can draw upon the impact identification and assessment experience and guidance which they have developed in their implementation of NEPA. The concepts of impact assessment applicable to both NEPA and the Order are identical, with the Order's focus being narrower. The following discussion addresses general concepts of impact identification and assessment (Step 4.A.), and the two areas of concern which are impacted as a result of the occupancy and modification of floodplains: lives and property (Step 4.B.), and floodplain values (Step 4.C.).

4.A. General Concepts

In their regulations and procedures, the agencies must identify the means by which they will address the following impact-related issues:

- All agency actions can have impacts associated with the modification of floodplains. Although the modification of floodplains and ensuing impacts most clearly result from actions located in the floodplain or at its periphery, it can also result from actions out of the floodplain.
- Certain types of agency actions may support subsequent actions which have additional impacts of their own;
- The Order focuses on the adverse impacts of proposed actions on lives and property, and on natural and beneficial floodplain values.
- The three basic types of impacts are: (a) positive and negative; (b) concentrated and dispersed; and (c) short- and long-term.

4.A.1. DIRECT AND INDIRECT SUPPORT OF FLOODPLAIN DEVELOPMENT

The Order requires the agencies to avoid the direct and indirect support of floodplain development. For the purposes of these guidelines, an action supports floodplain development if it encourages, allows, serves or otherwise facilitates additional floodplain development. The agencies may also reflect in their regulations and procedures, the manner in which agency actions similarly accommodate the maintenance of existing uses in the floodplain. That is, a proposed action can reinforce existing land use patterns which generally have developed without reflecting the concepts of hazard and risk minimization and restoration and preservation of natural floodplain values which form the basis of the Order.

Direct support results from actions located on the floodplain, while indirect support results from those outside the floodplain. For example, the location of a major public service structure or facility (a post office, library or office building), in the floodplain, requires new or additional investment in or construction of support facilities for food service, parking, etc. Further, simply through their location, such actions would foster additional developments in the floodplain. Floodplain development could be indirectly supported by the provision of infrastructure (water and waste water systems, power supplies, highway and secondary road networks, mass transit systems and airports) outside the floodplain.

Clearly, it is the intent of the Order that the impacts of Federal actions and the impacts of actions supported by Federal actions be evaluated. However, the identification and evaluation of these positive and negative changes to the systems of flood losses, threats to life and health, and environmental values are often both difficult and even speculative. Moreover, the process by which an agency tries to describe the actions supported by their actions is both complex and often not well addressed in accepted methodologies, without a clear conceptualization of the supported action, there is little chance that the impacts can be identified. On the other hand, when the supported actions are describable in terms of growth experience in the area or from experience with similar actions elsewhere, the impacts of the supported actions can be identified as they are for the proposed Federal action.

4.A.2. TYPES OF IMPACTS

The three basic types of impacts which must be addressed are: (a) positive and negative; (b) concentrated

ed and dispersed; and (c) short and long term.

Positive and negative impacts: both must be identified, even though the focus of impact identification and assessment is on negative or adverse impacts. This is necessary in order to identify the full range of impacts against which to weigh the practicability of a proposed action. In addition, it must be recognized that impacts which are beneficial to some, may be harmful to others. For example, draining wetlands establishes an environment which is suitable for certain uses, but at the expense of the beneficial values of the wetland.

Concentrated and dispersed impacts: both may result from any action. The impact is concentrated if it occurs at or near the site of the action and is dispersed if it occurs at a site remote from the action. For example, a concentrated impact of constructing a building on a wooded area is the loss of vegetation at the site. A dispersed impact of the same action could be sedimentation downstream caused by erosion at the site.

Short- and long-term impacts: both must be analyzed in order to evaluate the total impact of an action. Short-term impacts are temporary changes occurring during or immediately following an action and usually persist for a short while. Long-term impacts occur during or after an action and may take the form of delayed changes or changes resulting from the cumulative effects of many individual actions. Long-term impacts may persist for a considerable time and may continue indefinitely. An example of a short-term impact could be sedimentation at or below a construction site. A long-term impact could be the loss of valley floodwater storage resulting from the cumulative effect of floodplain development.

4.A.3. SOURCES OF IMPACTS

Regardless of the source of impacts, the agencies are required to identify the types of impacts discussed above which arise from their actions when these impacts affect the floodplain. Thus, this requirement applies to actions proposed both in and out of the base floodplain (or the 500-year floodplain where a critical action is proposed). The location of the action causing the impact determines which of the requirements of the Order must be met by the agencies. For actions proposed in the base floodplain (or the 500-year floodplain where a critical action is proposed), all of the requirements of the Order must be met as outlined (Figure 1). For actions proposed out of the base floodplain, however, the Order does not require that the public notice and findings discussed in Steps 2 and 7 be prepared. Similarly, since in these cases the action causing the impacts in the base floodplain is located outside of it, the practicability test (Step 3) is not required. As a minimum, however, the agencies must identify these impacts and minimize ensuing harm to or within the floodplain which would result if the action is taken as proposed. Because there is no requirement for public notice or the practicability test, the minimization responsibility (Step 5) takes on added significance. This should be reflected in agency procedures.

The agencies are strongly encouraged to apply the public notice procedures and alternate site and action evaluations to actions proposed out of the floodplain which will result in impacts to the floodplain. It has been recognized that public input in agency decision-making processes through NEPA has improved the environmental soundness of these decisions. It is even more reasonable to apply the alternate site and action evaluation to actions taking place

outside the floodplain. The evaluation of alternatives to the proposed action as discussed in Step 3, provides a better opportunity to explore the range of possibilities for avoiding adverse impacts to or within the floodplain than the more narrowly focused concepts of minimization, restoration and preservation discussed in Step 5. For example, the overall costs involved in locating a highway interchange, sewer interceptor line, airport facility, etc., at a location less directly affecting the floodplain could be less than the costs incurred in attempting to minimize the impacts of the proposed action and to restore and preserve floodplain values.

4.B. Lives and Property

After determining that a proposed action is in the base floodplain, the risk to lives and property involved in using that site must be determined. This requires an understanding of the magnitude and consequences of flooding that can be expected.

4.B.1. NATURE OF HAZARD AND RISK

Two basic types of floods are used in determining flood hazards: observed or historic floods and probability floods.

Historic Floods: Often these can be the basis for deciding whether a proposed site is in a hazardous area. However, the fact that a certain level of flooding has been observed indicates little about how floods are likely to occur in the future. Even where records extend over a long period of time, the highest observed flood must not be used as the only guide for decision-making. With very few exceptions, flooding at any site can be expected to reach higher levels than those previously recorded because larger storms, urbanization, flood plain encroachment, or other factors affect flooding.

Probability Floods: These are statistically derived floods. The one percent chance (100-year or base) flood is the term which describes the magnitude of flooding used by FIA as the minimum acceptable level to which a community must regulate the floodplain in order to qualify for the National Flood Insurance Program. As stated previously, this magnitude flood has a one percent chance of being exceeded in any one year period. The likelihood of exceeding the one percent chance flood magnitude increases with time periods longer than one year. For example, the probability is about one in four that the one percent chance flood will be exceeded during the life of a 30-year mortgage.

Large floods occur each year in many parts of the United States. No part of the country is immune from large floods. Consequently, it has become standard practice for agencies dealing with flood problems to calculate elevations of a greater flood to indicate the range of flooding which can and will occur.

4.B.2. HIGH HAZARD AREAS

High hazard areas are those portions of riverine and coastal floodplains nearest the source of flooding. These are the frequently flooded areas that become arenas of major flood dynamics during large floods. Here, floodwaters exert their maximum pressures, erosion is greatly accelerated and loss potential is increased. Additionally, these are the areas of coastal and riverine floodplains within which many of the most critical floodplain values are concentrated. In riverine situations, the high hazard area is that portion of the floodplain where impedance to flood flow resulting from man's occupancy can increase flood heights and consequently the area subject to flooding. In coastal floodplains, the high hazard area is usually confined

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to the beach area in front of high bluffs or the crest of primary or foredunes, where wave impact is the most significant inducing factor. In light of the high loss potential and the likelihood of significant adverse effects to floodplain values associated with the conduct, support or allowance of actions in these portions of the floodplain, the agencies must rigorously apply the Order's charge to avoid these areas.

4.B.3. EVALUATION OF FLOOD HAZARD

Evaluation procedures must be established in writing by all agencies. This evaluation serves to express clearly the hazard involved and provides the basis for carrying out the succeeding phases of the analysis. Key questions which must be addressed by the agencies in establishing their regulations and procedures for the evaluation of flood hazard include the following:

- Is the proposed action to be located in the floodway portion of the riverine floodplain, or the coastal high hazard area?
- Is the proposed action in a flood-fringe area such as the flood-fringe portion of a riverine floodplain or the backwater areas of a coastal floodplain?
- Is the flood hazard aggravated by the presence of, or potential for, destructive velocity flows, flood-related erosion, subsidence or sinkholes, or other special problems?
- Is there a combination of flood sources present which may flood simultaneously in the area (e.g., river and ocean, or shallow overland runoff and river, etc.)?

4.C. Natural and Beneficial Floodplain Values

Water and the adjacent floodplain exist in nature in a state of dynamic equilibrium. If one part of a coastal or riverine system is disturbed, the entire system usually readjusts

toward a new equilibrium. The environmental effects of this readjustment may affect areas far from the original site of the disturbance and can last for decades. Thus, floodplain actions must be viewed with caution and a careful assessment made of their impact on natural and beneficial floodplain values.

Floodplains in their natural or relatively undisturbed state serve water resources values (natural moderation of floods, water quality maintenance, and groundwater recharge), living resource values (fish, wildlife, and plant resources), cultural resource values (open space, natural beauty, scientific study, outdoor education, and recreation), and cultivated resource values (agriculture, aquaculture, and forestry).

4.C.1. WATER RESOURCES

Floodplains provide for the natural storage of surface and ground waters and the natural improvement of water quality.

Natural Moderation of Floods: The characteristics of the floodplain and of flooding are closely interdependent. Floods shape floodplain topography, soils, and ecology. In turn, the physical characteristics of the floodplain shape flood flows. Except for some steep valley and coastal bluff situations, naturally vegetated floodplains can provide a broad area to spread and slow floodwaters, thereby reducing velocities and flood peaks. Stream meander, dune formation in coastal areas and other natural processes which reduce the force of floodwaters are also accommodated in undisturbed floodplains.

Floodplain encroachment modifies these processes. The effects of such modification are complex and not fully understood. Although in some cases encroachments may interact with natural processes to aid in the reduction of flood forces, their predominant effect has been to aggravate the flood hazard.

In coastal floodplains natural barriers exist in the form of sand dunes and certain vegetation, e.g., mangrove stands, which reduce the impact of high tides and storm surges. Alteration or removal of the barriers themselves, or the vegetative and drainage systems which support them, reduces or eliminates their role in the reduction of flood forces. In addition, excessive withdrawal of groundwater may result in land subsidence thereby increasing flood depths and exposing greater areas to flooding.

Water Quality Maintenance: Floodplain vegetation functions in maintaining the physical and chemical integrity of the water that ultimately supports biological communities. Runoff is slowed by vegetation, allowing the water to deposit not only sediments originating on land but also those scoured from the channel bank and bed. Sediment deposition may add rich nutrients to the floodplain soil and keeps sediment-associated pathogens from the water.

However, siltation can destroy biological communities supported on the floodplain because it contributes to eutrophication (nutrient overloading), decreased dissolved oxygen, increased water temperature, and serious impairment of photosynthetic productivity. Vegetation shades stream banks and decreases daily water temperature fluctuations thereby alleviating temperature stress to the biota. Vegetation slows the flow of water and provides slack waters that give the aquatic biota a greater chance to survive flooding. In addition, floodplain storage and vegetation reduces siltation in downstream reservoirs.

Groundwater Recharge: An additional value of floodplain vegetation's role in slowing runoff is in groundwater recharge. Slowing the floodwater allows it to infiltrate through the generally porous floodplain soil. Base streamflow and the

level of standing water bodies is regulated naturally by groundwater. During periods of excessive precipitation, runoff enters the groundwater system as well as stream channels and standing water bodies, thereby reducing peak flows; during the dry season, water generally flows from the groundwater system into surface waters, augmenting low flows.

4.C.2. LIVING RESOURCES

The Nation's coastal and riverine floodplains support large and diverse populations of flora and fauna which represent valuable, renewable resources of great importance to man.

The floodplain is biologically very productive because it is here that land and water meet and the elements of both terrestrial and aquatic habitats interact. For example, unspoiled tidal marshes rank well above intensively farmed croplands in the magnitude and diversity of biological productivity. Marsh-rimmed estuaries and adjacent floodplains are vital to marine fisheries as breeding, nursery, and feeding grounds. Inland ponds, potholes, marshes and other wetland areas may provide highly important habitat for waterfowl and other wildlife.

Fish and wildlife resources are highly susceptible to man-induced disruption of the floodplain because of their high sensitivity to the resulting impacts. For example, drainage of wetlands, channelization of natural water courses, clearing of vegetation, especially bottomland forests, all have short and long term indirect impacts on plant and animal communities. Other changes that limit food, water supplies, or protective cover have similar effects. Modification of the floodplain at one location can affect living resources elsewhere on the floodplain.

4.C.3. CULTURAL RESOURCES

Floodplains contain cultural resources important to the Nation and to individual localities. They provide many cultural values if left in their natural state. Because native American settlements and early cities were located along coasts and rivers for access to water transportation, supply, and power, floodplains include most of the Nation's earliest archeological and historical sites. In addition to cultural richness, floodplains may be valuable sources for scientific research. For example, because they may contain unique habitats, they are ideal areas for ecological study. Floodplains are used for open space and green belt parks in cities to vary the pattern of the urban scene, to absorb noise, to clean air, to lower air temperatures, and to serve as nature centers and outdoor experience labs. Floodplains are often attractive areas, a base for recreation (hiking and camping), and a base for water-oriented sports such as boating and swimming. In addition, floodplain wildlife resources can be managed for recreational hunting and fishing. Where they remain in essentially pristine condition, floodplains can be valued as a part of the "wilderness experience" so important to the American Culture.

4.C.4. AGRICULTURAL, AQUACULTURAL, AND FORESTRY RESOURCES

Floodplains generally provide excellent resources for agricultural, aquacultural and forestry production.

The natural processes of sediment renewal which take place in floodplains replenish soil and their nutrients. Thus with proper management, floodplain soils generally require less artificial fertilization than upland

sites. Level or gently rolling floodplain terrain facilitates agricultural operations. Surface and groundwater sources are usually easily accessible. Well-drained, deep soil suitable to most economic crops are often prevalent in the floodplain. Soils well suited to speciality crops are also found on floodplains (e.g., the poorly drained areas of the Sacramento Valley where rice is a major crop).

However, certain agricultural uses and practices in the floodplain may adversely affect natural floodplain values. They may be incompatible with wildlife production; may induce aggravated erosion and sedimentation; or may result in the drainage of inland and tidal wetlands to increase the amount of arable land. Excessive fertilization and poor feedlot practices can result in nutrient pollution in local water bodies. Thus, proper management practices are essential where agriculture is proposed in sensitive floodplain areas.

The use of floodplain areas for aquacultural operations has grown into a viable industry producing a wide variety of aquatic crops. Aquaculture is subject to similar limitations to those noted for agriculture, but if properly managed, it can be compatible with the natural values of floodplains, and may offer opportunities for the restoration of damaged floodplain values.

Many of the Nation's valuable forest resources are found within floodplains. Bottomland hardwoods and other riparian species (those which can only flourish in close proximity to water) are important to the timber industry and the overall economy of the country. Thus, sound management of forest resources in the floodplain is also essential.

STEP 5—MINIMIZE, RESTORE, PRESERVE

The requirements of the Order to minimize, restore, and preserve apply if a proposed action will result in harm to or within the floodplain. The term "harm," as used in the context of the Order, applies to both lives and property (Step 4.B.), and natural and beneficial floodplain values (Step 4.C.). The concept of minimization (Step 5.A.), applies to harm. The concept of restoration and preservation (Step 5.A.) applies only to floodplain values. Step 5.C. discusses some mechanisms which may be applied to achieve these three requirements.

5.A. Minimize

Minimize is a demanding standard and requires the agency to reduce harm to the smallest possible degree, thus establishing a far more rigorous standard than other terms which often are used in similar contexts, e.g., alleviate (to lessen), mitigate (to moderate the severity of), ameliorate (to improve), etc. From the standpoint of lives and property, potential harm to or within the floodplain must be reduced to the smallest possible amount or degree. The goal is to avoid increasing the flood loss potential associated with the level of the base flood prior to the proposed action. Where a critical action is proposed (see Step 2.C.) the goal is associated with higher levels of flooding. Similarly, from the standpoint of floodplain values, minimization requires that harm to such values be reduced to the smallest possible amount or degree. The Order's requirement to minimize potential harm applies to (1) the investment at risk, or the flood loss potential of the action itself, (2) the impact the action may have on others, and (3) the impact the action may have on floodplain values. The agencies must specify in their regulations and procedures, how actions

will be designed and modified to minimize harm to or within the floodplain. (Also see page 1-4 on the requirements to minimize harm.)

5.B. Restore and Preserve

In the context of this Order, "restore" focuses upon conditions existing as a result of prior actions, while "preserve" focuses upon the impacts of a proposed action.

Restore means to reestablish a setting or environment in which the natural and beneficial floodplain values can again operate. Where floodplain values have been degraded by past actions, the agency must identify, evaluate, and implement measures to restore the values diminished or lost. The functions of many of the Nation's degraded floodplains can be partially or fully restored through remedial action.

Preserve means to prevent modification to the natural floodplain environment, or to maintain it as closely as possible to its natural state. This term applies foremost to floodplains showing little or no disruption by man. If an action will result in harm to or within the floodplain, the agency must design or modify the action to assure that it will be carried out in a manner which preserves as much of the natural and beneficial floodplain values as is possible.

5.C. Methods to Minimize, Restore and Preserve

A wide range of methods have been developed over time to minimize harm to lives and property from flood hazards. In the recent past, other methods directed toward minimizing harm to natural and beneficial environmental values, including those associated with the floodplain, have also been developed. The technology and methodologies for achieving restoration and preservation are not as well documented nor understood, but currently are receiving increasing attention. The

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tools and approaches, which are directed toward attaining these three goals of the Order, should be considered and applied at all stages of a proposed action, as appropriate, e.g., during the planning, design, construction, operation and maintenance of a proposed project.

Although the Order emphasizes avoidance of the floodplain as the preferred manner for meeting its intent to avoid harm to or within the floodplain, the following examples are provided as additional guidance. The agencies should not be limited by the scope and level of detail of these examples.

5.C.1. NATURAL MODERATION OF FLOODS

- Minimize floodplain fills and actions that require fills such as construction of dwellings, factories, highways, etc.
- Require that structures and facilities on wetlands provide for adequate flow circulation.
- Use minimum grading requirements and save as much of the site from compaction as possible.
- Relocate nonconforming structures and facilities out of the floodplain.
- Return site to natural contours.
- Preserve free natural drainage when designing and constructing bridges, roads, fills, and large built-up centers.
- Prevent intrusion on and destruction of beach and estuarine ecosystems and restore damaged dunes and vegetation.

5.C.2. WATER QUALITY

- Maintain wetland and floodplain vegetation buffers to reduce sedimentation and delivery of chemical pollutants to the water body.
- Control agricultural activities to minimize nutrient input.

- Control urban runoff, other storm water, and point and nonpoint discharges.
- Control methods used for grading, filling, soil removal and replacement, etc., to minimize erosion and sedimentation during construction.
- Prohibit the location of potential pathogenic and toxic sources on the floodplain, such as sanitary land fills and septic tank, etc.

5.C.3. GROUNDWATER RECHARGE

- Require the use of previous surfaces where practicable.
- Design construction projects for runoff detention.
- Dispose of spoils and waste materials so as not to contaminate ground or surface water or change land contours.

5.C.4. LIVING RESOURCES

- Identify and protect wildlife habitat and other vital ecologically sensitive areas from disruption.
- Require topsoil protection programs during construction.
- Control wetland drainage, channelization, and water withdrawal.
- Reestablish damaged floodplain ecosystems.
- Minimize tree cutting and other vegetation removal.
- Design floodgates and seawalls to allow natural tidal activity and estuarine flow.

5.C.5. CULTURAL RESOURCES

- Provide public access to and along the waterfront for recreation, scientific study, educational instruction, etc.
- Locate and preserve from harm historical cultural resources; consult with appropriate governmental agency or private group.

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5.C.6. AGRICULTURAL RESOURCES

- Minimize soil erosion on cropped areas within floodplains.
- Control use of pesticides, herbicides, and fertilizer.
- Limit the size of fields, promote fence rows, shelter belts and strip-cropping.
- Strengthen water bank and soil bank type programs to be consistent with alternate demands for the use of agricultural land.
- Minimize irrigation return flows and excessive applications of water.

5.C.7. AQUACULTURAL RESOURCES

- Construct impoundments to minimize any alteration in natural drainage and flood flow. Existing natural impoundments such as oxbow lakes and sloughs could be utilized under proper management.
- Limit the use of exotic species, both plant and animal, to those organisms already common to the area or those known not to compete unfavorably with existing natural populations.
- Discourage mechanized operations. Machinery such as dredges, weeders, and large-scale harvesting equipment may lead to environmental problems such as sediment loading to adjacent watercourses.

5.C.8. FORESTRY RESOURCES

- Control the practice of clear-cutting, depending upon the species harvested, topography, and location.
- Complement state law governing other aspects of harvest operations; proximity to watercourses, limits on roadbuilding, equipment intrusions, etc.
- Include fire management in any overall management plans. Selective fire use may reduce the probability of major destructive fires.

- Require erosion control plans on all timber allotments, roads, and skidways.

Implementing the above mechanism may be achieved through many types of administrative measures, depending in part upon the agency programs and authority.

Some examples are:

- Engineering and realty section standards and procedures.
- Contract, grant, loan, permit, and license stipulations.
- Application of appropriate encumbrances during land conveyance.
- Information transfer and education of employees and public.
- Delegation of responsibility for floodplain activities to a specific office with sufficient authority to play an active leadership role both within and outside of the agency.
- Systematic review of existing agency programs to identify opportunities for floodplain value preservation and restoration.
- Site surveys to identify opportunities for floodplain preservation and restoration; and
- Provision of coordination methods within and outside of agency to enable the implementation of unified floodplain management measures.

STEP 6—REEVALUATE ALTERNATIVES

Having identified the impacts the proposed action would have on the floodplain (Step 4), methods to minimize these impacts, and opportunities to restore and preserve floodplain values (Step 5); the proposed action should not be reevaluated. For proposed actions in the base floodplain, the reevaluation should consider if the action is still feasible at this site. If not, consider limiting the action to make non-floodplain sites practicable. If neither is accept-

able, the alternative is no action. If the proposed action is outside the base floodplain but has impacts which cannot be minimized (Step 5), consider whether the action can be modified or relocated to eliminate or reduce the identified impacts, or if the no action alternative should be chosen.

The reevaluation should also include a provision for comparison of the relative adverse impacts associated with the proposed action located in and out of the floodplain. The comparison should emphasize floodplain values. However, a site out of the floodplain should not be chosen if the overall harm is significantly greater than that associated with the floodplain site.

6.A. Location in the Base Floodplain

In determining whether the proposed action will be located in the base floodplain, the agency must ascertain that the floodplain site is the only practicable alternative. Further, the importance of the location, must clearly outweigh the requirements of the Order to:

- Avoid direct or indirect support of floodplain development wherever there is a practicable alternative;
- Reduce the risk of flood loss;
- Minimize the impact of floods on human safety, health and welfare; and
- Restore and preserve the natural and beneficial floodplain values.

6.B. Limit Action

If an action proposed to be located in the floodplain cannot satisfy the four requirements in Step 6.A., consider reducing the criteria for the proposed action. This would lower the threshold for what constitutes a practicable alternative. New alternative actions and sites could then be identified and previously rejected ones reevaluated for practicability based on scaled-down expectations.

6.C. No Action

If neither of the above courses of action are feasible, the agency should reevaluate the no action alternative.

STEP 7—FINDINGS AND PUBLIC EXPLANATION

If reevaluation results in the determination that there is no practicable alternative to locating in or impacting the floodplain, a statement of findings and public explanation must be provided for the proposed action. Each agency should explain how any tradeoff analysis was conducted by the agency in making its findings. Some existing agency public notice procedures may already satisfy part of the requirements of the Order (Section 2(a)(2)(ii)) through such mechanisms as OMB A-95 and NEPA procedures, or other public involvement programs. However, agency procedures must incorporate the development and issuance of a written statement of findings and public explanation which includes:

1. A description of why the proposed action must be located in the floodplain;
2. A description of all significant facts considered in making the determination including alternative sites and actions;
3. A statement indicating whether the actions conform to applicable State or local floodplain protection standards;

In addition, and in keeping with the concept of the overall public involvement process discussed in Step 2, the following items should be included in the statement of findings and public explanation:

4. A statement indicating why the NFIP criteria are demonstrably inappropriate for the proposed action;
5. A provision for publication in the FEDERAL REGISTER or other appropriate vehicle;

6. A provision for a brief comment period prior to agency action (15 to 30 days);

7. A description of how the activity will be designed or modified to minimize harm to or within the floodplain;

8. A statement indicating how the action affects natural or beneficial floodplain values;

9. A statement listing other involved agencies and individuals.

7.A. Interagency Notice

Certain public review procedures already exist with which the Order's review requirements are to be integrated.

7.A.1. PROGRAMS SUBJECT TO OMB CIRCULAR A-95

For programs subject to OMB Circular A-95, the agency shall send a notice, not to exceed three pages in length including a location map, to the State and areawide A-95 clearinghouse for the areas affected. The notice shall include (as a minimum) 1, 2, and 3 from above. It would also be helpful to the reviewer, and consistent with the intent of the Order, to include items 4 through 9.

7.A.2. OTHER PROGRAMS

For programs not subject to OMB-95 review procedures, agencies must develop procedures to provide for similar notice and explanation of why a proposed action is to be located in a floodplain. This notice must be circulated among agencies and also made available to the public for review.

7.B. Actions Subject to NEPA

For agency actions subject to NEPA which take place in the base floodplain, the public review requirements discussed above as set out in Section 2(b) of Executive Order 11514, as amended, should include the nine items listed in the introduc-

tion to this step. Section 2(a)(4) of the Order requires the same public notice procedures for Federal actions in the floodplain even though impacts are not significant enough to require the preparation of an environmental impact statement (EIS) under Section 102(2)(C) of NEPA (Public Law 91-190).

Under NEPA procedures, a final EIS is circulated for public and interagency review and comment. A minimum of 30 days is required to allow a review and to receive responses from the public and governmental agencies. These comments must then be considered. The findings must be made in conjunction with a final agency decision, and the formal statement of findings required by the Order must be issued prior to initiating the proposed action. A final EIS should explain, if appropriate, why the responsible official has recommended or why the agency might support an action located in a floodplain.

7.C. All Actions Located in the Base Floodplain

A statement of findings (including the explanatory information discussed in 7.A.) must be issued by the agency head in compliance with Section 2(a)(2) of the Order. This applies to all proposed actions located within or impacting the floodplain, including proposed actions whose impacts are not significant enough or are not otherwise required to complete an EIS.

STEP 8—IMPLEMENT ACTION

With the conclusion of the decision-making process described in Steps 1-7, the proposed action can be implemented. However, there is a continuing responsibility for insuring that the action is carried out in compliance with the Order. This is especially important for projects with long-term operation, maintenance and repair programs such as

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reservoirs or waste treatment facilities.

APPENDIX A—FLOODPLAIN SERVICES AVAILABLE FROM LISTED AGENCIES

DEPARTMENT OF AGRICULTURE Soil Conservation Service (SCS)

As part of the SCS's Floodplain Management Assistance Program each State Conservationist carries out Cooperative Flood Hazard Analyses upon request of local governments, in accordance with a Joint Coordination Agreement with the responsible State agency. SCS flood hazard reports contain floodplain delineations on aerial photomaps, flood profiles, and discharge and floodway data. In addition, SCS provides continuing technical assistance to local governments, after completion of a flood hazard or insurance study, to help them implement their local floodplain management program. Each SCS State Office has additional flood elevation and related floodplain data on file from Watershed Project and Resource and Conservation Development Project investigations, River Basins Surveys, and detailed soil surveys. If the State or field office address is not known contact: Chief, Floodplain Management and Special Projects Branch, River Basins Division, SCS; P.O. Box 2890, Washington, D.C. 20013. Telephone 202-447-7897.

DEPARTMENT OF THE ARMY Corps of Engineers

The Corps' separately funded Flood Plain Management Services Program has units in 47 District and Division offices located throughout the country which provide information and assistance in flood-related matters. They maintain a file of floodplain information, survey, and other reports containing floodplain delineations, flood profiles, and data on flood discharges and hydro-

graphs. Each office provides: (1) interpretations as to flood depths, velocities and durations from existing data; (2) develops new data through field and hydrologic studies for interpretation; and (3) provides guidance on adjustments to minimize the adverse effects of floods and floodplain development. If the nearest District office address is not known, contact Chief, Flood Plain Management Services (FPMS), U.S. Army Corps of Engineers, HQDA (DAEN-CWP-F), Washington, D.C. 20314, telephone 202/693-1691, or the nearest Division office.

North Atlantic Division, New York, NY, 212-264-7483
South Atlantic Division, Atlantic, GA, 404-221-8702
Southwestern Division, Dallas, TX, 214-767-2310
South Pacific Division, San Francisco, CA, 415-556-5660
Lower Mississippi Valley Division, Vicksburg, MS, 601-636-1311 Ext. 385
Missouri River Division, Omaha, NB, 402-221-7270
North Central Division, Chicago, IL, 312-353-8531
Ohio River Division, Cincinnati, OH, 513-684-3012
North Pacific Division, Portland, OR, 503-221-3823
New England Division, Waltham, MA, 617-894-2400 Ext. 545
Pacific Ocean Division, APO San Francisco, 808-438-2883

DEPARTMENT OF COMMERCE NOAA-National Weather Service

Floodplain information and interpretative assistance for specific points on larger rivers of the United States can be obtained from the National Weather Service. Information available consists of the flood stage for selected communities (the stage above which flood damage occurs), and historical flood information for that location. An annual publication entitled *River Forecasts Provided by the National Weather Service*, lists the points for which data are compiled and includes that flood stage at

each point and the current year's maximum stage as well as the maximum state of record. This publication is for sale by the National Climatic Center of NOAA, Asheville, North Carolina 28801. The National Weather Service provides flood forecasts and warnings on larger rivers and provides flash flood warnings on smaller streams. Interested communities are assisted in establishing Flash Flood Warnings Systems.

For information and assistance contact the following National Weather Service Regional Offices:

Eastern Region, Garden City, NY, 212-995-8639
Southern Region, Ft. Worth, TX, 817-334-2674
Central Region, Kansas City, MO, 816-374-3229
Western Region, Salt Lake City, UT, 801-524-5137
Alaskan Region, Anchorage, AK, 907-265-4716
Pacific Region, Honolulu, HA, 808-546-5680

Storm surge frequency information and interpretative assistance are available for the Gulf of Mexico and Atlantic coasts. Studies have been completed for the Gulf of Mexico coast from the Alabama-Florida border to southern Florida; and along the Atlantic coast from southern Florida to Cape Henlopen, the southern boundary of Delaware Bay. The National Weather Service also provides warnings of storm surges associated with tropical and extratropical storms. For storm surge frequency information and interpretative assistance contact: Chief, Water Management Information, NWS Office of Hydrology (W21), 8060-13th Street, Silver Spring, MD 20910. Telephone: 301-427-7543.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Federal Housing Administration

The civil engineer at the 78 local or regional offices has specific

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knowledge of flood elevations for many urban locations and can provide knowledge of material available to assist in making a determination of floodplain location. The location of the nearest office may be obtained from one of HUD's 10 regional offices or by contacting: Federal Housing Administration, 451 7th Street SW., Washington, D.C. 20410. Telephone: 202-755-5111.

Federal Insurance Administration

Request for insurance maps or studies should be addressed as follows:

(1) *FIA Mailing List*. Copies of new or revised FHBMs, FIRMS and FIS reports are distributed upon publication to organizations on the FIA mailing list. In requesting to be added to the mailing list, the agency should specify the number and distribution of maps required (for example, two copies of each map for Maine and New Hampshire communities to Boston regional office). Mailing list inquiries should be sent to:

Engineering Division, Federal Insurance Administration, Room 5150, HUD Building, 451 7th Street, SW., Washington, D.C. 20514, Telephone: 202-755-7510.

(2) *Requests for a Single Map*. Request(s) for a previously published FHBMs or FIRM may be made by calling FIA's toll free number 800-424-8872 from outside of the Washington, D.C. area, or 755-9096 from within the Washington, D.C. area.

(3) *Flood Insurance Study Reports*. These detailed engineering reports are distributed to those on the mailing list when a FIRM is initially published. However, because there has not been a recurring demand for this information, FIA does not have a system for supplying copies to interested organizations at a later date. Copies are available at: (1) FIA's Engineering Division (address above);

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(2) FIA Regional Offices (see list below) and (3) Chief Executive Officer of the local community within which the action is proposed to be carried out.

Region I—Boston, 617-223-2616
Region II—New York City, 212-264-4734
Region III—Philadelphia, 215-597-9581
Region IV—Atlanta, 404-257-2391
Region V—Chicago, 312-353-0757
Region VI—Dallas, 214-749-7412
Region VII—Kansas City, 816-374-2161
Region VIII—Denver, 303-837-5041
Region IX—San Francisco, 415-556-3543
Region X—Seattle, 206-442-1026

Requests for floodplain management services, and a list of experienced consulting engineers may be obtained from the Director, Floodplain Management Division, Federal Insurance Administration 451 7th Street, S.W., Washington, D.C. 20410. Telephone 202-426-1891.

DEPARTMENT OF THE INTERIOR Geological Survey

User Assistance Centers at 48 locations can provide (a) factual information on flood peaks and discharges, flood depths, and velocities, profiles of the water surface during major floods, areas inundated during major floods, time-of-travel of flood wave, and sediment transport data; (b) interpretive information regarding flood-frequency relations, estimates of 10-, 50-, 100-, and 500 years flood discharges, computed water surface profiles, and flood-prone areas delineated on topographic maps, in most communities in the United States, with known flood problems; and (c) assistance in minimizing flood losses by quickly identifying areas of potential flood hazards. If the User Assistance Center address is not known, contact: Chief, Surface Water Branch, Water Resources Division, U.S. Geological Survey, National Center, Reston, VA. 22092. Telephone: 703-860-6837.

Bureau of Land Management

The Bureau of Land Management (BLM) has District Offices located in the 11 Western States and Alaska involved in land use planning for public lands. Floodplain protection and flood prevention is a significant element in the BLM planning system, and each District Office maintains a file of existing floodplain maps which are available for public inspection. If the location of the District Office is not known, contact: Bureau of Land Management, U.S. Department of the Interior, 18th & C Streets, NW., Washington, D.C. 20240. Telephone: 202-343-5717.

Bureau of Reclamation

The flood hydrologist at the seven regional offices has knowledge of flooding and flood elevation for related locations associated with Bureau projects and can provide interpretive assistance for existing data.

For information contact one of the seven regional or nearby project offices or the Flood Hydrology Section, U.S. Bureau of Reclamation, P.O. Box 25007, Denver Federal Center, Denver, CO. 80225. Telephone: 303-234-2035.

Fish and Wildlife Service

The Fish and Wildlife Service provides expertise on questions relating to fish, wildlife, and habitat resource, preservation, and maintenance. It functions through six regional, area and field offices. For information contact any of these offices, or the Fish and Wildlife Service, U.S. Department of the Interior, 18th and C Streets NW., Washington, D.C. 20240. Telephone: 202-343-5715.

TENNESSEE VALLEY AUTHORITY

Activities in water resources are confined to portions of the seven States in the Tennessee Valley Wa-

tershed. Since 1953, TVA has conducted a program of floodplain management assistance to local governments. Reports have been published for more than 130 communities, and have provided profiles and flood data to at least 70 others. Detailed information in files pertains to large floods which have occurred in the Valley since the 1930's, and in less detail, dating back to the large flood of 1867. TVA's Flood Plain Management Services Staff provides technical assistance to help those who propose developments in floodplains to use the floodplain wisely. Contact: Flood Plain Management Services, 100 Liberty Building, Tennessee Valley Authority, Knoxville, TN. 37902. Telephone: 615-632-4451.

DELAWARE RIVER BASIN COMMISSION

The Commission maintains a file of floodplain information, delineation and flood data studies prepared by the Commission, Federal agencies and others. Where data exist, assistance with interpretation will be provided. Contact: Head, Branch of Operations, Delaware River Basin Commission, P.O. Box 7360, West Trenton, N.J. 08628. Telephone: 609-883-9500.

SUSQUEHANNA RIVER BASIN COMMISSION

The Commission maintains a file of detailed hydrologic and hydraulic information for 245 basin communities studied under the National Flood Insurance Program for HUD. Limited additional hydrological data for other areas also is available. The Commission can provide general information and guidance on floodplain management measures. Contact: Chief, Planning and Operations, Susquehanna River Basin Commission, 1721 North Front Street, Harrisburg, PA. 17102. Telephone: 717-238-0425.

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Many (but not all) States have active floodplain management programs. They have on file or access to most floodplain information generated by Federal and State agencies, regional organizations, special districts and private consultants. State agencies are usually staffed and funded to: (1) coordinate floodplain management activities; (2) develop minimum standards for floodplain regulations; (3) assist local units of government (counties, cities, etc.) in developing floodplain management programs; and (4) interpret available floodplain information. For most States, the appropriate contact is the Department of Natural Resources or the Water Resources Division. At the substate level, regional agencies such as conservancy districts and multi-county planning agencies may be a source of floodplain data and interpretation.

APPENDIX B—RELATED PROGRAMS AND REFERENCES Publications

Useful information on many of the subjects discussed in this document is found in the following publications, which describe programs and studies related to the objectives of Executive Order 11988:

"A Unified National Program for Managing Flood Losses," *House Document 465*, 89th Congress, 2nd Session. A report by the Task Force on Federal Flood Control Policy, August, 1966.

Rules and Regulations of the National Flood Insurance Program. 41-FR 207, Oct. 26, 1976, at CFR 1909, et seq. Copies of the rules and regulations can be obtained from the U.S. Department of Housing and Urban Development, Federal Insurance Administration, Washington, D.C. 20410.

Regulation of Flood Hazard Areas to Reduce Flood Losses. A 2-volume

work published by the Water Resources Council in 1971-1972. It contains legal aspects of and draft legislation for riverine and coastal floodplain regulation programs of states and local governments.

Flood proofing Regulations. U.S. Army Corps of Engineers, June, 1972 (EP1165-2-314).

A Unified National Program for Flood Plain Management. U.S. Water Resources Council, July, 1976.

A Perspective on Flood Plain Regulations for Flood Plain Management. U.S. Army Corps of Engineers, June, 1976 (EP1165-2-304).

Elevated Residential Structures. HUD, Federal Insurance Administration, September, 1976.

Relevant Legislative Authority and Statement of Congressional Purpose for Minimizing Floodplain Encroachment

There is a large body of Federal legislation relevant to preservation or restoration of floodplains. Some of the major items of legislation are listed below.

Title and Lead Agency

Water Resources Planning Act (42 USC 1962), WRC
Watershed Protection and Flood Prevention Act (16 USC 1001), SCS
River and Harbor Act of 1899 (33 USC 001), COE
Flood Control Act of 1944 (16 USC 460d, et al.), COE
Flood Disaster Protection Act of 1973 (42 USC 4001),
Federal Water Pollution Control Act Amendments of 1972 (33 USC 1251), EPA
Coastal Zone Management Act (16 USC 1451), OCZM
Surface Mining Control and Reclamation Act of 1977, OSM
"1890 Organic Act" of the National Weather Service (15 USC 311) NOAA
National Environmental Policy Act (42 USC 4321), CEQ
Wild and Scenic Rivers Act (16 USC 1271), NPS

National Trail Systems Act (16 USC 1241), NPS

Fish and Wildlife Coordination Act (16 USC 661) Fish and Wildlife Restoration Projects (16 USC 777 and 869), FWS

Endangered Species Act (16 USC 1531), FWS

The Wilderness Act (16 USC 1131), Various

Land and Water Conservation Fund Act (16 USC 4601), HCRS

Antiquities Act of 1906 (16 USC 431), HCRS

Archeological and Historic Preservation Act of 1974 (16 USC 469), HCRS

Agencies should consider reviewing this body of legislation, act by act, in light of the Order to uncover opportunities within their existing programs for protecting the natural and beneficial floodplain values under the powers of these acts as well as to uncover problem areas in meeting mandates (lack of guidance, ceiling, budgets, etc.)

APPENDIX C—E.O. 11988, FLOODPLAIN MANAGEMENT

Statement by the President
Accompanying E.O. 11988, May 24, 1977

The floodplains which adjoin the Nation's inland and coastal waters have long been recognized as having special values to our citizens. They have provided us with wildlife habitat, agricultural and forest products, stable ecosystems, and park and recreation areas. However, unwise use and development of our riverine, coastal, and other floodplains not only destroy many of the special qualities of these areas but pose a severe threat to human life, health, and property.

Since the adoption of a national flood control policy in 1936, the Federal Government has invested about \$10 billion in flood protection works. Despite substantial efforts by the Federal Government to reduce flood hazards and protect floodplains, annual losses from floods and adverse alteration of floodplains continue to increase.

The problem arises mainly from unwise land use practices. The Federal Government can be responsible for or can influence these practices in the construction of projects, in the management of its own properties, in the provision of financial or technical assistance including support of financial institutions, and in the uses for which its agencies issue licenses or permits. In addition to minimizing the danger to human and nonhuman communities living in floodplains, active floodplain management represents sound business practice by reducing the risk of flood damage to properties benefiting from Federal assistance.

Because unwise floodplain development can lead to the loss of human and other natural resources, it is simply a bad Federal investment and should be avoided. In order to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative, I have issued an Executive order on floodplain management.

E.O. 11988—Floodplain Management

By virtue of the authority vested in me by the Constitution and statutes of the United States of America, and as President of the United States of America, in furtherance of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), the National Flood Insurance Act of 1968, as amended (42 U.S.C. 4001 *et seq.*), and the Flood Disaster Protection Act of 1973 (Public Law 93-234, 87 Stat. 975), in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative, it is hereby ordered as follows:

SECTION 1. Each agency shall provide leadership and shall take action to reduce the risk of flood loss to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

SEC. 2. In carrying out the activities described in Section 1 of this Order, each agency has a responsibility to evaluate the potential effects of any actions it may take in a floodplain; to ensure that its planning programs and budget requests reflect consideration of flood hazards and floodplain management; and to prescribe procedures to implement the policies and requirements of this Order, as follows:

(a) (1) Before taking an action, each agency shall determine whether the proposed action will occur in a floodplain—for major Federal actions significantly affecting the quality of the human environment, the evaluation required below will be included in any statement prepared under Section 102(2)(C) of the National Environmental Policy Act. This determination shall be made according to a Department of Housing and Urban Development (HUD) floodplain map or a more detailed map of an area, if available. If such maps are not available, the agency shall make a determination of the location of the floodplain based on the best available information. The Water Resources Council shall issue guidance on this information not later than October 1, 1977.

(2) If an agency has determined to, or proposes to, conduct, support, or

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allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplain. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of this Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain.

(3) For programs subject to the Office of Management and Budget Circular A-95, the agency shall send the notice, not to exceed three pages in length including a location map, to the state and areawide A-95 clearinghouses for the geographic areas affected. The notice shall include: (i) the reasons why the action is proposed to be located in a floodplain; (ii) a statement indicating whether the action conforms to applicable state or local floodplain protection standards and (iii) a list of the alternatives considered. Agencies shall endeavor to allow a brief comment period prior to taking any action.

(4) Each agency shall also provide opportunity for early public review of any plans or proposals for actions in floodplains, in accordance with Section 2(b) of Executive Order No. 11514, as amended, including the development of procedures to accomplish this objective for Federal actions whose impact is not significant enough to require the preparation of an environmental impact statement under Section 102(2)(C) of the National Environmental Policy Act of 1969, as amended.

(b) Any requests for new authorizations or appropriations transmitted to the Office of Management

and Budget shall indicate, if an action to be proposed will be located in a floodplain, whether the proposed action is in accord with this Order.

(c) Each agency shall take floodplain management into account when formulating or evaluating any water and land use plans and shall require land and water resources use appropriate to the degree of hazard involved. Agencies shall include adequate provision for the evaluation and consideration of flood hazards in the regulations and operating procedures for the licenses, permits, loans or grants-in-aid programs that they administer. Agencies shall also encourage and provide appropriate guidance to applicants to evaluate the effects of their proposals in floodplains prior to submitting applications for Federal licenses, permits, loans or grants.

(d) As allowed by law, each agency shall issue or amend existing regulations and procedures within one year to comply with this Order. These procedures shall incorporate the Unified National Program for Floodplain Management of the Water Resources Council, and shall explain the means that the agency will employ to pursue the nonhazardous use of riverine, coastal and other floodplains in connection with the activities under its authority. To the extent possible, existing processes, such as those of the Council on Environmental Quality and the Water Resources Council, shall be utilized to fulfill the requirements of this Order. Agencies shall prepare their procedures in consultation with the Water Resources Council, the Federal Insurance Administration, and the Council on Environmental Quality, and shall update such procedures as necessary.

Sec. 3. In addition to the requirements of Section 2, agencies with responsibilities for Federal real property and facilities shall take the following measures:

(a) The regulations and procedures established under Section 2(d) of this Order shall, at a minimum, require the construction of Federal structures and facilities to be in accordance with the standards and criteria and to be consistent with the intent of those promulgated under the National Flood Insurance Program. They shall deviate only to the extent that the standards of the Flood Insurance Program are demonstrably inappropriate for a given type of structure or facility.

(b) If, after compliance with the requirements of this Order, new construction of structures or facilities are to be located in a floodplain, accepted floodproofing and other flood protection measures shall be applied to new construction or rehabilitation. To achieve flood protection, agencies shall, wherever practicable, elevate structures above the base flood level rather than filling in land.

(c) If property used by the general public has suffered flood damage or is located in an identified flood hazard area, the responsible agency shall provide on structures, and other places where appropriate, conspicuous delineation of past and probable flood height in order to enhance public awareness of and knowledge about flood hazards.

(d) When property in floodplains is proposed for lease, easement, right-of-way, or disposal to non-Federal public or private parties, the Federal agency shall (1) reference in the conveyance those uses that are restricted under identified Federal, State, or local floodplain regulations; and (2) attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successors, except where prohibited by law; or (3) withhold such properties from conveyance.

Sec. 4. In addition to any responsibilities under this Order and Sections 202 and 205 of the Flood Disaster Protection Act of 1973, as amend-

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ed (42 U.S.C. 4106 and 4128), agencies which guarantee, approve, regulate, or insure any financial transaction which is related to an area located in a floodplain shall, prior to completing action on such transaction, inform any private parties participating in the transaction of the hazards of locating structures in the floodplain.

Sec. 5. The head of each agency shall submit a report to the Council on Environmental Quality and to the Water Resources Council on June 30, 1978, regarding the status of their procedures and the impact of this Order on the agency's operations. Thereafter, the Water Resources Council shall periodically evaluate agency procedures and their effectiveness.

Sec. 6. As used in this Order:

(a) The term "agency" shall have the same meaning as the term "Executive agency" in Section 105 of Title 5 of the United States Code and shall include the military departments; the directives contained in this Order, however, are meant to apply only to those agencies which perform the activities described in Section 1 which are located in or affecting floodplains.

(b) The term "base flood" shall mean that flood which has a one percent or greater chance of occurrence in any given year.

(c) The term "floodplain" shall mean the lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

Sec. 7. Executive Order No. 11296 of August 10, 1966, is hereby revoked. All actions, procedures, and issuances taken under that Order and still in effect shall remain in effect until modified by appropriate authority under the terms of this Order.

Sec. 8. Nothing in this Order shall apply to assistance provided for

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emergency work essential to save lives and protect property and public health and safety, performed pursuant to Sections 305 and 306 of the Disaster Relief Act of 1974 (88 Stat. 148, 42 U.S.C. 5145 and 5146).

SEC. 9. To the extent the provisions of Section 2(a) of this Order are applicable to projects covered by Section 104(h) of the Housing and Community Development Act of 1974, as amended (88 Stat. 640, 42 U.S.C. 5304(h)), the responsibilities under those provisions may be assumed by the appropriate applicant, if the applicant has also assumed, with respect to such projects, all of the responsibilities for environmental review, decisionmaking, and action pursuant to the National Environmental Policy Act of 1969, as amended.

JIMMY CARTER.

The White House,
May 24, 1977.

APPENDIX D—E.O. 11990 PROTECTION OF WETLANDS Statement by the President Accompanying E.O. 11990

The Nation's coastal and inland wetlands are vital natural resources of critical importance to the people of this country. Wetlands are areas of great natural productivity, hydrological utility, and environmental diversity, providing natural flood control, improved water quality, recharge of aquifers, flow stabilization of streams and rivers, and habitat for fish and wildlife resources. Wetlands contribute to the production of agricultural products and timber, and provide recreational, scientific, and aesthetic resources of national interest.

The unwise use and development of wetlands will destroy many of their special qualities and important natural functions. Recent estimates indicate that the United States has already lost over 40 percent of our 120 million acres of wetlands inven-

toried in the 1950's. This piecemeal alteration and destruction of wetlands through draining, dredging, filling, and other means has had an adverse cumulative impact on our natural resources and on the quality of human life.

The problem of loss of wetlands arises mainly from unwise land use practices. The Federal Government can be responsible for or can influence these practices in the construction of projects, in the management of its own properties, and in the provisions of financial or technical assistance.

In order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative, I have issued an Executive order on the protection of wetlands.

Executive Order 11990—Protection of Wetlands

By virtue of the authority vested in me by the Constitution and statutes of the United States of America, and as President of the United States of America, in furtherance of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), in order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative, it is hereby ordered as follows:

SECTION 1. (a) Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and

facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

(b) This Order does not apply to the issuance by Federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-Federal property.

SEC. 2. (a) In furtherance of Section 101(b)(3) of the National Environmental Policy Act of 1969 (42 U.S.C. 4331(b)(3)) to improve and coordinate Federal plans, functions, programs and resources to the end that the Nation may attain the widest range of beneficial uses of the environment without degradation and risk to health or safety, each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors.

(b) Each agency shall also provide opportunity for early public review of any plans or proposals for new construction in wetlands, in accordance with Section 2(b) of Executive Order No. 11514, as amended, including the development of procedures to accomplish this objective for Federal actions whose impact is not significant enough to require the preparation of an environmental impact statement under Section 102(2)(C) of the National Environmental Policy Act of 1969, as amended.

SEC. 3. Any requests for new authorizations or appropriations trans-

mitted to the Office of Management and Budget shall indicate, if an action to be proposed will be located in wetlands, whether the proposed action is in accord with this Order.

SEC. 4. When Federally-owned wetlands or portions of wetlands are proposed for lease, easement, right-of-way or disposal to non-Federal public or private parties, the Federal agency shall (a) reference in the conveyance those uses that are restricted under identified Federal, State or local wetlands regulations, and (b) attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successor, except where prohibited by law; or (c) withhold such properties from disposal.

SEC. 5. In carrying out the activities described in Section 1 of this Order, each agency shall consider factors relevant to a proposal's effect on the survival and quality of the wetlands. Among these factors are:

(a) public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards; and sediment and erosion;

(b) maintenance of natural systems, including conservation and long term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and

(c) other uses of wetlands in the public interest, including recreational, scientific, and cultural uses.

SEC. 6. As allowed by law, agencies shall issue or amend their existing procedures in order to comply with this Order. To the extent possible, existing processes, such as those of the Council on Environmental Quality and the Water Resources Council, shall be utilized to fulfill the requirements of this Order.

SEC. 7. As used in this Order:

(a) The term "agency" shall have the same meaning as the term "Ex-

ecutive agency" in Section 105 of Title 5 of the United States Code and shall include the military departments; the directives contained in this Order, however, are meant to apply only to those agencies which perform the activities described in Section 1 which are located in or affecting wetlands.

(b) The term "new construction" shall include draining, dredging, channelizing, filling, diking, impounding, and related activities and any structures or facilities begun or authorized after the effective date of this Order.

(c) The term "wetlands" means those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

Sec. 8. This Order does not apply to projects presently under construction, or to projects for which all of the funds have been appropriated through Fiscal Year 1977, or to projects and programs for which a draft or final environmental impact statement will be filed prior to October 1, 1977. The provisions of Section 2 of this Order shall be implemented by each agency not later than October 1, 1977.

Sec. 9. Nothing in this Order shall apply to assistance provided for emergency work, essential to save lives and protect property and public health and safety, performed pursuant to Sections 305 and 306 of the Disaster Relief Act of 1974 (88 Stat. 148, 42 U.S.C. 5145 and 5146).

Sec. 10. To the extent the provisions of Sections 2 and 5 of this Order are applicable to projects covered by Section 104(h) of the Hous-

ing and Community Development Act of 1974, as amended (88 Stat. 640, 42 U.S.C. 5304(h)), the responsibilities under those provisions may be assumed by the appropriate applicant, if the applicant has also assumed, with respect to such projects, all of the responsibilities for environmental review, decisionmaking, and action pursuant to the National Environmental Policy Act of 1969, as amended.

JIMMY CARTER

The White House,
May 24, 1977.

APPENDIX E—E.O. 11514 PROTECTION AND ENHANCEMENT OF ENVIRONMENTAL QUALITY

Excerpts From E.O. 11514 (March 5, 1970), as Amended by E.O. 11991 (May 24, 1977), Secs. 2(g) and 3(h)

By virtue of the authority vested in me as President of the United States and in furtherance of the purpose and policy of the National Environmental Policy Act of 1969 (Public Law No. 91-190, approved January 1, 1970), it is ordered as follows:

Section 1. *Policy.* The Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. The Council on Environmental Quality, through the Chairman, shall advise and assist the President in leading this national effort.

Sec. 2. *Responsibilities of Federal agencies.* Consonant with Title I of the National Environmental Policy Act of 1969, hereafter referred to as the "Act", the heads of Federal agencies shall:

(a) Monitor, evaluate, and control on a continuing basis their agencies' activities so as to protect and enhance the quality of the environ-

ment. Such activities shall include those directed to controlling pollution and enhancing the environment and those designed to accomplish other program objectives which may affect the quality of the environment. Agencies shall develop programs and measures to protect and enhance environmental quality and shall assess progress in meeting the specific objectives of such activities. Heads of agencies shall consult with appropriate Federal, State and local agencies in carrying out their activities as they affect the quality of the environment.

(b) Develop procedures to ensure the fullest practicable provision of timely public information and understanding of Federal plans and programs with environmental impact in order to obtain the views of interested parties. These procedures shall include, whenever appropriate, provision for public hearings, and shall provide the public with relevant information, including information on alternative courses of action. Federal agencies shall also encourage State and local agencies to adopt similar procedures informing the public concerning their activities affecting the quality of the environment.

(c) Insure that information regarding existing or potential environmental problems and control methods developed as part of research, development, demonstration, test, or evaluation activities is made available to Federal agencies, States, counties, municipalities, institutions, and other entities, as appropriate.

(d) Review their agencies' statutory authority, administrative regulation, policies, and procedures, including those relating to loans, grants, contracts, leases, licenses, or permits, in order to identify any deficiencies or inconsistencies therein which prohibit or limit full compliance with the purposes and provisions of the Act. A report on this review and the corrective actions

taken or planned, including such measures to be proposed to the President as may be necessary to bring their authority and policies into conformance with the intent, purposes, and procedures of the Act, shall be provided to the Council on Environmental Quality not later than September 1, 1970.

(e) Engage in exchange of data and research results, and cooperate with agencies of other governments to foster the purpose of the Act.

(f) Proceed, in coordination with other agencies, with actions required by section 102 of the Act.

(g) In carrying out their responsibilities under the Act and this Order, comply with the regulations issued by the Council except where such compliance would be inconsistent with statutory requirements.

Sec. 3. *Responsibilities of Council on Environmental Quality.* The Council on Environmental Quality shall:

(a) Evaluate existing and proposed policies and activities of the Federal Government directed to the control of pollution and the enhancement of the environment and to the accomplishment of other objectives which affect the quality of the environment. This shall include continuing review of procedures employed in the development and enforcement of Federal standards affecting environmental quality. Based upon such evaluations the Council shall, where appropriate, recommend to the President policies and programs to achieve more effective protection and enhancement of environmental quality and shall, where appropriate, seek resolution of significant environmental issues.

(b) Recommend to the President and to the agencies priorities among programs designed for the control of pollution and for enhancement of the environment.

(c) Determine the need for new policies and programs for dealing with environmental problems not being adequately addressed.

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(d) Conduct, as it determines to be appropriate, public hearings or conferences on issues of environmental significance.

(e) Promote the development and use of indices and monitoring systems (1) to assess environmental conditions and trends, (2) to predict the environmental impact of proposed public and private actions, and (3) to determine the effectiveness of programs for protecting and enhancing environmental quality.

(f) Coordinate Federal programs related to environmental quality.

(g) Advise and assist the President and the agencies in achieving international cooperation for dealing with environmental problems, under the foreign policy guidance of the Secretary of State.

(h) Issue regulations to Federal agencies for the implementation of the procedural provisions of the Act (42 U.S.C. 4332(2)). Such regulations shall be developed after consultation with affected agencies and after such public hearings as may be appropriate. They will be designed to make the environmental impact statement process more useful to decisionmakers and the public; and to reduce paperwork and the accumulation of extraneous background data, in order to emphasize the need to focus on real environmental issues and alternatives. They will require

impact statements to be concise, clear, and to the point, and supported by evidence that agencies have made the necessary environmental analyses. The Council shall include in its regulations procedures (1) for the early preparation of environmental impact statements, and (2) for the referral to the Council of conflicts between agencies concerning the implementation of the Nation Environmental Policy Act of 1969, as amended, and Section 309 of the Clean Air Act, as amended, for the Council's recommendation as to their prompt resolution.

(i) Issue such other instructions to agencies, and request such reports and other information from them, as may be required to carry out the Council's responsibilities under the Act.

(j) Assist the President in preparing the annual Environmental Quality Report provided for in section 201 of the Act.

(k) Foster investigations, studies, surveys, research, and analyses relating to (i) ecological systems and environmental quality, (ii) the impact of new and changing technologies thereon, and (iii) means of preventing or reducing adverse effects from such technologies.

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