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# REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

## REGULATORY GUIDE 1.185

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### STANDARD FORMAT AND CONTENT FOR POST-SHUTDOWN DECOMMISSIONING ACTIVITIES REPORT

#### A. INTRODUCTION

Decommissioning means permanently removing a nuclear facility from service and reducing radioactive materials on the licensee's site to levels that would permit termination of the Nuclear Regulatory Commission (NRC) license. On July 29, 1996, a final rule was published in the *Federal Register* (61 FR 39278) amending the NRC's regulations on the decommissioning procedures that will lead to termination of an operating license for nuclear power reactors. This rule included changes to 10 CFR Part 2, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders"; Part 50, "Domestic Licensing of Production and Utilization Facilities"; and Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

The regulation, in 10 CFR 50.82(a)(4)(i), requires the licensee, prior to or within 2 years of permanent cessation of operations, to provide the NRC with a post-shutdown decommissioning activities report (PSDAR). The PSDAR must include a description of the licensee's planned decommissioning activities, a schedule for the accomplishment of significant milestones, and an estimate of expected costs. The PSDAR should also document the results of the licensee's evaluation of the environmental impacts associated with site-specific decommissioning activities. The evaluation should include a comparison of the site-specific environmental impacts of the proposed decommissioning with those impacts identified in previously issued environmental statements, the generic environmental impact statement on decommissioning, "Final Generic Environmental Impact Statement (GEIS) on Decommissioning of

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Regulatory guides are issued to describe and make available to the public such information as methods acceptable to the NRC staff for implementing specific parts of the NRC's regulations, techniques used by the staff in evaluating specific problems or postulated accidents, and data needed by the NRC staff in its review of applications for permits and licenses. Regulatory guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

This guide was issued after consideration of comments received from the public. Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. Written comments may be submitted to the Rules and Directives Branch, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Regulatory guides are issued in ten broad divisions: 1, Power Reactors; 2, Research and Test Reactors; 3, Fuels and Materials Facilities; 4, Environmental and Siting; 5, Materials and Plant Protection; 6, Products; 7, Transportation; 8, Occupational Health; 9, Antitrust and Financial Review; and 10, General.

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Nuclear Facilities” (NUREG-0586, Ref. 1), and the GEIS, “Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC Licensed Nuclear Facilities” (NUREG-1496, Ref. 2).

The purpose of the PSDAR is to provide the NRC and the public with a general overview of the licensee's proposed decommissioning activities. The PSDAR serves to inform the NRC staff of the licensee's expected activities and schedule, facilitating planning for inspections and decisions regarding NRC oversight activities. The PSDAR is also a mechanism for informing the public of the proposed decommissioning activities before the decommissioning activities are conducted.

The purpose of this regulatory guide is to identify the type of information to be contained in the PSDAR and establish a standard format for the PSDAR that is acceptable to the NRC staff. The NRC staff suggests that licensees use this standard format to facilitate the preparation of PSDARs. This regulatory guide is being developed and issued in conjunction with Regulatory Guide 1.184, “Decommissioning of Nuclear Power Reactors” (Ref. 3), which is also in support of the decommissioning rule (61 FR 39278).

The information collections contained in this regulatory guide are covered by the requirements of 10 CFR Part 50, which were approved by the Office of Management and Budget, approval number 3150-0011. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

## **B. DISCUSSION**

According to 10 CFR 50.82(a)(5), the licensee is prohibited from performing any major decommissioning activities until 90 days after the NRC has received the licensee's PSDAR submission and until the certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel have been submitted. Major decommissioning activities are defined in 10 CFR 50.2 as "any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components for shipment containing greater than class C waste . . . ." Major radioactive components are defined in 10 CFR 50.2 as “the reactor vessel and internals, steam generators, pressurizers, large bore reactor coolant system piping, and other large components that are radioactive to a comparable degree.”

Upon receipt of the PSDAR, the NRC will docket the PSDAR and place a notice regarding its receipt in the *Federal Register* to solicit comments on the PSDAR from the public pursuant to 10 CFR 50.82(a)(4)(ii). A copy of the PSDAR will be made available to the public at the Public Document Room and electronically through the Electronic Reading Room at the NRC's web site, <WWW.NRC.GOV>. The NRC will schedule a public meeting in the vicinity of the site to describe planned activities and to hear public comments. Comments received by the NRC staff on the PSDAR will be addressed at the public meeting, and a question and answer period will follow the presentations. A written transcript of the meeting will be prepared and made available to the

public through the Public Document Room and electronically through the Electronic Reading Room at the NRC's web site, <WWW.NRC.GOV>. To the extent possible, the public meeting should be held within 90 days of the NRC's receipt of the licensee's PSDAR submittal; it normally would be held about 30 days before the 90-day period ends.

The NRC will determine whether the licensee's PSDAR contains the information required by the regulation. Major decommissioning activities may not start until 90 days after the NRC receives the PSDAR. Although NRC review and approval of the PSDAR is not required, if the NRC determines that the information provided by the licensee in the PSDAR does not comply with the requirements in 10 CFR 50.82(a)(4)(i), the NRC will inform the licensee in writing of the additional information required by the regulations before the PSDAR public meeting and before major decommissioning activities are begun. A list of factors that could cause the NRC to find the PSDAR deficient are given in Section 5 of this guide.

The above provisions for PSDARs apply to licensees who did not have an NRC-approved decommissioning plan by August 28, 1996, which was the effective date of the rule. For licensees that have a decommissioning plan that was approved before August 28, 1996, the approved decommissioning plan and the associated environmental review are considered to be the PSDAR submittal (see 10 CFR 50.82). Decommissioning plans normally contain sufficient information to satisfy the requirements of the PSDAR. If a licensee had submitted a decommissioning plan before August 28, 1996, and the NRC staff had not taken final action on the plan, the staff deems the decommissioning plan to be the PSDAR submittal. Licensees with an approved decommissioning plan are required to submit an update to the PSDAR for activities that were not considered in their decommissioning plan. Because of the amount of material contained in the decommissioning plans and the requirement to update this information, and because of the potential for a misunderstanding as to what must be updated, licensees are encouraged to replace their decommissioning plans with a PSDAR update that uses the format and content specified in this document.

### **C. FORMAT AND CONTENT OF THE POST-SHUTDOWN DECOMMISSIONING ACTIVITIES REPORT**

The purposes of the PSDAR are to (1) inform the public of the licensee's planned decommissioning activities, (2) assist in the scheduling of NRC resources necessary for the appropriate oversight activities, (3) ensure the licensee has considered the costs of the planned decommissioning activities and considered the funding for the decommissioning process, and (4) ensure the environmental impacts of the planned decommissioning activities are bounded by those considered in existing environmental impact statements.

Submission of the PSDAR must precede any major decommissioning activities as they are defined in 10 CFR 50.2. The rule in 10 CFR 50.82(a)(4)(i) requires that the PSDAR include (1) a description of the licensee's planned major decommissioning activities, (2) a schedule for completing these activities, (3) an estimate of the expected decommissioning costs, and (4) a discussion that provides the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate previously issued

environmental impact statements. Each of these items is discussed in further detail in the following sections and the content expected by the NRC staff is described.

## **1. DESCRIPTION OF LICENSEE'S PLANNED DECOMMISSIONING ACTIVITIES**

The PSDAR should include a description of the licensee's planned activities for decommissioning. The purpose of the description is to inform the NRC and the public of the planned decommissioning by providing a general overview of the proposed decommissioning activities and identifying specific activities to be accomplished or performed.

The licensee should describe (in general terms) the method or combination of methods selected for decommissioning (i.e., long-term storage followed by decontamination and dismantlement (SAFSTOR), or prompt decontamination and dismantlement (DECON), or partial decontamination and dismantlement followed by long-term storage and then final decontamination and dismantlement). The licensee should also list and describe the major activities and tasks related to decommissioning. The activities and tasks should be identified and discussed briefly in the order in which they will occur. The level of detail of the description provided for each of the activities will depend, in part, on the nature of the activity. Activities that are specific and unique to the facility, and thus would require additional NRC staff oversight, should be described in greater detail than routine activities. For example, a chemical decontamination of a slightly radioactively contaminated system using a mild acid would require only a short description of the process. However, it is expected that the use of a unique chemical decontamination method on a system containing large amounts of contamination (for instance, the primary system) would result in a more detailed description of the process for the staff to ascertain the level of oversight that would be required. Likewise, an activity that could result in an environmental impact that may be outside the bounds of those considered in the GEIS, such as the removal, processing, and storage of fuel debris contained in a system or in the spent fuel pool, would need to be discussed in greater detail.

The following are provided merely as examples and are not meant to be all inclusive or to imply that a given licensee must include each of the activities in the decommissioning process. The description of the licensee's planned decommissioning activities is meant to provide a general, site-specific overview of all the activities occurring from the time of certification of permanent removal of the fuel to the anticipated termination of the license.

For a prompt dismantlement, it is expected that activities such as the following would be described:

- Removal of the reactor vessel and internals,
- Removal of other large components, including major radioactive components,
- Removal of the balance of the primary system (charging system, boron control system, etc.),
- General activities related to the removal of other significant radioactive components and any structures,
- Decontamination of radioactive components, including the use of chemical decontamination techniques,

- Decontamination of structures or buildings, such as the auxiliary and fuel handling buildings,
- Special or unusual programs (for instance, removal and processing of fuel debris from the spent fuel pool) that might result in impacts that were not considered in the GEIS (these activities would need to be described in greater detail),
- Onsite storage of components,
- Shipment and processing of the low-level radioactive waste, including any anticipated compaction or incineration of the waste,
- Location (if known) of the ultimate disposal site for the low-level radioactive waste,
- Storage or removal of the spent fuel and greater-than-Class-C waste, including the use (if planned) of an independent spent fuel storage installation (ISFSI) or wet storage facility,
- Removal of hazardous radioactive (mixed) wastes, and
- Changes in management and staffing.

If long-term storage (longer than approximately 5 years) is selected as a decommissioning option, the activities related to preparing the facility and site for storage should be listed and described. Activities and tasks for maintaining the facility and site in safe storage should also be discussed. It is expected that the description of the preparation process and the storage phase would specifically call out activities such as the following examples.

- Draining of specific systems and removal of resins from ion exchangers,
- Decontamination of specific high-dose areas,
- Removal of low-level waste that is ready to be shipped,
- Shipment and processing or storage of the fuel and greater-than-Class-C waste,
- De-energizing or deactivating specific systems,
- Reconfiguration of ventilation systems and fire protection systems for use during the storage period,
- Inspection and monitoring plans during the storage period,
- Maintenance of any systems critical to final dismantlement during the storage period, and
- Changes in management and staffing.

The activities related to the transition from long-term storage to decommissioning and activities related to the final decommissioning of the facility should also be described to the extent known. According to 10 CFR 50.82(a)(3), decommissioning will be completed within 60 years of permanent cessation of operation unless a longer term for completion is approved by the NRC as necessary for public health and safety.

Details regarding the radiation protection plan, security plan, or discussions on quality assurance (QA) related to decommissioning are not required or expected in the PSDAR; however, this information may be required in periodic updates to the Final Safety Analysis Report.

## **2. SCHEDULE OF PLANNED DECOMMISSIONING ACTIVITIES**

The purpose of the schedule is to provide information to the NRC and the public on the anticipated timing of decommissioning events, as well as to allow the NRC to schedule resources necessary for appropriate oversight activities. The relationship between the activities should be

shown for the major activities described in Section 1, so the reader understands the sequence of events as well as the timing of the events.

Schedules or diagrams should clearly indicate the estimated initiation and completion of the major decommissioning activities with potential increased risk to the workers, public, or environment, or those that are unique to the facility. Any activities that will require a significant NRC licensing effort should be identified, including the start and desired end dates for activities such as the submission of defueled technical specifications, the approval and licensing of an ISFSI, the licensing activities associated with a certificate of compliance for transportation of major components, or the approval of the license termination plan. Changes to the schedule following submission of the PSDAR are addressed in Section 6 of this guide, “Changes to the PSDAR.”

The level of detail of the schedule will depend on the timing of the activity and will assist the NRC in determining the degree of oversight required. The schedule for major activities in the near term should be given to the nearest month and year. Activities that will follow a storage period of at least 5 years may be scheduled to the closest year.

### **3. ESTIMATE OF EXPECTED DECOMMISSIONING COSTS**

The PSDAR should include an updated estimate of the expected decommissioning costs. The updated cost estimate required by 10 CFR 50.82(a)(4)(i) may be (1) the amount of decommissioning funds estimated to be required pursuant to 10 CFR 50.75(b) and (c) as currently reported on a calendar-year basis at least once every 2 years to the NRC according to 10 CFR 50.75(f)(1), (2) a site-specific cost estimate that is based on the activities and schedule discussed in Sections 1 and 2 above, (3) an estimate based on actual costs at similar facilities that have undergone similar decommissioning activities, or (4) a generic cost estimate. The licensee’s decision on which type of estimate to include in the PSDAR should be based on specific plans for decommissioning. If a licensee has chosen extended safe storage of the facility followed by decontamination and dismantlement, generic information would be acceptable to the NRC staff as cost estimates of final dismantlement could occur far in the future. The licensee is reminded that a site-specific cost estimate is required within 2 years of permanently ceasing operation (10 CFR 50.82(a)(8)(iii)). The licensee may consider submitting site-specific cost estimate data in the PSDAR if it is planning immediate decontamination and dismantlement and is planning to spend more than 23 percent of the decommissioning funds.

For generic cost estimate methods, see NUREG/CR-0672 (including Addenda 1 through 4), “Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station” (Ref. 4); NUREG/CR-0130, “Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station” (Ref. 5); NUREG/CR-5884, “Revised Analysis of Decommissioning for the Reference Pressurized Water Reactor Power Station” (Ref. 6); NUREG/CR-6174, “Revised Analyses of Decommissioning for the Reference Boiling Water Reactor Power Station” (Ref. 7); and NUREG-0586, “Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities” (Ref. 1).

The cost estimate presented in the PSDAR could be a combination of any of these or other methods, but the amount estimated cannot be less than the amount estimated by the method in 10 CFR 50.75(c). If the cost estimate is less than the amount estimated by the method in 10 CFR 50.75(c), the PSDAR would be considered to be deficient. Also, in accordance with 10 CFR 50.75(b)(2), the licensee must annually adjust the minimum amounts required by 10 CFR 50.75(c)(2).

Following the submission of the site-specific cost estimate that is required by 10 CFR 50.82(a)(8)(iii), if the licensee's PSDAR specifies delayed completion of decommissioning, the licensee must provide a means of adjusting cost estimates and associated funding levels over the duration of the storage or surveillance period to ensure that the appropriate amount of funding will be available to terminate the license [see 10 CFR 50.82(a)(8)(iv)]. That mechanism should be described in the PSDAR. If the licensee has submitted a site-specific estimate as required by 10 CFR 50.82(a)(8)(iii), the means of adjusting the cost estimates should be described in the cost section of the PSDAR as well as in the site-specific cost estimate.

Additional regulatory guidance on cost estimates is being developed and will be provided in a regulatory guide.

#### **4. ENVIRONMENTAL IMPACTS**

The PSDAR should include a discussion of the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by previously issued environmental impact statements. Prior to preparing the PSDAR, the licensee should evaluate the potential environmental impacts associated with the site-specific decommissioning activities, including those activities listed in Section 1 of this guide. The potential environmental impacts associated with decommissioning should be compared with similar impacts given in the Final Environmental Statement (FES) for the plant (as supplemented), in the GEIS on decommissioning (NUREG-0586) (Ref. 1), site-specific environmental assessments, and the GEIS on radiological criteria for license termination (NUREG-1496) (Ref. 2). The comparison with impacts in the GEIS should recognize the unique nature of the site. If the postulated impacts associated with decommissioning have already been considered in the plant-specific FES as supplemented, or the GEIS, the licensee should state this in the PSDAR [see 10 CFR 50.82(a)(4)(i)]. An analysis of the specific environmental impacts associated with decommissioning activities need not be included in the PSDAR. For those activities determined to have impacts greater than those evaluated in the GEIS, FES, site-specific analysis, or NUREG-1496, a supplement to these documents must be completed prior to the initiation of the activities. The analysis of the specific environmental impacts associated with decommissioning activities need not be included in the PSDAR; however, supporting documentation and analyses must be available at the reactor site for inspection by the NRC staff.

Potential impacts include both radiological and nonradiological impacts. Examples of potential impacts that should be examined to ensure they are within the envelope of impacts predicted in the GEISs on decommissioning or radiological criteria for license termination, FES, or site-specific analysis include occupational dose; environmental releases to air, water, and soil and the resulting population doses; quantity of low-level radioactive waste generated;

transportation impacts; and impacts from nonradiological hazards such as dust, noise, water use, and hazardous (nonradiological) waste. The licensee's dose estimates should be for Total Effective Dose Equivalent (TEDE). The licensee should briefly describe how these estimates of TEDE compare to or are different from the GEIS or FES whole body and organ dose estimates. Impacts to endangered and threatened species should be examined specifically. In many cases, the list of endangered or threatened species has changed since the most recent FES; a current list should be obtained from the appropriate U.S. Fish and Wildlife Service office. A determination should be made as to the likelihood that a protected species is found on the site. If any species is likely to be affected by the decommissioning of the facility, this potential should be identified in the PSDAR.

Any planned decommissioning activity using a method not considered in the GEIS on decommissioning (NUREG-0586, Ref. 1) could cause an environmental impact that has not been considered and should be specifically examined. For example, the explosive destruction of buildings that have not been decontaminated to levels that allowed their free release would likely result in environmental impacts not considered in the GEIS or the site-specific FES.

If significant environmental impacts are identified that have not been considered in the plant-specific FES or in the GEISs on decommissioning (Ref. 1) and on radiological criteria for license termination (Ref. 2), the licensee is prohibited by 10 CFR 50.82(a)(6)(ii) from undertaking the activity that would result in such an impact without first complying with 10 CFR Part 51. The licensee must submit a supplement to its environmental report that relates to the additional impacts under 10 CFR Part 51.

For plants that do not have an FES, an environmental assessment such as that prepared for the change from a provisional operating license to a full-term operating license is appropriate.

## **5. FACTORS THAT COULD CAUSE THE NRC TO FIND THE PSDAR DEFICIENT**

A number of factors could cause the NRC to find the PSDAR deficient. These factors are directly related to the topics included in the PSDAR, as discussed above. The NRC could find the PSDAR deficient in the following circumstances.

- The licensee's plan for decommissioning could not be completed as described, for example, if the plan called for immediate decontamination and dismantlement of the facility and there were no waste disposal facilities available for the facility to use.
- The schedule included a decommissioning process that could not be completed within 60 years of the permanent cessation of operations as required by 10 CFR 50.82(a)(3), unless it were shown that a longer decommissioning period is necessary to protect public health and safety (if so, approval would be made on a case-by-case basis).
- The licensee's decommissioning plans, as presented in the PSDAR, included a decommissioning process that could not be completed for the estimated cost using the generic guidelines in the GEIS and using previous facility decommissioning costs or if the estimated costs were less than the amount estimated by the method in 10 CFR 50.75(c).



- The PSDAR included activities that would endanger the health and safety of the public by proposing activities that do not comply with the NRC's health and safety regulations or would result in a significant detrimental impact to the environment that is not bounded by the current environmental impact statements.

## **6. CHANGES TO THE PSDAR**

According to 10 CFR 50.82(a)(7), the licensee must notify the NRC, in writing with a copy to the affected States, before performing any significant decommissioning activity that could be considered to be inconsistent with, or a significant schedule change from, the list of planned decommissioning activities or schedules described in the PSDAR. Changes to the PSDAR may be in the form of a written letter to NRC or may be an actual revision to the PSDAR. Changes that result in any type of environmental impact not bounded by previously issued environmental impact statements would need a supplement to the Environmental Report. The supplement should be submitted to the NRC, with a copy sent to the affected States. Changes that significantly increase the decommissioning costs also require notification to the NRC with a copy sent to the affected States.

The PSDAR may be changed by the following process. Significant changes in major schedules or the cost estimate require written notification to the NRC. Changes to the milestone schedule will be used by the NRC staff to schedule NRC inspections of the licensee's activities and to provide assurance that decommissioning is being conducted safely and in accordance with regulatory requirements. Examples of changes in activities and schedule include, but are not limited to, changing from long-term storage to active dismantlement, changing the method used to remove the reactor vessel or steam generators from cutting and segmenting to intact removal, or changing the schedule to affect major milestones. Changes regarding the removal of structures, systems, or components that do not pose a direct or indirect potential radiological hazard need not be reported. Examples of significant increases in cost associated with decommissioning the facility would include a new estimated cost greater than 20 percent above the site-specific cost estimate or the PSDAR cost estimate, or a 25 percent increase in cost above a major milestone estimate. The significant increase in cost would require written notification to the NRC. Notification should be made only if cost changes occur as a result of changes in the timing of activities or if planned decommissioning activities result in a significant increase in decommissioning costs. Notification of increased decommissioning costs is not necessary if the increases are simply because of higher estimated costs caused by inflation.

Changes in decommissioning activities should be evaluated as to their potential environmental impact. If the expected impact is greater than that predicted in the GEIS or the site-specific FES, or is outside the bounds of these documents, the licensee must notify the NRC in writing and provide a supplement to the Environmental Report for the facility that evaluates the impact of the change.

For facilities that either have an approved decommissioning plan or have submitted a decommissioning plan before the effective date of the rule, August 28, 1996, the decommissioning plan is deemed to be the PSDAR submittal according to 10 CFR 50.82. This is appropriate since

the decommissioning plan was required to contain all the information required by the PSDAR, but in greater detail.

For facilities with approved decommissioning plans, decommissioning can proceed under the associated decommissioning order. Significant changes in major milestones, schedules, or cost estimates require written notification to the NRC. For facilities that submitted a decommissioning plan for NRC approval prior to the issuance of the 1996 rule but the NRC had not yet approved their plan, the 90-day period prior to initiation of major decommissioning activities began August 28, 1996.

Since the level of detail required in the PSDAR is significantly less than that required in decommissioning plans, licensees who have submitted a decommissioning plan for approval or licensees with an approved decommissioning plan are encouraged to extract the pertinent detail from the decommissioning plan and submit a PSDAR update in the format and content specified by this regulatory guide.

Written notifications to the NRC made under 10 CFR 50.82(a)(7) do not require a 90-day waiting period prior to initiation of activities. Typically, the staff would not require a public meeting to discuss the proposed changes. If, however, the licensee proposes changing the method of decommissioning, for example, from long-term storage followed by decontamination and dismantlement to prompt decontamination and dismantlement, a public meeting may be held.

## **7. FORMAT OF PSDAR**

Graphic presentations such as drawings, maps, diagrams, sketches, and tables should be employed where the information may be presented more adequately or conveniently by such means. Due concern should be taken to ensure all information so presented is legible, symbols are defined, and scales are not reduced to the extent that visual aids are necessary to interpret pertinent items of information. These graphic presentations should be located in the section where they are primarily addressed.

References should appear either as footnotes to the page where they were discussed or at the end of each chapter.

### **Paper Size**

- (1) Text pages: 8-1/2 x 11 inches.
- (2) Drawings and graphics: 8-1/2 x 11 inches; however, a larger size is acceptable provided the finished copy when folded does not exceed 8-1/2 x 11 inches.

### **Paper Stock and Ink**

Use suitable quality in substance, paper color, and ink density for handling and reproduction by microfilming or image-copying equipment.

### **Page Margins**

A margin of no less than 1 inch should be maintained on the top, bottom, and binding side of all pages submitted.

**Printing**

- (1) Composition: Text pages should be single spaced.
- (2) Type Face and Style: Should be suitable for microfilming or image-copying equipment, including computer scanning.
- (3) Reproduction: May be mechanically or photographically reproduced. All pages of text should be printed on both sides and the image printed head-to-head.

**Binding**

No requirements.

**Page Numbering**

Pages should be numbered sequentially.

**Table of Contents**

A table of contents should be included.

**Procedures for Updating or Revising Pages**

Data and text should be updated or revised by replacing pages. The changed or revised portion on each page should be highlighted by a "change indicator" mark consisting of a bold vertical line drawn in the margin opposite the binding margin. The line should be of the same length as the portion actually changed.

All pages submitted to update, revise, or add pages to the report should show the date of change and a change or amendment number. A guide page listing the pages to be inserted and the pages to be removed should accompany the revised pages. When major changes or additions are made, a revised table of contents should be provided.

**Exceptions to Physical Specifications**

Other forms such as electronic media may be used; however, in accordance with 10 CFR 50.4(c), prior to making any submission in other than paper form, the licensee must contact the Information and Records Management Branch, U.S. Nuclear Regulatory Commission, Washington, DC, 20555, telephone (301)415-7230, to obtain specifications, copy requirements, and prior approval.

## REFERENCES

1. USNRC, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," NUREG-0586, August 1988.
2. USNRC, "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities," NUREG-1496, Volume 1, July 1997.
3. USNRC, "Decommissioning of Nuclear Power Reactors," Regulatory Guide 1.184, July 2000.
4. H.D. Oak et al., "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station," NUREG/CR-0672 (Prepared for the U.S. NRC by Pacific Northwest Laboratory, Richland, Washington), June 1980 (Addendum 1, July 1983; Addendum 2, September 1984; Addendum 3, July 1988; Addendum 4, December 1990).
5. R.I. Smith, G.J. Konzek, and W.E. Kennedy, Jr., "Technology, Safety, and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," NUREG/CR-0130 (Prepared for the U.S. NRC by Pacific Northwest Laboratory, Richland, Washington), June 1978 (Addendum 1, July 1979; Addendum 2, July 1983; Addendum 3, September 1984; Addendum 4, July 1988).
6. G.J. Konzek et al., "Revised Analysis of Decommissioning for the Reference Pressurized Water Reactor Power Station," NUREG/CR-5884 (Prepared for the U.S. NRC by Pacific Northwest Laboratory, Richland, Washington), November 1995.
7. R.I. Smith et al., "Revised Analyses of Decommissioning for the Reference Boiling Water Reactor Power Station," NUREG/CR-6174 (Prepared for the U.S. NRC by Pacific Northwest National Laboratory, Richland, Washington), July 1996.

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## **REGULATORY ANALYSIS**

A separate regulatory analysis was not prepared for this regulatory guide. The regulatory analysis prepared for the amendments to Parts 2, 50, and 51, "Decommissioning of Nuclear Power Reactors," which was issued on July 29, 1996 (61 FR 39278), provides the regulatory basis for this guide and examines the costs and benefits of the rule as implemented by the guide. A copy of this regulatory analysis is available for inspection or copying for a fee in the NRC Public Document Room, 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.