SECY-97-186

August 13, 1997

FOR:	The Commissioners
FROM:	L. Joseph Callan /s/ Executive Director for Operations
SUBJECT:	CHANGES TO THE FINANCIAL PROTECTION REQUIREMENTS FOR PERMANENTLY SHUTDOWN NUCLEAR POWER REACTORS, 10 CFR 50.54(w) AND 10 CFR 140.11

PURPOSE:
To request Commission approval to issue a proposed rule that would amend financial protection requirements for permanently shutdown nuclear power reactors.

CATEGORY:

This paper covers a major policy question requiring Commission consideration.

BACKGROUND:

This proposed rulemaking is consistent with an SRM dated January 28, 1997, in which the Commission approved a staff recommendation in SECY-96-256 to implement Option 2 for making changes to the financial protection requirements in 10 CFR 50.54(w) and 10 CFR 140.11 for permanently shutdown nuclear power reactors.

DISCUSSION:

The proposed rule would specify appropriate levels of liability coverage that would be required of licensees that meet specified reactor configurations during permanent shutdown. This would allow nuclear reactor licensees a reduction in onsite and offsite liability coverage during permanent shutdown without resorting to the exemption process.

The proposed rule does not address the financial protection requirements for Independent Spent Fuel Storage Installations (ISFSIs). This subject will be addressed after efforts dealing with technical and licensing issues for ISFSIs are resolved in areas of safeguards requirements, emergency planning, and potential fuel storage handling activities.

COORDINATION:

The Office of the General Counsel has no legal objection to the proposed rulemaking. The Office of the Chief Financial Officer has no resource-related objection to this rulemaking. The Office of the Chief Information Officer concurs that there will be no information technology impacts.

RECOMMENDATION:

That the Commission:

1. Approve for publication in the Federal Register the proposed amendments to 10 CFR Part 50.54(w) and 10 CFR 140.11 on financial protection requirements for permanently shutdown nuclear power reactors (Attachment 1).

2. Note:

a. That the proposed amendments will be published in the Federal Register allowing 75 days for public comment.

b. That the Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification and the reasons for it, as required by the Regulatory Flexibility Act, 5 U.S.C. 605(b).

c. That a regulatory analysis has been prepared for this rulemaking (Attachment 2).

d. That an Environmental Assessment has been prepared for this rulemaking (Attachment 3).

e. The appropriate Congressional committees will be informed of this action (Attachment 4).

f. That a public announcement will be issued by the Office of Public Affairs when the proposed rulemaking is filed with the Office of the Federal Register (Attachment 5).

g. That resources to complete and implement this rulemaking are included in the current budget.

L. Joseph Callan
Executive Director
for Operations

Attachments: As stated (5)

[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 50 and 140

RIN 3150-AF79

Financial Protection Requirements for

Permanently Shutdown Nuclear Power Reactors

AGENCY:	Nuclear Regulatory Commission.
ACTION:	Proposed rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations to allow nuclear reactor licensees to reduce onsite and offsite liability coverage during permanent shutdown of the reactors if they meet specified reactor configurations. This proposed amendment would reduce the level of insurance coverage commensurate with the risk reduction after the appropriate spent fuel cooling period following permanent shutdown of the reactor.

DATES: The comment period expires (75 days after publication). 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: Send comments by mail or addressed to the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Attention: Rulemakings and Adjudications Staff.

Hand-deliver comments to: 11555 Rockville Pike, Rockville, Maryland, between 7:30 am and 4:15 pm on Federal workdays.

You may also provide comments via the NRC's interactive rulemaking web site through the NRC home page (http://www.nrc.gov). This site provides the availability to upload comments as files (any format), if your web browser supports that function. For information about the interactive rulemaking site, contact Ms. Carol Gallagher, (301) 415-6215; e-mail CAG@nrc.gov.

Certain documents related to this rulemaking, including comments received and the environmental assessment and finding of no significant impact, may be examined at the NRC Public Document Room, 2120 L Street NW., (Lower Level), Washington, DC. These same documents also may be viewed and downloaded electronically via the interactive rulemaking website established by NRC for this rulemaking.

FOR FURTHER INFORMATION CONTACT: George Mencinsky, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone: (301) 415-6206, e-mail GJM@nrc.gov.; Stephen Lewis, Office of the General Counsel, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone: (301) 415-1684, e-mail SHL@nrc.gov.; Ira Dinitz, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone: (301) 415-1289, e-mail IPD1@nrc.gov.

SUPPLEMENTARY INFORMATION:

Background

The current regulations governing insurance coverage for nuclear power reactors are contained in 10 CFR 50.54(w) and 10 CFR 140.11. These regulations do not take into consideration the reduced risk associated with permanently shutdown plants. The exemption process allows reduced insurance coverage for these plants.

Consideration of whether financial protection coverage should be reduced for permanently shutdown plants must take into account the preservation of the solvency of the organization responsible for maintaining and decommissioning these facilities in the unlikely event of a nuclear incident. In addition, consideration would be given to timely payment for valid damage claims by members of the public and minimization of the likelihood that Federal Government indemnity would be exercised for satisfaction of claims for damages.

The regulations in 10 CFR 140.11 require that the licensees of facilities designed to produce substantial amounts of electricity, a rated capacity of 100,000 kWe or more, must have and maintain a primary insurance coverage of $200 million from private sources to protect against offsite liability. In addition, licensees must maintain secondary financial protection in the form of private liability insurance available under an industry retrospective rating plan. The current maximum obligation for secondary financial protection for a licensee in this plan is $75.5 million with respect to any nuclear incident. Thus, the total financial protection for offsite liability for any incident would be the primary layer of $200 million, plus the secondary layer of $75.5 million

multiplied by the number of licensed power reactors with a rated capacity of 100,000 kWe or higher.

Under 10 CFR 50.54(w), power reactor licensees must obtain insurance coverage from private sources to provide protection against onsite damage in the event of an accident. These monies would allow the licensee to stabilize and decontaminate the reactor and reactor station site in the event of an accident. The minimum amount of insurance coverage is the lesser of $1.06 billion or the maximum amount of insurance generally available from private sources.

This proposed rule is part of the NRC effort to eliminate unnecessary regulatory burdens for power reactor facilities that are permanently shutdown and in the process of decommissioning. This would complement other amendments for decommissioning, such as the final rule that was published in the Federal Register (61 FR 39278) on July 29, 1996, which clarified the procedures leading to permanent shutdown and, eventually, to the termination of an operating license for nuclear power reactors.

This proposed rule would also address a petition for rulemaking (PRM-50-57) submitted by the North Carolina Public Staff Utilities Commission. The petition requested reduction or, preferably, elimination of the $1.06 billion of insurance for onsite reactor stabilization and accident decontamination that is required by 10 CFR 50.54(w) when all nuclear fuel has been removed from the site. The petitioner also requested that the offsite primary and secondary liability coverages required under 10 CFR 140.11(a)(4) be reduced or, preferably, eliminated for shutdown reactors when no nuclear fuel is on the reactor site.

The proposed rule does not address the financial protection requirements for Independent Spent Fuel Storage Installations (ISFSIs). This subject will be addressed after efforts dealing with technical and licensing issues for ISFSIs are resolved in areas of safeguards requirements, emergency planning, and potential fuel storage handling activities.

Discussion

Several different configurations for permanently shutdown reactors are being established that encompass anticipated spent fuel characteristics and storage modes during the period between permanent shutdown and termination of the license. They are as follows:

Reactor Configuration 1: The reactor is defueled, permanently shutdown, and spent fuel in the spent fuel pool is susceptible to a zircaloy cladding fire if the spent fuel pool is drained accidentally. This configuration encompasses the period from immediately after the core is offloaded to just before the decay heat of the hottest assemblies is low enough that no rapid zircaloy oxidation will take place, and the fuel cladding will remain intact with no gap release if water in the spent fuel pool is lost.

Reactor Configuration 2: The reactor is defueled, permanently shutdown, and spent fuel is in the spent fuel pool but is not susceptible to a zircaloy cladding fire or gap release caused by an incipient fuel cladding failure in the event the spent fuel pool is drained accidentally. In this configuration, the spent fuel can be stored long-term in the spent fuel pool without the possibility of initiating a zircaloy fire or significant fuel cladding failure. In addition, the site may contain a radioactive inventory of liquid radwaste, activated reactor components, and contaminated structural materials. The radioactive inventory during this configuration may change depending on the licensee's proposed shutdown activities and schedule.

Reactor Configuration 3: The reactor is permanently shutdown and no spent fuel is in the reactor or the spent fuel pool. All spent fuel has been removed to an offsite or onsite dry storage independent spent fuel storage installation (ISFSI) or to a DOE high-level repository. The remaining radioactive inventory depends on the decommissioning status and may include liquid radwaste, activated reactor components, and contaminated structural materials.

Reactor Configuration 4: Same as reactor configuration 3, except the reactor site has no significant mobile sources of radioactivity such as contaminated liquids (less than 1000 gallons).

There are potential onsite and offsite radiological consequences that could be associated with the onsite storage of the spent fuel in the spent fuel pool for some time after permanent shutdown. In Reactor Configuration 1, in the event of a complete loss of spent fuel pool coolant inventory such as from a beyond-design-basis earthquake scenario, there is a potential for overheating the fuel by decay heat. This sequence could result in a zircaloy cladding fire that may have significant onsite and offsite consequences.

To prevent fuel rod cladding failure leading to a zircaloy-cladding fire if all spent fuel pool water is lost, the rod cladding temperature must not exceed 565^{0}C. The rod cladding temperature is an important factor that must be considered in modifying the financial protection requirements for permanently shutdown reactors.

In Reactor Configuration 2, the spent fuel has decay heat sufficiently low that the cladding will remain intact even if all spent fuel pool water is lost. However, if there are significant sources of radioactive material stored onsite, it would be appropriate to maintain an adequate level of onsite insurance coverage. Although the offsite consequences are negligible in the Reactor Configuration 2 , because the spent fuel pool is operational and an inventory of radioactive materials exists onsite, an appropriate level of offsite financial protection is required to account for the potential for significant judgments or settlements from litigation that might be instituted and to protect the Federal government from indemnity claims.

In Reactor Configuration 3, when spent fuel is no longer stored in the spent fuel pool, the potential for a radiological incident is primarily in mobile sources of radioactivity onsite at permanently shutdown nuclear reactors. The offsite cleanup costs were found to be negligible for Reactor Configuration 3, but as was noted in Reactor Configuration 2, an appropriate level of offsite financial protection is still required to account for the potential for significant judgments or settlements from litigation that might be instituted and also to protect the Federal government from indemnity claims. Because the level of risk has decreased vis-a-vis the Reactor Configuration 2 by having no spent fuel in the spent fuel pool, the level of offsite financial protection

required is being reduced by taking into account only the mobile radioactive inventory onsite.

In the Reactor Configuration 4, with no significant amount of mobile sources of radioactivity such as contaminated liquids onsite, there is no need to maintain the same level of insurance coverage for onsite or offsite financial protection as in Reactor Configuration 3. The basis for the transition from Reactor Configuration 3 to Reactor Configuration 4 is the point at which there is less than 1000 gallons of liquid radwaste stored onsite. A limiting value of 1000 gallons has been considered because it constitutes approximately a factor of 500 reduction in volume from the large volume tank used as the basis for the Reactor Configuration 3 limiting event.

In Reactor Configuration 4, if the licensee has cleaned the site to unrestricted release levels and is awaiting a confirmatory survey for terminating the license, the necessary level of onsite insurance coverage at this stage would be less than when 1000 gallons of liquid radwaste were stored onsite. Under these circumstances, the onsite coverage could be further reduced or eliminated to account for negligible onsite consequences. However, for offsite financial protection requirements, although the offsite consequences are negligible, some level of public liability financial protection must be maintained as long as there remains in effect a nuclear reactor license issued pursuant to 10 CFR Part 50 under the authority of Section 103 or 104 of the Atomic Energy Act (42 U.S.C. 2133, 2134). See Section 170a of that Act (42 U.S.C. 2210a). Section 170 is commonly referred to as the "Price-Anderson Act."

Proposed Regulatory Action

The proposed amendments would adjust the onsite insurance coverage requirements and the offsite financial protection requirements for permanently shutdown reactors based on limiting the spent fuel cladding temperatures for accidents involving loss of spent fuel pool water and the amount of onsite radioactive inventory such as liquid radwaste in post shutdown modes. The insurance amounts are based on the estimated cost of recovery from limiting hypothetical events for specific reactor configurations.

The proposed amendments would also address "rated capacity" in 10 CFR 140.11 as used in Section 170a of the Atomic Energy Act to indicate that a permanently shutdown nuclear reactor has a "rated capacity" of zero.

The proposed financial protection requirements are as follows.

Reactor Configuration 1 - Fuel in spent fuel pool not sufficiently cool.

- The requirements for onsite insurance coverage and offsite financial protection remain as presently specified in 10 CFR 50.54(w) and 10 CFR 140.11, respectively.

Reactor Configuration 2 - Fuel could tolerate a complete loss of water in the spent fuel pool.

- The onsite insurance coverage requirement is $50 million. The amount of $50 million is to recover from a postulated accident in the spent fuel pool.
- The offsite financial protection requirement is $100 million, based on the potential for significant judgments or settlements resulting from litigation despite negligible offsite consequences.

Reactor Configuration 3 - No fuel in spent fuel pool, risk dependent on radioactive inventory at plant site in decommissioning status.

- The onsite insurance coverage requirement is $50 million. The amount of $50 million is the estimated amount needed to recover from a postulated onsite event of a rupture of a large slightly contaminated liquid storage tank.
- The offsite financial protection requirement is $50 million, based on the potential for significant judgments or settlements resulting from litigation that might still be instituted despite negligible offsite consequences; however the liability risk is considered less than in Reactor Configuration 2.

Reactor Configuration 4 - No fuel in the spent fuel pool and no significant source of mobile radioactive material.

- The onsite insurance coverage requirements is either $25 million or is eliminated. The amount of $25 million is based on the possibility of having to clean up onsite contamination from an accidental rupture of a less-than-1000-gallon contaminated liquid storage tank during shutdown activities. Elimination of onsite insurance coverage would be warranted when a licensee is awaiting a confirmatory survey for license termination.
- The offsite financial protection requirement is $25 million, based on the potential for claims arising from asserted offsite consequences. This would minimize the possibility that Federal Government indemnification would be required. As noted above, the Atomic Energy Act does not allow a 10 CFR Part 50 licensee to drop this coverage entirely, only to reduce it.

Discussion

This proposed rule would allow power reactor licensees to reduce their onsite insurance coverage and offsite financial protection requirements during permanent shutdown without resorting to the exemption process. The level of financial protection would be determined for permanently shutdown reactors at a level that coincides with their actual configuration stage.

During Reactor Configuration 1, licensees would be required to maintain onsite insurance coverage and offsite financial protection at the levels currently required by 10 CFR 50.54(w) and 10 CFR 140.11, respectively. This is because the radiological consequences during this stage of permanent shutdown approximate the magnitude of a severe core damage accident.

After allowing the spent fuel to cool down to the point that the maximum spent fuel cladding temperature will not exceed 565^0C in the event of a loss of water in the spent fuel pool (Reactor Configuration 2), power reactor licensees would be allowed under 10 CFR 50.54(w) to reduce their onsite insurance coverage from $1.06 billion to $50 million. The reason for this reduction in insurance coverage is that the rapid clad oxidation event of Reactor Configuration 1 is not possible. Insurance coverage requirements for Reactor Configuration 2 are based on the fact that there is a possibility for a fuel handling accident in the spent fuel pool, and significant amounts of mobile radioactive sources remain onsite that have a potential for release during this period. The $50 million coverage would be adequate to clean up the site in the event of a fuel handling accident, an accidental release of cooling water from the spent fuel pool, or a rupture of a large slightly contaminated liquid storage tank.

The proposed insurance coverage requirement for Reactor Configuration 2 does not take into account the reduction in radioactive decay of the spent fuel assemblies with the passage of time during that period. The insurance coverage requirements are based on the conservative assumption of a fuel handling accident shortly after the transition to Reactor Configuration 2. Adjusting insurance requirements during Reactor Configuration 2 based on the decay level of the spent fuel would be burdensome from a regulatory standpoint, as opposed to selecting a bounding figure to encompass any unexpected events concerning the spent fuel pool.

In Reactor Configuration 2, the offsite financial protection requirements set forth in 10 CFR 140.11 would be reduced from $200 million to $100 million for the primary liability coverage, and the licensee would be allowed to withdraw from the secondary liability coverage under Price-Anderson.

In Reactor Configuration 3, when all the spent fuel has been removed to an onsite or offsite dry storage ISFSI or to a DOE high-level repository and the onsite radioactive inventory is greater than 1000 gallons, the onsite insurance coverage requirements would be $50 million under the proposed 10 CFR 50.54(w). This amount is based on the fact that there are still mobile radioactive sources onsite that have the potential to contaminate the site. The maximum cleanup costs associated with Reactor Configuration 3 are estimated at approximately $50 million. The conservative limiting event is the rupture of a large contaminated liquid storage tank that causes soil contamination and the potential to contaminate groundwater. The offsite financial protection requirements under the proposed Section 140.11 would be reduced from $100 million to $50 million, and the licensee would not be required to maintain secondary liability coverage under the Price-Anderson Act for Reactor Configuration 3. With no spent fuel in the spent fuel pool, the risks of offsite contamination have been reduced considerably for this configuration.

In Reactor Configuration 4, there are no significant mobile sources of radioactivity, such as liquid contaminants, onsite. Thus, the potential for onsite and offsite radiological impacts is limited. In this situation, onsite insurance coverage requirements either would be $25 million or would be completely eliminated under the proposed 10 CFR 50.54(w). The amount in each case would be based on information provided by the licensee and evaluated by the staff for the particular circumstances of the shutdown reactor. The $25 million onsite insurance coverage would be required if liquid radwaste remained stored onsite, usually 1,000 gallons or less of radwaste, that may be susceptible to an accidental spill and the consequent need for cleanup of the contaminated site. Elimination of required onsite insurance coverage would be based on the licensee's submittal of its terminal radiation survey to the NRC stating that the site has been cleaned to unrestricted release levels and is awaiting a confirmatory survey for termination of the license. In either case, the onsite and offsite consequences would be negligible.

In Reactor Configuration 4, the required offsite financial protection would be reduced to $25 million to account for the continuing potential for claims based on asserted offsite consequences. A minimum of $25 million in coverage would minimize the possibility that Federal Government indemnification would be required and would be consistent with the requirements of Section 170 of the Atomic Energy Act that power reactor licensees maintain some level of public liability financial protection. The licensee would not be required to maintain secondary liability coverage under Price-Anderson for Reactor Configuration 4.

In addition, "rated capacity" would be addressed in 10 CFR Part 140 to indicate that permanently shutdown nuclear power plants have "zero" rated capacity. The effect of this amendment would be to allow the NRC to permit reduction of the primary liability coverage and elimination of the requirement for participation in the secondary liability coverage for nuclear power plants that had made the certifications under 10 CFR 50.82(a)(1)(i) and (ii). However, for reasons stated above, the NRC does not propose to permit this reduction and withdrawal until a reactor has entered the Reactor Configuration 2. At that point the NRC proposes that the reactor no longer be subject to the requirements to maintain primary financial protection in the "maximum amount available at reasonable cost and on reasonable terms from private sources" or to participate in the secondary financial protection public liability system under Section 170 of the Atomic Energy Act. The Commission has already approved, in response to site-specific requests, these adjustments in the primary and secondary public liability insurance regime, and this clarification in Part 140, as requested by the Commission, places into the Commission's regulations a statement that a permanently shutdown nuclear power plant is no longer considered to have any "rated capacity."

The petition for rulemaking submitted by the North Carolina Public Staff Utilities Commission would be substantially granted in that the insurance requirements would be significantly reduced, as requested. However, the petition could not be been fully granted because of the Price-Anderson statutory provisions that do not allow licensees who continue to hold 10 CFR Part 50 licenses to drop the offsite public liability coverage entirely.

Finding of No Significant Environmental Impact: Availability

The Commission has determined under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in Subpart A of 10 CFR Part 51, that this rule, if adopted, would not be a major Federal action significantly affecting the quality of the human environment, and therefore, an environmental impact statement is not required. The proposed rule change would allow licensees to seek reductions in onsite and offsite insurance coverage following permanent shutdown if they meet specified reactor configurations because of the reduced risk associated with permanently shutdown reactors. The proposed rule change would require no changes in hardware, procedures, organization, or operation of nuclear power reactors. It would not affect the safety requirements for nuclear power reactors because of the significantly reduced risks to the public health and safety in Reactor Configurations 2, 3, and 4 and it would not affect the likelihood, magnitude, or consequences of accidents at the permanently shutdown nuclear power reactors. Although the proposed rule change would reduce the level of financial protection available to pay for environmental or other consequences that

may result from accidents at permanently shutdown nuclear power reactors, the Commission considers the reduced required insurance and financial protection coverage to be fully adequate and commensurate with the reduced consequences of potential accidents at permanently shutdown nuclear reactors and that the environment will not be negatively affected. Accordingly, the Commission has determined that the proposed rulemaking would have no significant impacts on the quality of the environment.

The environmental assessment and finding of no significant impact on which this determination is based are available for inspection at the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC. Single copies of the environmental assessment and the finding of no significant impact are available from George Mencinsky, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-6206.

Paperwork Reduction Act Statement

This proposed rule does not contain a new or amended information collection requirement subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget, approval numbers 3150-0011.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a currently valid OMB control number.

Regulatory Analysis

The Commission has prepared a draft regulatory analysis on this proposed regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. The draft analysis is available for inspection in the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC. Single copies of the draft analysis may be obtained from George Mencinsky, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-6206.

The Commission requests public comment on the draft regulatory analysis. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES heading.

Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act of 1980 (5 U.S.C. 605(b)), the Commission certifies that this rule, if adopted, will not have a significant economic impact upon a substantial number of small entities. The proposed rule only affects NRC power reactor licensees, which are not "small entities."

Backfit Analysis

The NRC has determined that the backfit rule, 10 CFR 50.109, does not apply to this proposed rule because the backfit rule is limited in scope to construction and operation of nuclear reactors. This rule would only apply to reactors that have permanently ceased operations. Therefore, a backfit analysis is not required because these amendments do not involve any provisions that would impose backfits as defined in 10 CFR 50.109(a)(1).

List of Subjects

10 CFR Part 50

Antitrust, Classified information, Criminal penalties, Fire protection, Incorporation by reference, Intergovernmental relations, Nuclear power plants and reactors, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements.

10 CFR Part 140

Criminal penalties, Extraordinary nuclear occurrence, Insurance, Intergovernmental relations, Nuclear materials, Nuclear power plants and reactors, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 553, the NRC is proposing to adopt the following amendments to 10 CFR Parts 50 and 140.

PART 50--DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

1. The authority citation for Part 50 continues to read as follows: **AUTHORITY:** Secs. 102, 103, 104, 105, 161, 182, 183, 186, 189, 68 Stat. 936, 937, 938, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended 1244, 1246, (42 U.S.C. 5841, 5842, 5846).

Section 50.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951, (42 U.S.C. 5851). Sections 50.10 also issued under secs. 101, 185, 68 Stat. 955, as amended (42 U.S.C. 2131, 2235); sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.13, 50.54(dd), and 50.103 also issued under sec. 108, 68 Stat. 939, as amended (42 U.S.C. 2138). Sections 50.23, 50.35, 50.55, and 50.56 also issued under sec. 185, 68 Stat. 955 (42 U.S.C. 2235). Sections 50.33a, 50.55a and Appendix Q also issued under sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.34 and 50.54 also issued under sec. 204, 88 Stat. 1245 (42 U.S.C. 5844). Sections 50.58, 50.91, and 50.92 also issued under Pub. L. 97-415, 96 Stat. 2073 (42 U.S.C. 2239). Section 50.78 also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Sections 50.80-50.81 also issued under sec. 184, 68 Stat. 954,

as amended (42 U.S.C. 2234). Appendix F also issued under sec. 187, 68 Stat. 955 (42 U.S.C. 2237).

2. In 50.54(w), paragraph (5) is added to read as follows:

50.54 Conditions of licenses.

* * * * *

(w) * * *

(5) For the specified reactor configurations during permanent shutdown, licensees shall maintain the following insurance requirements:

(i) For Reactor Configuration 1: when the reactor is defueled, permanently shutdown, and the spent fuel cladding temperature in the spent fuel pool is 565^0C or greater for a postulated loss of spent fuel pool cooling event, the insurance coverage must be as specified in paragraph (w)(1).

(ii) For Reactor Configuration 2: when the reactor is defueled and permanently shutdown, no operating reactors are on the site, and the spent fuel cladding temperature in the spent fuel pool does not exceed 565^0C for a postulated loss-of-spent-fuel-pool-cooling event, the minimum insurance coverage limit for each reactor must be $50 million.

(iii) For Reactor Configuration 3: when the reactor is defueled and permanently shutdown, no operating reactors are on the site, no fuel is in the spent fuel pool, and the radioactive liquid inventory onsite is 1,000 gallons or greater, the minimum insurance coverage for each reactor must be $50 million.

(iv) For Reactor Configuration 4: when the reactor is defueled and permanently shutdown, no operating reactors are on the site, no fuel is in the spent fuel pool, and the radioactive liquid inventory onsite is less than 1,000 gallons, the minimum insurance coverage for each reactor must be $25 million. For sites awaiting license termination, no insurance coverage is required if the licensee has completed its terminal radiation survey and the site is ready for the confirmatory survey for license termination.

* * * * *

PART 140--FINANCIAL PROTECTION REQUIREMENTS AND INDEMNITY AGREEMENTS

1. The authority citation for Part 140 continues to read as follows: **AUTHORITY:** Secs. 161, 170, 68 Stat. 948, 71 Stat. 576, as amended (42 U.S.C. 2201, 2210); secs. 201, as amended, 202, 88 Stat. 1242, as amended, 1244 (42 U.S.C. 5842, 5842).

2. In 140.11(a), paragraphs (5) and (6) are added to read as follows:

140.11 Amounts of financial protection for certain reactors.

(a) * * *

(5) For the specified reactor configurations during permanent shutdown of nuclear power reactors that were covered during their operation by paragraph (a)(4) of this section, licensees shall maintain the following financial protection requirements :

(i) For Reactor Configuration 1: when the reactor is defueled, permanently shutdown, and the spent fuel cladding temperature in the spent fuel pool is 565^0C or greater for a postulated loss of spent fuel pool cooling event, the financial protection must be as specified in paragraph (a)(4) of this section.

(ii) For Reactor Configuration 2: when the reactor is defueled and permanently shutdown, no operating reactors are on the site, and the spent fuel cladding temperature in the spent fuel pool does not exceed 565^0C for a postulated loss-of-spent-fuel-pool-cooling event, the required financial protection for each reactor must be $100 million and the secondary liability coverage under the Price-Anderson Act is not required.

(iii) For Reactor Configuration 3: when the reactor is defueled and permanently shutdown, no operating reactors are on the site, no fuel is in the spent fuel pool, and the radioactive liquid inventory onsite is 1,000 gallons or greater, the required financial protection for each reactor must be $50 million and the secondary liability coverage under the Price-Anderson Act is not required.

(iv) For Reactor Configuration 4: when the reactor is defueled and permanently shutdown, no operating reactors are on the site, no fuel is in the spent fuel pool, and the radioactive liquid inventory onsite is less than 1,000 gallons, the required financial protection for each reactor must be $25 million and the secondary liability coverage under the Price-Anderson Act is not required.

(6) Power reactors that are defueled and permanently shutdown must be classified as having zero electric power level rated capacity.

Dated at Rockville, Maryland, this _____ day of _____ , 1997.

For the Nuclear Regulatory Commission.

John C. Hoyle,
Secretary of the Commission.

Regulatory Analysis for Rulemaking on

Financial Protection Requirements for

Permanently Shutdown Nuclear Power Reactors

1. INTRODUCTION

NRC has issued a Rulemaking Plan for amending its current financial protection requirements for permanently shutdown (PSD) nuclear power reactors.[1] This Plan complements other amendments for decommissioning, published in the *Federal Register* (61 *FR* 39278) on July 29, 1996, clarifying the procedures that lead to permanent shutdown and eventually to the termination of an operating license for nuclear power reactors. Under that rule, "permanent shutdown" would become a codified status of a reactor when a licensee has certified that all fuel has been removed from the reactor core and that it has permanently ceased power operations.

NRC's Rulemaking Plan responds to NRC's experience in implementing the current financial protection requirements for PSD reactors. To date, five PSD reactor licensees have requested and been granted exemptions reducing their coverage under these requirements. The staff believes that the factors supporting these five exemptions including, in particular, the reduced risk associated with PSD reactors, are applicable to PSD reactors on a more generic basis.[2]

With regard to the issue of financial protection requirements for PSD nuclear power reactors, NRC is currently studying several regulatory options. This document presents NRC's Regulatory Analysis of these options.

1.1 Statement of the Problem and Objective of the Rulemaking

NRC has determined that there is a need to modify its existing regulations for insurance coverage and financial protection requirements for nuclear power reactors. These regulations currently specify the same on-site and off-site financial protection requirements regardless of whether a power reactor is permanently shutdown or operating, and thus do not take into consideration the reduced risk associated with PSD plants. Rather, reduced insurance coverage for these plants has traditionally been allowed on a case-by-case basis through the exemption process. In addition, the existing requirements for off-site financial protection apply to power reactors with a specified "rated capacity" in terms of electrical kilowatts but do not account for the fact that PSD reactors no longer operate at any rated capacity.

The primary objective of the current rulemaking is to eliminate unnecessary regulatory burdens for power reactor facilities that are permanently shutdown and in the process of decommissioning. To accomplish this objective, NRC is proposing to allow licensees to reduce the level of required on-site and off-site liability coverage, without resorting to the exemption process, based on several different reactor configurations that encompass spent fuel characteristics and storage modes following permanent shutdown. NRC is also proposing to modify use of the term "rated capacity" to address indemnity for permanently shutdown plants.

1.2 Current Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors

NRC's current requirements pertaining to financial protection for PSD nuclear power reactors are contained in 10 CFR 50.54(w) and 10 CFR 140.11. Under 10 CFR 50.54(w), power reactor licensees must obtain insurance coverage from private sources to provide protection against *on-site* damage in the event of an accident. Specifically, licensees must obtain insurance having

". . . a minimum coverage limit for each reactor station site of either $1.06 billion or whatever amount of insurance is generally available from private sources, whichever is less."

In the event of an accident, the proceeds from this insurance must be used first to stabilize the reactor and then to decontaminate the reactor and reactor station site.

According to 10 CFR 140.11, licensees of facilities designed to produce substantial amounts of electricity (i.e., those with a rated capacity of 100,000 kWe or more) must have and maintain two levels of financial protection against off-site liability:

(1) *Primary insurance coverage* of $200 million from private sources; and

(2) *Secondary financial protection* in the form of private liability insurance available under an industry retrospective rating plan.

The current maximum obligation for secondary financial protection for a licensee in the industry retrospective rating plan is $75.5 million with respect to any nuclear incident. In total, the financial protection for off-site liability for any incident equals the primary layer of $200 million plus the secondary layer of $75.5 million multiplied by the number of licensed power reactors with a rated capacity of 100,000 kWe or higher. This coverage currently amounts to approximately $8 billion.

2. IDENTIFICATION AND PRELIMINARY ANALYSIS OF ALTERNATIVE APPROACHES

The Rulemaking Plan for this rulemaking identified two specific options, in addition to a no-action alternative, to address the issues discussed in Section 1.1. These options are discussed below.

2.1 Option 1

Under Option 1, the no-action alternative, NRC would maintain on-site insurance coverage requirements and off-site financial protection requirements for permanently shutdown (PSD) nuclear power reactors as prescribed by 10 CFR 50.54(w) and 10 CFR 140.11. Power reactor licensees would continue to be required to maintain coverage at the levels specified in the regulations during permanent shutdown. For each power reactor, this would require *on-site* insurance coverage in the amount of $1.06 billion or, if that level of coverage is not available, the maximum amount that is generally available from private sources, and *off-site* liability coverage consisting of (1) a primary layer of $200 million and (2) a secondary layer of $75.5 million times the total number of licensed power reactors with a rated capacity at or above 100,000 kWe.

Under Option 1, PSD power reactor licensees would have the opportunity to request an exemption from the above requirements on a case-by-case basis if they believe that the above amount of financial coverage required of licensees would be more than necessary based on the level of perceived risk. A number of licensees already have used this process to obtain regulatory relief (see Table 2-1 below). While exemptions could continue to provide regulatory relief in the future, NRC believes that Option 1 would do so with less regulatory certainty than Options 2 and 3 discussed below. In addition, NRC believes that Option 1 may result in inconsistencies among licensees and would result in higher costs to both the licensee population and NRC because of the cost inefficiencies of dealing with the exemption issue on an individual plant basis.

Table 2-1 - Financial Protection Exemptions Currently in Effect at PSD Plants

Plant	On-Site Insurance Coverage ($million)	Primary Off-Site Financial Protection ($million)	Secondary Off-Site Financial Protection ($million)
Rancho Seco	50	100	0
LaCrosse	180	30.6	0
Yankee-Rowe	5	100	0
Humboldt Bay	63.2	50	0
Trojan	5	100	0

2.2 Option 2

Under this option, NRC would adjust the on-site insurance coverage requirements and the off-site financial protection requirements on a generic basis for PSD reactors. Adjusted coverage levels would be based on the spent fuel cladding temperatures that would result from accidents involving the loss of spent fuel pool water and the amount of liquid radioactive waste stored onsite in post-shutdown modes. Option 2 would allow power reactor licensees to reduce their insurance coverage and financial protection requirements during permanent shutdown without resorting to the exemption process. The insurance coverage requirements proposed under Option 2 are based on the estimated costs resulting from hypothetical events for four different reactor configurations (described below). These costs may include on-site costs of recovery (i.e., stabilization and decontamination) and claims by members of the public for off-site consequences from nuclear energy hazards.[(3)]

Option 2 would also modify 10 CFR 140.11 to indicate that a PSD nuclear power reactor has a rated capacity of zero. The effect of this modification would be that, once a shutdown reactor's spent fuel has cooled to the point where the spent fuel cladding temperature would not exceed 565C in the event of a loss of water from the spent fuel pool, the licensee would be allowed to (1) reduce its primary off-site financial protection level and (2) cease its participation in the secondary financial protection system under 10 CFR 140.11(a)(4). This rule change would not require licensees to carry the full primary and secondary insurance once the certification under 50.82 has been made for permanent cessation of operations and permanent removal of fuel from the reactor vessel.

As noted above, several different configurations for PSD reactors have been established that encompass anticipated spent fuel characteristics and storage modes following permanent shutdown. These configurations are discussed in the following sections, along with the levels of on-site and off-site coverage that Option 2 would require for each configuration. A key distinction between NRC's existing coverage levels and the coverage levels proposed under Option 2 (as well as Option 3) is that, whereas the existing requirements apply on a *per-site* basis, the proposed requirements would apply on a *per-reactor* basis.

2.2.1 Reactor Configuration 1

In reactor Configuration 1, the reactor is defueled and permanently shutdown, but spent fuel in the spent fuel pool is susceptible to a zircaloy cladding fire if the water in the pool is lost. This configuration encompasses the period commencing immediately after the offload of the core and ending just prior to when the decay heat of the hottest assemblies is low enough so that no rapid zircaloy oxidation would take place and the fuel cladding would remain intact in the event of loss of water from the spent fuel pool. NRC's preliminary analysis indicates that, in order to prevent fuel rod cladding failure leading to a zircaloy cladding fire given the loss of all spent fuel pool water, the resulting rod cladding temperature must not exceed 565C. NRC's analysis also estimates that, for typical reactors, the spent fuel would be sufficiently cool so as to prevent the cladding temperature from exceeding 565C in the event of a loss of all spent fuel pool water after a decay period of approximately 7 months for BWRs and approximately 17 months for PWRs. Once a sufficient cooling period for the spent fuel has elapsed after reactor shutdown, the potential zircaloy cladding fire sequence would no longer be a concern because, in an emergency situation, air would cool the spent fuel sufficiently to avoid zircaloy cladding combustion.

During reactor Configuration 1, licensees would be required to maintain on-site insurance coverage and off-site financial protection at the levels currently required by 10 CFR 50.54(w) and 10 CFR 140.11, respectively. This is because the radiological consequences during this stage of permanent shutdown

approximate the magnitude of a severe core damage accident.

2.2.2 Reactor Configuration 2

In reactor Configuration 2, the reactor is defueled and permanently shutdown, and spent fuel is in the spent fuel pool but is not susceptible to a zircaloy cladding fire or gap release caused by an incipient fuel cladding failure in the event the pool is drained accidentally. In this configuration, the spent fuel can be stored on a long-term basis in the spent fuel pool without the possibility of initiating a zircaloy fire or significant fuel cladding failure. However, the possibility exists for a fuel handling accident in the spent fuel pool, and the site may contain a significantly large inventory of liquid radioactive waste, activated reactor components, and contaminated structural materials. The radioactive inventory during this configuration may change depending on the licensee's proposed shutdown activities and schedule.

During reactor Configuration 2, licensees would be allowed to reduce both their on-site and off-site financial protection coverage as long as there are no operating reactors on the site. Specifically, for a reactor in Configuration 2, licensees would be allowed to reduce their on-site insurance coverage to the minimum amount of $50 million to recover from a fuel handling accident or a release of cooling water from the spent fuel pool. Licensees would also be allowed to reduce their off-site financial protection to the amount of $100 million, based on the potential for significant judgments or settlements resulting from litigation and to protect the Federal government from indemnity claims. However, licensees would be allowed to withdraw from the secondary financial protection layer provided under the Price-Anderson Act.

The proposed insurance coverage requirements for reactor Configuration 2 do not allow for periodic adjustments to account for the reduction in radioactive decay of the spent fuel assemblies with the passage of time. Rather, the insurance coverage requirements are based on the conservative assumption of a fuel handling accident shortly after the transition from reactor Configuration 1 to reactor Configuration 2. NRC believes that adjusting the insurance requirements during reactor Configuration 2 based on the decay level of the spent fuel would be burdensome from a regulatory standpoint in comparison to selecting a bounding figure to encompass any unexpected events concerning the spent fuel pool.

2.2.3 Reactor Configuration 3

In reactor Configuration 3, the reactor is permanently shutdown and no spent fuel is in the reactor or the spent fuel pool. All spent fuel has been removed to an off-site or on-site dry storage ISFSI or to a DOE high-level repository. The remaining radioactive inventory depends on the decommissioning status and will include liquid radioactive waste, activated reactor components, and contaminated structural materials. For this configuration, the potential for a radiological incident is primarily focused on mobile sources of radioactivity onsite at permanently shutdown nuclear reactors.

For a reactor in Configuration 3, licensees would be allowed to reduce their on-site insurance coverage to the minimum amount of $50 million (the same level as in reactor Configuration 2), if there are no operating reactors on the site, to account for a rupture of a large (i.e., greater than 1,000 gallons), slightly-contaminated-liquid storage tank. Licensees would also be allowed to reduce their off-site financial protection to the amount of $50 million, based on the potential for significant judgments or settlements resulting from litigation and to protect the Federal government from indemnity claims. The off-site requirement is reduced from that required in reactor Configuration 2 because the liability risk is considered to be less in reactor Configuration 3. As in reactor Configuration 2, the secondary financial protection layer would no longer be required.

2.2.4 Reactor Configuration 4

In reactor Configuration 4, the reactor is permanently shutdown and no spent fuel is in the reactor or the spent fuel pool. All spent fuel has been removed to an off-site or on-site dry storage ISFSI or to a DOE high-level repository. Unlike reactor Configuration 3, however, the reactor site has only a small amount (i.e., less than 1,000 gallons) of mobile sources of radioactivity (e.g., contaminated liquids) onsite. Finally, reactor Configuration 4 also covers the period during which the licensee has cleaned the reactor site to unrestricted release levels and is awaiting a confirmatory survey for termination of the license.

For a reactor in Configuration 4, licensees would be allowed to reduce their on-site insurance coverage to the minimum amount of $25 million, if there are no operating reactors on the site, to account for a rupture of a less-than-1,000-gallon, slightly-contaminated-liquid storage tank. This on-site coverage for the reactor may be eliminated, however, when the licensee is awaiting a confirmatory survey for license termination. Licensees would also be allowed to reduce their off-site financial protection to the amount of $25 million, based on the potential for claims based upon asserted off-site consequences and to minimize the possibility that Federal indemnification would be required. As in reactor Configurations 2 and 3, however, the secondary financial protection layer would no longer be required.

2.3 Option 3

Under Option 3, licensees would be required to meet the same on-site insurance coverage requirements specified in Option 2 but would be allowed to reduce further their off-site financial protection requirements during permanent shutdown without resorting to the exemption process. Specifically, Option 3 sets a de minimis level of liability insurance for off-site coverage on the order of $5 million to $10 million for reactor Configurations 2, 3, and 4, as long as there are no operating reactors on the site. Although this de minimis level reflects the fact that off-site radiological consequences are likely to be small, it would provide the Federal government with a minimal threshold of protection to financial risk from public indemnity claims from actual or perceived consequences.

Option 3 essentially endorses eliminating off-site financial protection requirements for permanently shutdown reactors in reactor Configurations 2, 3, and 4, but maintains some required coverage to satisfy the legal requirements of the Price-Anderson Act. The Price-Anderson Act requires all Part 50 licensees to maintain some level of public liability financial protection coverage and requires the Federal government to assume responsibility for the

liability claims that exceed that level of coverage. By reducing the off-site financial protection coverage under reactor Configurations 2, 3, and 4 to the $5 to $10 million range, licensees' insurance premiums would most likely be reduced, yielding a cost savings to licensees. However, on an expected value basis, Option 3 increases the likelihood that the Federal government would have to bear some of the financial risk associated with accidents. Furthermore, lowering the liability of licensees in the event of an accident could be problematic in terms of the public's perception.

3. ANALYSIS OF VALUES AND IMPACTS

This section examines the values and impacts expected to result from NRC's rulemaking, and is presented in three subsections. Section 3.1 identifies attributes that are expected to be affected by the rulemaking. Section 3.2 describes the analytical model used to quantify values and impacts. Finally, the proposal's effects on values and impacts are presented in Section 3.3.

3.1 Identification of Affected Attributes

This section identifies and describes the factors within the public and private sectors that the regulatory alternatives (discussed in Section 2) are expected to affect. These factors were classified as "attributes," using the list of potential attributes provided by NRC in Chapter 5 of its *Regulatory Analysis Technical Evaluation Handbook*.[4] Each attribute listed in Chapter 5 was evaluated, and the basis for selecting those attributes expected to be affected by the proposed action is presented in the balance of this section.

The proposed rule would revise the insurance coverage and financial protection requirements that support requirements for facility operation/shutdown and license termination. The insurance coverage and financial protection requirements are designed to provide financial protection both onsite and offsite in the event of an accident at a reactor. They do not create or define the operation/shutdown and termination activities themselves. Therefore, some of the following attributes either are not consequences of the proposed action or are potential secondary consequences properly attributable not to the insurance coverage and financial protection requirements but to the facility operation/shutdown and license termination requirements that the protection requirements support. The attributes in this group include the following:

Public Health (Accident) -- No changes to radiation exposures to the public within 50 miles of a facility are expected due to changes in accident frequencies or accident consequences associated with the proposed action because the action is not designed or expected to address accident frequency or consequences.

Public Health (Routine) -- No changes to radiation exposures to the public during normal facility operations are expected to be associated with the proposed action because the action does not affect routine facility operations in any manner that could result in radiation exposures to the public.

Occupational Health (Accident) -- No changes to health effects, both immediate and long-term, associated with site workers as a result of changes in accident frequency or accident mitigation are expected to be associated with the proposed action because the action is not designed or expected to affect accident frequency or consequences.

Occupational Health (Routine) -- No changes to radiological exposures to workers during normal facility operations are expected to be associated with the proposed action because the action is not designed or expected to affect routine facility operations in any manner that could result in radiation exposures to workers.

Off-site Property -- No changes to monetary effects on off-site property, either through changes in accident frequency and consequences or in other direct or indirect forms, are expected to be associated with the proposed action. The action is not designed or expected to affect accident frequency or consequences. Effects on off-site property resulting from operation/shutdown and license termination are considered an attribute of the operation/shutdown and license termination requirements and not of the financial protection requirements.

On-site Property -- No changes to monetary effects on on-site property, either through changes in accident frequency and consequences or in other direct or indirect forms, are expected to be associated with the proposed action. The action is not designed or expected to affect the need for replacement power, decontamination, or refurbishment costs. Effects on on-site property resulting from operation/shutdown and license termination are considered an attribute of the operation/shutdown and license termination requirements and not of the financial protection requirements.

Industry Implementation -- The proposed action would require licensees to alter the coverages of existing insurance policies in order to achieve the operational savings discussed below. However, the effort required to alter insurance coverages is not believed to be of any significance.

NRC Implementation -- The proposed action is not expected to have any effect on NRC implementation, assuming that no Regulatory Guides will have to be proposed or revised.

Antitrust Considerations -- The proposed action is not expected to have any antitrust effects.

Safeguards and Security Considerations -- The proposed action is not expected to have any effect on the existing level of safeguards and security.

Environmental Considerations -- The proposed action is not expected to have any effect on the existing level of protection of environmental considerations.

The proposed regulatory actions are expected to involve the following attributes:

Industry Operation -- Relative to the no-action option (Option 1), the proposed rule changes in Option 2 and Option 3 would result in industry operation savings for licensees. Specifically, under either Option 2 or Option 3, licensees attempting to obtain exemptions from the current insurance coverage and

financial protection requirements following plant shutdown would avoid the costs of preparing and submitting exemption packages to NRC. In addition, licensees potentially would realize annual savings in the form of reduced insurance premiums.

NRC Operation -- Relative to the no-action option (Option 1), the proposed rule changes in Option 2 and Option 3 would result in industry operation savings for NRC. Specifically, under either Option 2 or Option 3, NRC would avoid the costs of reviewing and evaluating submissions from licensees attempting to obtain exemptions from the current insurance coverage and financial protection requirements.

Other Government -- Relative to the no-action option (Option 1), Option 2 and Option 3 would result in impacts to the Federal government in that they would increase the government's indemnity risk associated with accidents at PSD reactor facilities. This risk, which is believed to be insignificant for Option 2 and significant for Option 3, has not been quantified in this analysis.

Regulatory Efficiency -- Relative to the no-action option (Option 1), Option 2 and Option 3 would result in enhanced regulatory efficiency, particularly by eliminating the need for preparation, submission, and review of individual plant exemption requests. In addition, Option 2 and Option 3 would provide greater regulatory certainty than the no-action option, would ensure consistent treatment among all power reactor licensees, and would eliminate the potential for costly delays in effecting regulatory exemptions. These values, while believed to be significant, have not been quantified in this analysis.

3.2 Model Design

This section describes the general methods used to structure the analysis and calculate results. The quantifiable results of the analysis (see Section 3.3) are based primarily on modeled effects of the proposed rule on (1) the costs of preparing, submitting, and reviewing exemption requests and (2) insurance premium data for nuclear power reactor licensees. Although the rulemaking would also result in significantly enhanced regulatory efficiency (see Section 3.1), these values have not been quantified.

The discussion in this section is divided into three parts. Section 3.2.1 summarizes the development of the database used in the analysis. Section 3.2.2 describes the methodology that was used to model the regulatory options under consideration. Finally, Section 3.2.3 discusses key assumptions that were used in the analysis.

3.2.1 Development of the Database

To help quantify the effects of the proposed rule, a database was developed containing a variety of data on nuclear power reactors and the licensees that own and operate these reactors. These data were obtained from the following two sources:

Nuclear Regulatory Commission Information Digest.[(5)] The *Information Digest* provided reactor-specific information including licensee, unit name and type, location, operating status, operating license expiration date, licensed MWt, and decommissioning method (for shutdown reactors).

Annual Survey of Nuclear Decommissioning Cost Estimates and Funding Policies, Public Utility Survey.[(6)] The *Annual Survey* provided reactor-specific information on license expiration dates and the expected timing and method of decommissioning.

The database includes information on a total of 74 reactor station sites, at which there are 109 operating reactors and 12 shutdown reactors. Of the 74 sites, 35 sites have only one reactor (whether operating or shutdown), 31 sites have two reactors, and 8 sites have three reactors. The database excludes reactors that (1) are not of the PWR or BWR type, (2) have been fully decommissioned, or (3) are not yet operational. However, the database does include NRC-regulated reactors that have already shutdown but have not been fully decommissioned.

3.2.2 Modeling of Regulatory Options

This section describes how each of the regulatory options under consideration has been modeled to quantify values and impacts associated with the options' insurance coverage and financial protection requirements. Option 1 is the no-action alternative and, as such, would have no values or impacts to be estimated. As a result, this discussion will focus on the modeling of Options 2 and 3. Under Options 2 and 3, NRC would allow power reactor licensees to modify their on-site and off-site liability coverage, without resorting to the exemption process, based on four different reactor configurations that follow permanent shutdown. In addition, NRC would clarify the definition of "rated capacity" to indicate that a PSD nuclear power reactor has a rated capacity of zero.

The requirements envisioned in Options 2 and 3 are deregulatory in nature and would affect licensees in two ways. First, because licensees would be able to reduce their financial protection coverage without resorting to the exemption process, licensees would avoid the costs of preparing and submitting exemption packages to NRC to obtain exemptions from the current insurance coverage and financial protection requirements.[(7)] Second, licensees potentially would realize savings over time in the form of reduced annual insurance premiums associated with the modified insurance coverage and financial protection requirements. The proposed requirements in Options 2 and 3 also would benefit NRC in that NRC would avoid the costs of reviewing and evaluating exemption packages submitted by licensees.

The proposed rule changes under Options 2 and 3 would also result in values and impacts that are not quantified in this analysis. In particular, the proposed requirements would result in enhanced regulatory efficiency because they would provide greater regulatory certainty than the no-action option, would ensure consistent treatment among all power reactor licensees, and would eliminate the potential for costly delays in effecting regulatory exemptions. On the other hand, relative to both the no-action option and Option 2, Option 3 significantly increases the likelihood that the Federal government would have to bear some of the financial risk associated with accidents at nuclear power reactor facilities.

As noted above, both licensees and NRC would realize cost savings under Options 2 and 3 because the proposed rulemaking would eliminate the need

for licensees to resort to the exemption process in order to reduce their insurance coverage and financial protection requirements following permanent shutdown. For licensees, these cost savings are calculated by multiplying the time required to prepare and submit exemption packages (in hours) for each reactor station site by the hourly wage rate for licensee staff. For NRC, these cost savings are calculated by multiplying the time required to review and evaluate exemption packages (in hours) by the hourly wage rate for NRC staff.

In addition, Options 2 and 3 potentially would generate cost savings to licensees due to reduced insurance premiums from the beginning of reactor Configuration 2 through the end of decommissioning. These potential cost savings are modeled in four general steps:

Step 1: The present value of the insurance premiums that licensees would have paid under the existing insurance coverage and financial protection requirements is calculated.(8)

Step 2: For each of the reactor configurations during which licensees would be able to reduce their insurance coverage (i.e., reactor Configurations 2, 3, and 4), the present value of the premiums that licensees would pay under the proposed rule is calculated.

Step 3: The premiums that licensees would pay under reactor Configurations 2, 3, and 4 (calculated in Step 2) are added to yield the total premiums paid by licensees under the proposed rule.

Step 4: The sum from Step 3 is subtracted from the total calculated in Step 1 to yield the total discounted cost savings to licensees from the proposed rule.

A critical variable in the methodology described above is the insurance premium paid by licensees for on-site and off-site coverage. For this analysis, data on insurance premiums were obtained from two sources. The first source, an article by Kurland (1993), provides 1992 data on the annual premiums charged by three different nuclear insurers -- American Nuclear Insurers, Nuclear Material Limited, and Nuclear Electric Insurance Limited.(9) Data are provided for various amounts of both on-site and off-site coverage and, in some cases, are broken out into premiums for single-reactor sites and multiple-reactor sites. The second source used to obtain data on insurance premiums, SECY-96-256, provides data on the annual insurance premiums that would apply to various levels of off-site liability coverage.(10)

The insurance premium figures used in this analysis were derived by fitting quadratic regression curves to the data from the two sources listed above. A total of four curves were developed, three for on-site coverage and one for off-site coverage.(11) Quadratic, rather than linear, regressions were chosen to reflect that insurance premiums tend to increase at a decreasing rate as the level of coverage increases.

3.2.3 Assumptions

Several assumptions were used in conducting the analysis described above. Key assumptions include the following:

- The analysis assumes that the proposed rule would become effective in April 1998. Based on this assumption, all future costs and cost savings are discounted back to April 1998, using a 7 percent discount rate.(12) All dollar amounts in the analysis are stated in 1997 dollars.(13)
- NRC's Rulemaking Plan indicates that, under Option 3, the off-site financial protection requirement for reactor Configurations 2, 3, and 4 would be on the order of $5 million to $10 million. For simplicity, the analysis assumes that the required level of off-site coverage under Option 3 for these three configurations is $7.5 million.
- Because the proposed insurance coverage and financial protection requirements under Options 2 and 3 apply on a per-reactor basis, the analysis treats each reactor on a multiple-reactor site as an independent unit, with its own spent fuel pool and its own insurance policies. In addition, the analysis assumes that the 1,000-gallon on-site radioactive-liquid-inventory threshold that governs the transition from reactor Configuration 3 to reactor Configuration 4 is applicable to each reactor on a multiple-reactor site (as opposed to the entire site as a whole).
- Information provided in the *Information Digest* or the *Annual Survey* indicates that, for eight of the 39 sites with multiple reactors, one or more reactors at the site is/are being or will be decommissioned using the SAFSTOR method while the remaining reactor(s) will be decommissioned using the DECON method. In six of these eight cases, the sources indicate that the reactors using SAFSTOR will be kept in safe storage until the reactors using DECON have ceased operations and are ready for decommissioning. This analysis assumes that the same situation would apply in the remaining two cases.
- The DECON or SAFSTOR process for a given power reactor is assumed to begin at the time the reactor ceases operation (i.e., the operating license expiration date). Also, the analysis assumes that no licenses will be renewed at expiration.
- Based on NRC's decommissioning analysis for BWRs,(14) the analysis assumes that the DECON and SAFSTOR methods of decommissioning for BWRs last 6.3 years and 60 years, respectively, following power reactor shutdown. For each of these methods, spent fuel is stored in the cooling pools for a period of 4.6 years.
- Based on NRC's decommissioning analysis for PWRs,(15) the analysis assumes that the DECON and SAFSTOR methods of decommissioning for PWRs last 8.62 years and 60 years, respectively, following power reactor shutdown. For each of these methods, spent fuel is stored in the cooling pools for a period of 6.92 years.
- Based on NRC's preliminary analysis, reactor Configuration 1 (i.e., the period between operating license expiration and the time at which the spent fuel has cooled to the point where the spent fuel cladding temperature would not exceed 565C in the event of a loss of water from the spent fuel pool) is assumed to last 0.58 years (or 7 months) for BWRs and 1.42 years (or 17 months) for PWRs.
- Reactor Configuration 2 (i.e., the period between the end of reactor Configuration 1 and the time at which the spent fuel is removed from the cooling pools) is assumed to last 4.02 years for BWRs and 5.5 years for PWRs.(16)
- For reactors using DECON, reactor Configuration 3 (i.e., the time between the end of reactor Configuration 2 and the time at which the on-site

radioactive liquid inventory falls to below 1,000 gallons) is assumed to cover 75 percent of the period between the end of the pool storage period and the end of decommissioning. For reactors using SAFSTOR, reactor Configuration 3 is assumed to cover the entire extended safe storage period plus 75 percent of the remaining decommissioning period.

- For reactors using DECON or SAFSTOR, reactor Configuration 4 (i.e., the period between the end of reactor Configuration 3 and the end of decommissioning) is divided into two parts. For the first 80 percent of the Configuration 4 period, the on-site radioactive liquid inventory is assumed to be between 0 and 1,000 gallons. For the final 20 percent of the Configuration 4 period, the analysis assumes that there are no radioactive liquids onsite, and the licensee is merely awaiting/undergoing a confirmatory survey.
- Based on information provided in SECY-96-256, the analysis assumes that 90 percent of licensees at sites without exemptions from the current financial protection requirements would seek exemptions in the absence of the proposed rule. For sites with active reactors, the analysis assumes that these exemptions would be submitted immediately following shutdown of the last reactor on the site. For sites with shutdown reactors only (excluding the five sites that already have exemptions), the analysis assumes that exemptions would be submitted at the time the proposed rule becomes effective (i.e., April 1998). For purposes of sensitivity analysis, the model also calculates results assuming that 100 percent of licensees would seek exemptions in the absence of the rule.
- Based on the on-site and off-site coverage levels that currently apply to the five reactor sites that have already been through the exemption process (see Table 2-1), the analysis assumes on-site and off-site coverage levels of $75 million and $100 million, respectively, for sites obtaining exemptions. As a sensitivity on this assumption, the analysis also considers on-site and off-site exemption levels of $50 million and $75 million, respectively, and $25 million and $50 million, respectively.
- The wage rates applicable to NRC staff and licensee staff are assumed to be $68.28 per hour and $73.56 per hour, respectively. These rates were calculated from 1996 wage rates developed by NRC for use in regulatory analyses of $67.50 per hour for NRC staff and $72.72 for licensee staff. The 1996 wage rates were converted to 1997 dollars to be compatible with the use of 1997 dollars in the balance of the analysis.
- Based on information provided in SECY-96-256, the level of effort required by a licensee to prepare and submit an exemption request for a particular site is assumed to be 160 hours. The level of effort required by NRC to review and evaluate an exemption request for a particular site is assumed to be 120 hours.

3.3 Results

The results of the analysis for each of the affected attributes identified in Section 3.1 are shown below in Exhibit 3-1, including (1) the qualitative results for Regulatory Efficiency (i.e., greater regulatory certainty, more consistent treatment of licensees, and elimination of delays associated with the exemption process) and Other Government (i.e., increased indemnity risk) and (2) the quantitative results for Industry Operation (i.e., exemption cost savings and potential insurance premium savings) and NRC Operation (i.e., exemption cost savings). As shown in the exhibit, there are no values or impacts associated with Option 1 (the no-action alternative). Rather, during the shutdown period, licensees would continue to maintain on-site and off-site financial protection coverage in the amounts prescribed by 10 CFR 50.54(w) and 10 CFR 140.11, and would need to resort to the exemption process in order to reduce this coverage.

Option 2 would result in increases in regulatory efficiency relative to the no-action option. In particular, Option 2 would provide greater regulatory certainty than the no-action option, would ensure consistent treatment among all power reactor licensees, and would eliminate the potential for costly delays in effecting regulatory exemptions. These increases in regulatory efficiency have not been quantified but are believed to be significant. Under Option 2, elimination of the need for licensees to resort to the exemption process to reduce their financial protection coverage levels is expected to save licensees $202,000 in preparation and submission costs and to save NRC $141,000 in review and evaluation costs. In addition, the proposed changes to the insurance coverage and financial protection requirements for PSD reactors potentially could save licensees on the order of $48 million in insurance premiums over the period from shutdown through the end of decommissioning. It is important to note, however, that this $48 million savings assumes that 10 percent of licensees at sites without exemptions would not seek exemptions following shutdown, even though seeking exemptions would likely reduce their costs. To the extent that all licensees would pursue exemptions from the current coverage requirements, savings from Option 2 would fall by 75 percent to $12 million. Also, the amount of potential savings is sensitive to the assumption regarding the on-site and off-site coverage levels that would apply under exemptions from the current requirements.[17] Finally, due to the reduced coverage levels that would be allowed under Option 2, the indemnity risk to the Federal government would increase. This increase in risk has not been quantified but is believed to be insignificant because the coverage levels established under Option 2 represent NRC's best estimate of the on-site and off-site consequences that could result from accidents during each of the four reactor configurations following shutdown.

Option 3, like Option 2, would result in increases in regulatory efficiency relative to the no-action option in that it would provide greater regulatory certainty, would ensure consistent treatment among all power reactor licensees, and would eliminate the potential for costly delays in effecting regulatory exemptions. These increases in regulatory efficiency have not been quantified but are believed to be significant. Option 3 would also eliminate the need for licensees to resort to the exemption process to reduce their coverage levels, thereby generating an expected savings to licensees of $202,000 in preparation and submission costs, and savings to NRC of $141,000 in review and evaluation costs (i.e., the same as in Option 2). In addition, the proposed rule changes in Option 3 potentially could save licensees approximately $98 million in insurance premiums over the period from shutdown through the end of decommissioning. Several points concerning this $98 million savings are worth noting. First, as with the insurance premium savings estimates for Option 2, this $98 million savings is based on the assumption that 10 percent of licensees at sites without exemptions would not seek exemptions following shutdown. To the extent that all licensees would pursue exemptions from the current coverage requirements, approximately 37 percent of these savings would not be realized. Second, as in Option 2, the amount of potential savings is sensitive to the assumption regarding the on-site and off-site coverage levels that would apply under exemptions from the current requirements. Finally, even though Option 3 potentially could result in an additional $50 million in insurance premium savings to licensees relative to Option 2 (due to the fact that the off-site financial protection requirements under Option 3 are significantly lower than in Option 2), these additional savings would be at the expense of increased impacts to the Federal government. This is because the reduced coverage levels under Option 3 increase the likelihood that the Federal government would have to bear some of the financial risk associated with accidents at nuclear power reactor facilities. This increase in risk has not been quantified but is believed to be

significant.

Exhibit 3-1

Estimated Values and Impacts Under Options 1, 2, and 3*

	Option 1	Option 2	Option 3
Values			
Increase in regulatory certainty and consistency of treatment of licensees, and reduction in delays associated with the exemption process	-	Significant	Significant
Avoided cost to licensees of preparing and submitting exemption packages	-	$0.202M	$0.202M
Avoided cost to NRC of reviewing and evaluating exemption packages	-	$0.141M	$0.141M
Potential savings in insurance premiums	-	$48M	$98M
Impacts			
Increase in Federal government indemnity risk	-	Insignificant	Significant

* All dollar figures shown in the table are present values. Results of the sensitivity analysis are discussed in the text.

4. BACKFIT ANALYSIS

The NRC has determined that the backfit rule, 10 CFR 50.109, does not apply to this proposed rule, and therefore, that a backfit analysis is not required for this proposed rule, because these amendments do not involve any provisions which would impose backfits as defined in 10 CFR 50.109(a)(1), nor do they impose more stringent safety requirements on 10 CFR Part 50 licensees.

5. DECISION RATIONALE

1. Option 1, the no-action alternative, would retain the existing requirements for on-site and off-site financial protection for PSD reactors. Both Option 2 and Option 3 would allow power reactor licensees to reduce their on-site and off-site liability coverage, without resorting to the exemption process, based on four different reactor configurations that are anticipated following permanent shutdown. In addition, both options would clarify the definition of "rated capacity" to indicate that a PSD nuclear power reactor has a rated capacity of zero. Both Option 2 and Option 3 are expected to result in cost savings for licensees and NRC. First, the proposed requirements under Options 2 and 3 would result in enhanced regulatory efficiency because they would provide greater regulatory certainty than Option 1 (the no-action alternative), would ensure consistent treatment among all power reactor licensees, and would eliminate the potential for costly delays in effecting regulatory exemptions. Second, because licensees would be able to reduce their financial protection coverage without resorting to the exemption process, licensees wishing to reduce their current financial protection requirements would avoid the costs of preparing and submitting exemption packages to NRC, which could amount to approximately $202,000 (present value). This would benefit NRC in that NRC would avoid costs of approximately $141,000 (present value) for reviewing and evaluating exemption packages submitted by licensees. Finally, licensees potentially would realize savings over time in the form of reduced annual insurance premiums associated with the modified coverage levels that would be required under the proposed rule. The present value of these savings could amount to between $48 million (for Option 2) and $98 million (for Option 3), assuming that 90 percent of licensees would seek exemptions from the current requirements following shutdown. If, on the other hand, all licensees obtained exemptions following shutdown, these savings would be significantly smaller ($12 million and $62 million for Options 2 and 3, respectively). Insurance premium savings could also be smaller depending on the on-site and off-site coverage levels that would apply under exemptions from the current requirements.

2. The only distinction between Option 2 and Option 3 is that Option 3 would allow licensees to reduce their off-site financial protection requirements to levels significantly lower than those allowed under Option 2. However, this option significantly increases the financial risk associated with accidents that the Federal government would have to bear. NRC believes that the coverage levels established under Option 2 represent NRC's best estimate of the on-site and off-site consequences that could result from accidents during each of the four reactor configurations following shutdown. As a result, NRC believes that the further reduction in off-site coverage levels under Option 3 jeopardizes the financial protection requirements, despite the potential for an additional insurance premium savings to licensees of approximately $50 million (i.e., $98 million minus $48 million). Finally, NRC believes that a further reduction of the liability of licensees in the event of an accident could be problematic in terms of the public's perception.

3. For the reasons stated in (1) and (2) above, Option 2 is superior to Option 1 (the no-action alternative) and Option 3.

6. IMPLEMENTATION

This action would be enacted through a Proposed Rule Notice and public comment and a Final Rule, with promulgation of the Final Rule expected by April 1998. Implementation can begin immediately following the enactment of the final rulemaking. No impediments to implementation of the recommended alternative have been identified. In addition, no Regulatory Guides for licensees are expected to be needed.

Draft Environmental Assessment and Finding of No Significant Environmental Impact

Proposed Rule: Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors

This document fulfills NRC's obligation under 10 CFR Part 51 to examine the environmental impacts of its regulatory actions, in this case in regard to a rulemaking addressing NRC's current insurance coverage and financial protection requirements for nuclear power reactors. NRC is proposing to modify these requirements, which are contained in 10 CFR 50.54(w) and 10 CFR 140.11, on a generic basis for permanently shutdown (PSD) reactors to account for the reduced risk associated with these reactors.

NRC's regulations for implementing Section 102(2) of the National Environmental Policy Act of 1969 (NEPA), as amended, are contained in Subpart A of 10 CFR Part 51. These regulations require that an environmental impact statement or an environmental assessment be prepared for all licensing and regulatory actions that are not classified as "categorical exclusions" under 10 CFR 51.22(c) and are not identified in 10 CFR 51.22(d) as other actions not requiring environmental review.

NRC has determined that, under Section 102(2) of NEPA, as amended, and NRC's regulations in Subpart A of 10 CFR Part 51, that the proposed rule modifying the insurance coverage and financial protection requirements for nuclear power reactors is not a major federal action significantly affecting the quality of the human environment and, therefore, that an environmental impact statement is not required. NRC has also determined that the proposed rule does not qualify as a categorical exclusion or other action not requiring environmental review. Consequently, NRC has determined that an environmental assessment is required. This document presents the results of NRC's environmental assessment of the proposed rule.

Background

Under 10 CFR 50.54(w), nuclear power reactor licensees must obtain insurance coverage in the amount of $1.06 billion (or, if that level of coverage is not available, the maximum amount that is generally available from private sources) to provide protection against *on-site* damage in the event of an accident at a reactor. In the event of an accident, the proceeds from this insurance must be used first to stabilize the reactor and then to decontaminate the reactor and reactor station site. Under 10 CFR 140.11, licensees of facilities designed to produce substantial amounts of electricity (i.e., those with a rated capacity of 100,000 kWe or more) must have and maintain two levels of financial protection against *off-site* liability: (1) primary insurance coverage of $200 million from private sources, and (2) secondary financial protection in the form of private liability insurance available under an industry retrospective rating plan.[(18)]

In a staff requirements memorandum (SRM) dated July 13, 1993, the Commission approved staff recommendations to (1) allow licensees that have permanently shutdown to withdraw from the secondary financial protection layer under the Price-Anderson Act (section 170 of the Atomic Energy Act, as amended), (2) reduce the required primary financial protection coverage under the Price-Anderson Act, through exemption, to $100 million after an appropriate spent fuel cooling period, and (3) proceed with a rulemaking to determine appropriate further reductions in the level of insurance coverage after the appropriate spent fuel cooling period. The Commission also requested that the staff determine whether there is a need for financial protection for ISFSIs and requested clarification of the term "rated capacity," as applied to PSD reactors. In addition, the North Carolina Public Staff Utilities Commission submitted a petition requesting a reduction in or elimination of the $1.06 billion in insurance for on-site reactor stabilization and accident decontamination, currently required by 10 CFR 50.54(w), in instances when all nuclear fuel has been removed from the site. The petitioner also requested that the requirement for off-site primary and secondary liability coverages required under 10 CFR 140.11(a)(4) be reduced or eliminated for shutdown reactors when no nuclear fuel is on the reactor site.

In response to item 3 of the SRM[(19)] and the petition from the North Carolina Public Staff Utilities Commission, the staff issued a Rulemaking Plan for amending NRC's current insurance coverage and financial protection requirements for PSD nuclear power reactors.[(20)] This Plan complements other amendments for decommissioning, published in the *Federal Register* (61 *FR* 39278) on July 29, 1996, clarifying the procedures that lead to permanent shutdown and, eventually, to the termination of an operating license for nuclear power reactors. Under that rule, "permanent shutdown" would become a codified status of a reactor when a licensee has certified that all fuel has been removed from the reactor core and that it has permanently ceased power operations.

The Rulemaking Plan also responds to NRC's experience in implementing the current financial insurance coverage and protection requirements for PSD reactors. To date, five PSD reactor licensees have requested and been granted exemptions reducing their coverage under these requirements. The staff believes that the factors supporting these five exemptions including, in particular, the reduced risk associated with PSD reactors, are applicable to PSD reactors on a more generic basis.

Discussion

NRC's Rulemaking Plan is part of a broad effort to eliminate unnecessary regulatory burdens for power reactor facilities that are permanently shutdown and in the process of decommissioning. NRC has determined that there is a need to modify its existing insurance coverage and financial protection

regulations for nuclear power reactors because these regulations currently specify the same on-site and off-site requirements regardless of whether a power reactor is permanently shutdown or operating, and thus do not take into consideration the reduced risk associated with PSD plants. Rather, reduced insurance coverage for these plants has traditionally been allowed on a case-by-case basis through the exemption process. In addition, the existing requirements for off-site financial protection apply to power reactors with a specified "rated capacity" in terms of electrical kilowatts but do not account for the fact that PSD reactors no longer operate at any rated capacity.

NRC is proposing to adjust the on-site insurance coverage requirements under 10 CFR 50.54(w) and the off-site financial protection requirements under 10 CFR 140.11 on a generic basis for PSD reactors. Specifically, NRC is proposing to allow power reactor licensees to reduce their on-site and off-site liability coverage, without resorting to the exemption process, based on several different reactor configurations that encompass spent fuel characteristics and storage modes following permanent shutdown.[(21)] These configurations and the associated coverage levels are described below:

- Reactor Configuration 1: In this configuration, the reactor is defueled and permanently shutdown, but spent fuel in the spent fuel pool is susceptible to a zircaloy cladding fire if the water in the pool is lost. This configuration encompasses the period commencing immediately after the offload of the core and ending just prior to when the decay heat of the hottest assemblies is low enough so that no rapid zircaloy oxidation would take place and the fuel cladding would remain intact in the event of loss of water from the spent fuel pool. NRC's preliminary analysis indicates that, in order to prevent fuel rod cladding failure leading to a zircaloy cladding fire given the loss of all spent fuel pool water, the resulting rod cladding temperature must not exceed 565C. NRC's analysis also estimates that, for typical reactors, the spent fuel would be sufficiently cool so as to prevent the cladding temperature from exceeding 565C in the event of a loss of all spent fuel pool water after a decay period of approximately 7 months for BWRs and approximately 17 months for PWRs. Once a sufficient cooling period for the spent fuel has elapsed after reactor shutdown, the potential zircaloy cladding fire sequence would no longer be a concern because, in an emergency situation, air would cool the spent fuel sufficiently to avoid zircaloy cladding combustion.

During reactor Configuration 1, licensees would be required to maintain on-site insurance coverage and off-site financial protection at the levels currently required by 10 CFR 50.54(w) and 10 CFR 140.11, respectively. This is because the radiological consequences during this stage of permanent shutdown approximate the magnitude of a severe core damage accident.

- Reactor Configuration 2: In this configuration, the reactor is defueled and permanently shutdown, and spent fuel is in the spent fuel pool but is not susceptible to a zircaloy cladding fire or gap release caused by an incipient fuel cladding failure in the event the pool is drained accidentally. In reactor Configuration 2, the spent fuel can be stored on a long term basis in the spent fuel pool without the possibility of initiating a zircaloy fire or significant fuel cladding failure. However, the possibility exists for a fuel handling accident in the spent fuel pool, and the site may contain a significantly large inventory of liquid radioactive waste, activated reactor components, and contaminated structural materials. The radioactive inventory during this configuration may change depending on the licensee's proposed shutdown activities and schedule.

During reactor Configuration 2, licensees would be allowed to reduce both their on-site and off-site financial protection coverage as long as there are no operating reactors on the site. Specifically, for a reactor in Configuration 2, licensees would be allowed to reduce their on-site insurance coverage to a minimum amount of $50 million to recover from a fuel handling accident or a release of cooling water from the spent fuel pool. Licensees would also be allowed to reduce their off-site financial protection to the amount of $100 million, based on the potential for significant judgments or settlements resulting from litigation and to protect the Federal government from indemnity claims. However, licensees would be allowed to withdraw from the secondary financial protection layer provided under the Price-Anderson Act.

- Reactor Configuration 3: In this configuration, the reactor is permanently shutdown and no spent fuel is in the reactor or the spent fuel pool. All spent fuel has been removed to an off-site or on-site dry storage ISFSI or to a DOE high level repository. The remaining radioactive inventory depends on the decommissioning status and will include liquid radioactive waste, activated reactor components, and contaminated structural materials. For this configuration, the potential for a radiological incident is primarily focused on mobile sources of radioactivity onsite at permanently shutdown nuclear reactors.

For a reactor in Configuration 3, licensees would be allowed to reduce their on-site insurance coverage to a minimum amount of $50 million (to the same minimum level permitted under reactor Configuration 2), if there are no operating reactors on the site, to account for a rupture of a large (i.e., greater than 1,000 gallons), slightly-contaminated-liquid storage tank. Licensees would also be allowed to further reduce their off-site financial protection to the amount of $50 million, based on the potential for significant judgments or settlements resulting from litigation and to protect the Federal government from indemnity claims. The off-site requirement is reduced from that required in reactor Configuration 2 because the liability risk is considered to be less in reactor Configuration 3. As in reactor Configuration 2, the secondary financial protection layer would no longer be required.

- Reactor Configuration 4: In this configuration, the reactor is permanently shutdown and no spent fuel is in the reactor or the spent fuel pool. All spent fuel has been removed to an off-site or on-site dry storage ISFSI or to a DOE high level repository. Unlike reactor Configuration 3, however, the reactor site has only a small amount (i.e., less than 1,000 gallons) of mobile sources of radioactivity (e.g., contaminated liquids) onsite. Finally, this configuration also covers the period during which the licensee has cleaned the reactor site to unrestricted release levels and is awaiting a confirmatory survey for termination of the license.

For a reactor in Configuration 4, licensees would be allowed to reduce their on-site insurance coverage to a minimum amount of $25 million, if there are no operating reactors on the site, to account for a rupture of a less-than-1,000-gallon, slightly-contaminated-liquid storage tank. This on-site coverage for the reactor may be eliminated, however, when the licensee has cleaned the site to unrestricted release levels and is awaiting a confirmatory survey for license termination. The Commission has issued a proposed License Termination Rule. If that rule becomes final it would prescribe the requirements that apply to establishment of funds that may be required at license termination. Licensees would also be allowed to further reduce their off-site financial protection to the amount of $25 million based on the continued potential for claims from asserted off-site consequences and to minimize the possibility

that Federal indemnification would be required. As in reactor Configurations 2 and 3, the secondary financial protection layer would no longer be required.

NRC is also proposing to modify 10 CFR 140.11 to indicate that a PSD nuclear power reactor has a rated capacity of zero. The effect of this modification would be that, once a shutdown reactor's spent fuel has cooled to the point where the spent fuel cladding temperature would not exceed 565C in the event of a loss of water from the spent fuel pool, the licensee would be allowed to (1) reduce its primary off-site financial protection level and (2) cease its participation in the secondary financial protection system under 10 CFR 140.11(a)(4).

Environmental Considerations

The proposed rule, if implemented by NRC, would reduce the burden of existing requirements on nuclear power reactor licensees by allowing them to reduce their on-site and off-site liability coverage, without resorting to the exemption process, based on several different reactor configurations that encompass spent fuel characteristics and storage modes following permanent shutdown. The proposed rule would also clarify that a PSD nuclear power reactor has a rated capacity of zero.

The proposed regulatory changes, which apply only to nuclear power reactors that have permanently ceased operations, would require no changes in hardware, procedures, organization, or operation of nuclear power reactors. The proposed requirements would not affect the safety provided by NRC's requirements for nuclear power reactor operation/shutdown and license termination because of the significantly reduced risks to the public health and safety in reactor Configurations 2, 3, and 4. In addition, the proposed modifications would not affect the likelihood, magnitude, or consequences of accidents at nuclear power reactor facilities. While the modifications would reduce the levels of financial protection available under the regulations to pay for environmental or other consequences that may result from accidents at PSD reactors, NRC believes the reduced coverage levels are fully adequate and commensurate with the reduced consequences of potential accidents at PSD reactors and, therefore, that the environment will not be negatively affected. Based on these factors, NRC has determined that the proposed rulemaking would have no significant impacts on the quality of the environment.

The Honorable James M. Inhofe, Chairman
Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety
Committee on Environment and Public Works
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

The NRC has sent to the Office of the Federal Register for publication and comment the enclosed proposed amendments to the Commission's rules in

10 CFR Part 50 and 10 CFR Part 140. The amendments, if adopted, would specify levels of liability coverage that would be required of licensees that meet specified reactor configurations during permanent shutdown of nuclear power reactors. This would allow nuclear reactor licensees a reduction in onsite and offsite liability coverage during permanent shutdown without resorting to the exemption process.

The proposed rule would amend 10 CFR 50.54(w) to allow nuclear reactor licensees to lower the onsite insurance requirements based on several different configurations that encompass spent fuel characteristics and storage modes following permanent shutdown. In parallel, offsite financial protection requirements as specified in 10 CFR 140.11 would also be adjusted to allow licensees to lower their primary insurance coverage and be able to withdraw from the industry retrospective rating plan, based on satisfying the requirements specified for the same configurations during permanent shutdown. In addition, the proposed offsite insurance requirements would continue to provide the Federal Government protection from indemnity claims even though the NRC staff considers that such events would be rare and would have negligible offsite consequences.

Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure: Federal Register Notice

cc: Senator Bob Graham

The Honorable James M. Inhofe, Chairman
Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety
Committee on Environment and Public Works
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The proposed rule would amend 10 CFR 50.54(w) to allow nuclear reactor licensees to lower the onsite insurance requirements based on several different configurations that encompass spent fuel characteristics and storage modes following permanent shutdown. In parallel, offsite financial protection requirements as specified in 10 CFR 140.11 would also be adjusted to allow licensees to lower their primary insurance coverage and be able to withdraw from the industry retrospective rating plan, based on satisfying the requirements specified for the same configurations during permanent shutdown. In addition, the proposed offsite insurance requirements would continue to provide the Federal Government protection from indemnity claims even though the NRC staff considers that such events would be rare and would have negligible offsite consequences.

Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure: Federal Register Notice

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cc: Senator Bob Graham

The Honorable Dan Schaefer, Chairman
Subcommittee on Energy and Power
United States House of Representatives
Washington, DC 20515

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The proposed rule would amend 10 CFR 50.54(w) to allow nuclear reactor licensees to lower the onsite insurance requirements based on several different configurations that encompass spent fuel characteristics and storage modes following permanent shutdown. In parallel, offsite financial protection requirements as specified in 10 CFR 140.11 would also be adjusted to allow licensees to lower their primary insurance coverage and be able to withdraw from the industry retrospective rating plan, based on satisfying the requirements specified for the same configurations during permanent shutdown. In addition, the proposed offsite insurance requirements would continue to provide the Federal Government protection from indemnity claims even though the NRC staff considers that such events would be rare and would have negligible offsite consequences.

Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure: Federal Register Notice

cc: Representative Ralph Hall

The Honorable Dan Schaefer, Chairman
Subcommittee on Energy and Power
United States House of Representatives
Washington, DC 20515

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The proposed rule would amend 10 CFR 50.54(w) to allow nuclear reactor licensees to lower the onsite insurance requirements based on several different configurations that encompass spent fuel characteristics and storage modes following permanent shutdown. In parallel, offsite financial protection requirements as specified in 10 CFR 140.11 would also be adjusted to allow licensees to lower their primary insurance coverage and be able to withdraw from the industry retrospective rating plan, based on satisfying the requirements specified for the same configurations during permanent shutdown. In addition, the proposed offsite insurance requirements would continue to provide the Federal Government protection from indemnity claims even though the NRC staff considers that such events would be rare and would have negligible offsite consequences.

Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

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cc: Representative Ralph Hall

NRC ISSUES PROPOSED RULE TO REDUCE INSURANCE

COVERAGE FOR SHUT-DOWN NUCLEAR REACTORS

The Nuclear Regulatory Commission is proposing to amend its regulations reducing onsite insurance liability coverage and offsite financial protection requirements for nuclear power plants that have been permanently shut down. The amendment is being proposed because of the reduced risks associated with a permanently shut down plant, after an appropriate spent fuel cooling period. Currently, licensees at permanently shut down facilities must request an exemption from the regulations in order to obtain a reduced level of insurance coverage. The proposed rule would eliminate the need for such an exemption.

Currently, licensees must obtain approximately $1 billion of insurance for each power reactor site to stabilize and decontaminate a reactor, and to provide coverage for onsite damage in the event of an accident. They are also required, under the Price-Anderson Act, to obtain a minimum of $200 million for financial protection and to participate in a secondary financial protection system against damages and injuries which could occur offsite.

Under the proposed rule, the amount of insurance coverage required onsite would be reduced downwards to $50 million or less, and the amount of coverage required offsite would be reduced to $100 million or less. These amounts would be based on certain configurations of the reactor and the spent fuel stored onsite. For instance, reactors with spent fuel in the storage pool and fuel that is still above a certain temperature would require more insurance than reactors that have no spent fuel in the pool because of the possibility of a fuel cladding fire if the pool is accidentally drained. In addition, sites with an inventory of liquid radioactive waste, radioactive reactor components, or contaminated structural material, may require higher insurance coverage than sites without such materials. The proposed rule does not address the financial protection reqirements for Independent Spent Fuel Storage Installations (ISFSIs). That subject will be addressed after efforts dealing with technical and licensing issues for ISFSIs.

The proposed rule will be published for comment shortly in the Federal Register. Comments may be submitted electronically through the NRC Electronic Bulletin Board on FedWorld, and through NRC's interactive rulemaking web site on its homepage at http://www.nrc.gov

Comments may also be sent by mail to the Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C., 20555-0001, Attention: Rulemakings and Adjudications Staff.

[1] SECY-96-256, "Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR

140.11," December 17, 1996 and revised January 9, 1997. The staff's recommended course of action was approved by the Commission by an SRM dated January 28, 1997.

[2] NRC's Rulemaking Plan also addresses a petition submitted by the North Carolina Public Staff Utilities Commission. The petition requested a reduction in or elimination of the $1.06 billion in insurance for on-site reactor stabilization and accident decontamination, currently required by 10 CFR 50.54(w), in instances when all nuclear fuel has been removed from the site. The petitioner also requested that the requirement for off-site primary and secondary liability coverages required under 10 CFR 140.11(a)(4) be reduced or eliminated for shutdown reactors when no nuclear fuel is on the reactor site.

[3] Experience from the accident at TMI-2 has shown that significant settlements can be involved even though the off-site consequences may be negligible.

[4] *Regulatory Analysis Technical Evaluation Handbook, Final Report*, NUREG/BR-0184, Office of Nuclear Regulatory Research, January 1997.

[5] *Nuclear Regulatory Commission Information Digest*, NUREG-1350, Volume 7, U.S. Nuclear Regulatory Commission, Office of the Comptroller, March 1995.

[6] *Annual Survey of Nuclear Decommissioning Cost Estimates and Funding Policies, Public Utility Survey*, Goldman Sachs, August 1995, Table 32. (A more recent version of this survey is not currently available.)

[7] While these cost savings can be quantified, these values actually are attributable to the proposed options only indirectly because licensees are not currently required to obtain exemptions for their PSD reactors.

[8] The insurance premiums that would be paid by licensees under the current rule reflect the assumption that 90 percent (and, for sensitivity analysis purposes, 100 percent) of licensees at sites without exemptions would obtain exemptions following shutdown. In addition, for the five PSD reactors that have already been through the exemption process (i.e., Humboldt Bay 3, LaCrosse, Rancho Seco, Trojan, Yankee-Rowe), the combined on-site and off-site insurance coverage limits applicable to those reactors are assumed to either stay the same or decline depending on whether the combined on-site and off-site insurance coverage limits in the proposed rule are higher or lower than those currently in effect for those reactors.

[9] Kurland, Orin M., "Who the nuclear insurers are," *Risk Management*, vol. 40, no. 6, June 1993, p. 44.

[10] SECY-96-256, "Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11," December 17, 1996.

[11] The three curves for on-site coverage were used to derive insurance premium estimates for sites with one reactor, two reactors, and three reactors, respectively. Only one curve was developed for off-site coverage because the data on premiums for this type of coverage did not reflect variation based on the number of reactors at a site.

[12] A discount rate of 7 percent was used in accordance with NRC's *Regulatory Analysis Technical Evaluation Handbook,* January 1997, page B-2.

[13] To convert dollar figures to 1997 dollars, the analysis uses inflation adjustment factors that are based on GDP implicit price deflators as reported in *Economic Indicators*, U.S. Government Printing Office, Washington, D.C., April 1997.

[14] NUREG/CR-6174, "Revised Analyses of Decommissioning for the Reference Boiling Water Reactor Power Station: Effects of Current Regulatory and Other Considerations on the Financial Assurance Requirements of the Decommissioning Rule and on Estimates of Occupational Radiation Exposure," PNL-9975, Vol. 1, Main Report, Final Report, July 1996, pp. 3.2 and 4.5.

[15] NUREG/CR-5884, "Revised Analyses of Decommissioning for the Reference Pressurized Water Reactor Power Station: Effects of Current Regulatory and Other Considerations on the Financial Assurance Requirements of the Decommissioning Rule and on Estimates of Occupational Radiation Exposure," PNL-8742, Vol. 1, Main Report, Final Report, November 1995, pp. 3.2 and 4.4.

[16] The duration of reactor Configuration 2 is calculated as the difference between the length of the pool storage period and the length of reactor Configuration 1.

[17] As noted in Section 3.2.3, the $48 million savings estimate assumes that sites obtaining exemptions would be required to maintain $75 million in on-site coverage and $100 million in off-site coverage. If the on-site and off-site exemption levels were set at $50 million and $75 million, respectively, the potential savings to licensees would fall to $30 million. If the on-site and off-site exemption levels were set at $25 million and $50 million, respectively, the potential savings would fall to $11 million.

[18] The current maximum obligation for secondary financial protection for a licensee in the industry retrospective rating plan is $75.5 million with respect to any nuclear incident. In total, the financial protection for off-site liability for any incident equals the primary layer of $200 million plus the secondary layer of $75.5 million multiplied by the number of licensed power reactors with a rated capacity of 100,000 kWe or higher. This coverage currently amounts to approximately $8 billion.

[19] Items 1 and 2 of the SRM were addressed previously in a memorandum dated August 4, 1993, from the EDO to the Commission.

[20] SECY-96-256, "Changes to the Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w) and 10 CFR 140.11," December 17, 1996. The staff's recommended course of action was approved by the Commission by an SRM dated January 28, 1997.

[21] A key distinction between NRC's existing coverage levels and the coverage levels in the proposed rule is that, whereas the existing coverage levels apply on a per-site basis, the proposed coverage levels would apply on a per-reactor basis.