RULEMAKING ISSUE
NOTATION VOTE

March 1, 2012 SECY-12-0034

FOR: The Commissioners

FROM: R. W. Borchardt
Executive Director for Operations

SUBJECT: PROPOSED RULEMAKING – 10 CFR 50.46c: EMERGENCY CORE COOLING SYSTEM PERFORMANCE DURING LOSS-OF-COOLANT ACCIDENTS (RIN 3150-AH42)

PURPOSE:

To obtain Commission approval to publish for public comment a proposed rule that would amend the NRC's current requirements governing emergency core cooling systems (ECCS), which are set forth in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.46.

SUMMARY:

The staff has prepared a proposed rule (Enclosure 1) that would replace the current regulations for ECCS, found in § 50.46, by establishing performance-based requirements. The proposed rulemaking would incorporate recent research findings which identified previously unknown cladding embrittlement mechanisms and expanded the U.S. Nuclear Regulatory Commission's (NRC or the Commission) knowledge of previously identified mechanisms. The proposed rule would also expand applicability of ECCS acceptance criteria to all light water reactors, regardless of fuel design or cladding materials (as per Commission direction, and the request of petition for rulemaking (PRM) PRM-50-71). Finally, the proposed rule would require licensees to evaluate the thermal effects of crud and oxide layers which may have developed on the fuel cladding during normal operation. This requirement would address a request of PRM-50-84.

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The NRC research program identified that zirconium-based fuel cladding materials may be subject to embrittlement at a lower combination of temperature and level of oxygen absorption than currently allowed under the current regulations due to absorption of hydrogen during normal operation. Thus, under the current regulations, post quench ductility (which is necessary to ensure coolable core geometry)[1] is not assured following a postulated LOCA. The proposed rulemaking is necessary to ensure adequate protection to the public health and safety by restoring that level of protection (i.e., reasonable assurance of adequate protection) which the NRC thought would be achieved (throughout the entire term of licensed operation) by the current rule. Therefore, the NRC has determined that the proposed rule is necessary to ensure that the facility provides adequate protection to the health and safety of the public, and that a backfit analysis as described in § 50.109(a)(3) and (b) need not be prepared under the exception in § 50.109(a)(4)(ii).

BACKGROUND:

In SECY-98-300, "Options for Risk-Informed Revisions to 10 CFR Part 50 – 'Domestic Licensing of Production and Utilization Facilities,'" dated December 23, 1998 (ADAMS Accession No. ML992870048), the NRC began to explore approaches to risk-informing its regulations for nuclear power reactors. The industry identified two regulations which would benefit from risk-informed changes: §§ 50.44 and 50.46. On March 23, 2003, in response to SECY-02-0057, "Update to SECY-01-0133, 'Fourth Status Report on Study of Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50 (Option 3) and Recommendations on Risk-Informed Changes to § 50.46 (ECCS Acceptance Criteria),'" the Commission issued a staff requirements memorandum (SRM) (ADAMS Accession No. ML030910476) directing the NRC staff to move forward to risk-inform its regulations in a number of specific areas. Included in this SRM was the direction to the staff to modify the ECCS acceptance criteria to provide for a performance-based approach to meeting the ECCS requirements in § 50.46.

Additionally, on March 14, 2000, as amended on April 12, 2000, the Nuclear Energy Institute (NEI) submitted a PRM (ADAMS Accession No. ML010880245), docketed as PRM-50-71 (65 FR 34599), requesting that the NRC amend its regulations in § 50.44 and 50.46 to expand the applicability of these regulations beyond the two zirconium-based fuel claddings identified in the regulations (zircaloy and ZIRLO™). The petition noted that these two regulations apply to only zircaloy and ZIRLO™, but that reactor fuel vendors had developed new cladding materials other than the two acknowledged by the regulations, and that in order for licensees to use these new materials under the existing regulations, licensees had to request NRC approval of exemptions from §§ 50.44 and 50.46.

Separately from the Commission's efforts to modify its regulations to provide a more risk-informed, performance-based regulatory approach, the NRC had also undertaken a fuel cladding research program intended to investigate the behavior of high exposure fuel cladding

[1] The Commission concluded, as part of the 1973 Emergency Core Cooling System rulemaking, that retention of ductility in the zircaloy cladding material was determined to be the best guarantee of its remaining intact during the hypothetical loss-of-coolant accident, thereby maintaining a coolable core geometry. *See Acceptance Criteria for Emergency Core Cooling Systems for Light-Water-Cooled Nuclear Power Reactors,* CLI-73-39, *at page 1098* (December 28, 1973).

under accident conditions. The effects of both alloy composition and fuel burnup (the extent to which fuel is used in a reactor) on cladding embrittlement (i.e., loss of ductility) under accident conditions were studied in this research program. The research identified new cladding embrittlement mechanisms and expanded the NRC's knowledge of previously identified mechanisms. One of the major findings of the research program was that hydrogen, which is absorbed in the cladding during normal operation, has a significant influence on the embrittlement during a postulated LOCA. The research findings have been summarized in Research Information Letter (RIL) 0801, "Technical Basis for Revision of Embrittlement Criteria in 10 CFR 50.46" (ADAMS Accession No. ML081350225).

On March 15, 2007, Mark Leyse submitted a PRM to the NRC (PRM-50-84, ADAMS Accession No. ML070871368). The petitioner requests rulemaking in three specific areas, including the consideration of the thermal effects of crud and oxide layers and the inclusion of a maximum allowable percentage of hydrogen content in [fuel rod] cladding. A notice of receipt for the petition was published in the *Federal Register* (FR) on May 12, 2007 (72 FR 28902), and public comments were requested. After evaluating the public comments, the NRC resolved the petition by deciding that each of the petitioner's issues should be considered in the rulemaking process. This decision was published in the FR on November 25, 2008 (73 FR 71564).

The technical basis for this rulemaking was published for public comment in the FR on July 31, 2008 (73 FR 44778). Comments received can be found at http://www.regulations.gov by searching on Docket ID NRC-2008-0332. Since 2002, the NRC has met with the Advisory Committee on Reactor Safeguards (ACRS) multiple times to discuss the progress of the LOCA research program. A table which lists the dates and ADAMS accession numbers of the relevant ACRS meetings and associated correspondence is located in Section II, "Background," of the *Federal Register* Notice (FRN) for the proposed rule Enclosure 1.

DISCUSSION:

The proposed rule would establish a general, performance-based rule governing ECCS performance for light water nuclear power reactors (LWR), regardless of fuel design or cladding material. This represents a significant change from the current ECCS regulations, which apply to "uranium oxide pellets within cylindrical zircaloy or ZIRLO™ cladding." Because ECCS requirements must be expressed independent of fuel type, and because ECCS performance ultimately must be based upon maintaining the fuel used in a safe (analyzed) condition, the new rule separates the ECCS requirements from the need for the applicant/licensee to establish the *fuel system design performance criteria* constituting a safe condition.

In proposed § 50.46c, the specified performance objectives of the systems, structures, and components of the ECCS are to provide residual heat removal during and following a postulated LOCA. As with the current regulations, the ECCS performance is demonstrated by NRC-approved evaluation models in proposed § 50.46c. Specific performance requirements and analytical limits have been established for fuel designs consisting of uranium oxide or mixed uranium-plutonium oxide pellets within zirconium cladding alloys which account for recent research findings. New performance objectives and analytical limits may be necessary for other fuel designs to take into consideration all degradation mechanisms and any unique features of the particular fuel system for which the ECCS is trying to cool.

The proposed rule follows the general regulatory approach of the existing regulations by establishing non-prescriptive, performance-based regulatory language for demonstrating acceptable ECCS system performance and determining the fuel's performance characteristics. In addition, because the embrittlement criteria in the current regulations for fuel with zirconium-based cladding continue to be acceptable (although incomplete, as discussed below) the proposed rule retains the current regulation(s)' 2200 °F limit for fuel with zirconium-based cladding as well as limitations on oxidation and hydrogen generation.

The organization and CFR designations of the NRC's requirements governing ECCS (currently in § 50.46) and reactor cooling venting systems (currently in § 50.46a) are expected to change, as a result of: 1) ongoing rulemaking activities; 2) the proposed implementation schedule for those activities; and 3) the need to maintain the current requirements in place for those licensees that have not transitioned to the new requirements (following the implementation schedule which would be provided in the final rule). A detailed description of the transition of CFR designations is provided in Section VII, "Section by Section Analysis," of the FRN for the proposed rule.

ECCS Performance Criteria

The current ECCS rule is specific to uranium oxide pellets within cylindrical zircaloy or ZIRLO™ cladding and therefore, the current rule does not provide specific performance objectives for the ECCS. In proposed § 50.46c, the specified performance objectives of the systems, structures, and components of the ECCS are to provide residual heat removal during and following a postulated LOCA.

Zirconium-clad Uranium Fuel Assemblies

The existing ECCS performance rule is specific to uranium oxide pellets within cylindrical zircaloy or ZIRLO™ and requires that the peak cladding temperature remain below 2200 °F and that the calculated total oxidation of the cladding nowhere exceed 0.17 times the total cladding thickness before oxidation in order to prevent cladding embrittlement. While the research findings confirmed that the peak cladding temperatures should remain below 2200 °F, the findings identified that high exposure fuel can embrittle at total calculated oxidation levels less than 17 percent. In the proposed rule, the objectives and methodology for evaluating ECCS performance for uranium oxide or mixed uranium-plutonium oxide pellets within cylindrical zirconium-alloy cladding remains largely the same as the existing ECCS performance regulations. However, the criteria in the existing ECCS performance regulations are technically appropriate only to zirconium-based cladding. The proposed regulation provides a technology-independent, performance-based approach for developing design-specific criteria which account for the effects of exposure.

For uranium oxide or mixed uranium-plutonium oxide pellets within cylindrical zirconium-alloy cladding, the proposed rule would require analytical limits for peak cladding temperature and integral time at temperature to be developed which account for the effects of exposure. A Draft Regulatory Guide (DG) was developed to provide a test method to measure embrittlement behavior for zirconium alloys. Another DG was developed to provide a method for using test data to develop and support analytical limits for peak cladding temperature and integral time at temperature which account for the effects of exposure. The findings of the NRC's fuel cladding

research program also developed significant understanding of a phenomenon termed "breakaway oxidation" which is not addressed with the existing ECCS performance regulations. The proposed rule would require an analytical limit to prevent breakaway oxidation under postulated LOCA conditions. A DG was developed to provide a test method for measuring breakaway oxidation behavior.

Long Term Cooling

The existing ECCS performance regulations require that long-term temperature be maintained "at an acceptably low value." The proposed rule would add clarity and define a performance-based metric to determine an acceptably low temperature. This would be achieved by requiring that a specified limit on long-term peak cladding temperature be established which would preserve a measure of cladding ductility throughout the period of long-term demonstration. This limit would have to be reviewed and approved by the NRC for each cladding type. Enclosure 1 contains a specific request for public comment on this performance objective, as well as whether the proposed rule should alternatively establish an analytical limit on long-term fuel rod cladding temperature related to observed corrosion behavior.

NEI PRM

The proposed rule addresses PRM-50-71 submitted by NEI in 2000 (ADAMS Accession No. ML010880245) by removing the terms "zircaloy" and "ZIRLO™" from § 50.46. This would eliminate the need for a licensee to seek an exemption to use cladding alloys other than zircaloy or ZIRLO™, thereby facilitating the introduction of advanced zirconium-based alloy claddings.

PRM Submitted by Mr. Mark Leyse

The proposed rule also addresses PRM-50-84 submitted by Mr. Mark Leyse by requiring, in explicit terms, licensees to evaluate the thermal effects of crud and oxide layers that accumulate on the fuel cladding during plant operation.

Applicability of Ductility-Based Analytical Limits in the Rupture Region

During a postulated LOCA, fuel rods may be predicted to balloon and rupture as a result of elevated cladding temperature and differential pressure (difference between rod internal pressure and system pressure, which is decreasing due to a break in pressure boundary). This flawed section of the fuel rod may experience degradation mechanisms beyond oxygen diffusion embrittlement encountered in the remaining portions of the fuel rod, including significant amounts of hydrogen uptake from steam entering the fuel rod through the rupture. The Regulatory Guidance developed to support implementation of this performance-based rule provides a test method to measure embrittlement behavior for zirconium alloys which utilizes uniform unflawed cladding segments, and these measurements may not fully represent the region of the fuel rod surrounding the cladding rupture. Furthermore, the overall goal of preserving cladding ductility may not apply to the rupture area that contains non-uniform distributions of flaws, cladding thickness, hydrogen distribution, and oxidation levels.

To investigate the mechanical behavior of ruptured fuel rods, the NRC conducted integral LOCA testing, designed to induce ballooning and rupture, on as-fabricated and hydrogen-charged cladding specimens and high burnup fuel rod segments exposed to high temperature steam

oxidation followed by quench. The integral LOCA testing confirms that continued exposure to a high temperature steam environment weakens the already flawed region of the fuel rod surrounding the cladding rupture. Hence, limitations on integral time at temperature are necessary to preserve an acceptable amount of mechanical strength and fracture toughness. In addition, this research demonstrated that the degradation in strength and fracture toughness with prolonged exposure to steam oxidation was enhanced with pre-existing cladding hydrogen content. Applying the hydrogen-based, analytical limits acceptable for the non-ballooned section of the fuel rod to limit oxidation in the ballooned and ruptured region was determined to be sufficient to preserve reasonable behavior of the ballooned and ruptured region when double-sided oxidation and wall thinning were taken into account. Section V, "Proposed Requirements for ECCS Performance during LOCAs," of Enclosure I elaborates on this position and provides further discussion of the staff considerations regarding the applicability of ductility-based analytical limits in the burst region.

The Office of Nuclear Regulatory Research (RES) developed a technical report titled "Mechanical Behavior of Ballooned and Ruptured Cladding," which addresses the applicability of the hydrogen-based cladding embrittlement correlation in the rupture region (ADAMS Accession No. ML12048A475) and serves as the technical basis for the treatment of ballooned and ruptured cladding in LOCA analysis. The staff presented the research results, and its evaluation of the results, to the ACRS in June and July 2011.

Fuel Fragmentation, Relocation, and Dispersal

In-pile and out-of-pile integral LOCA testing conducted on irradiated fuel rod segments have shown that fuel rods which experience cladding ballooning and rupture are likely to exhibit fuel pellet fragmentation. Depending on several variables including balloon strains, rupture opening, and fuel rod exposure, fragmented fuel particles may potentially relocate within the enlarged ballooned and ruptured region and/or disperse outside of the fuel rod. The current § 50.46 and proposed § 50.46c recognize and accommodate fuel rod burst by limiting peak cladding temperature and integral time at temperature to reduce further degradation of mechanical properties within the burst region. However, these regulations will not prevent ballooning and rupture and therefore, may not guarantee the retention of fragmented fuel within the fuel rod.

To investigate these phenomena and narrow down factors which may impact the sensitivity of fuel rods to fuel fragmentation, relocation, and dispersion, RES is developing a technical report on this subject. Further research is planned by the staff to understand the sensitivities of these phenomena and their potential significance. The staff's consideration of this matter is being considered within the Generic Issues program. Thus, the staff does not have a sufficient technical basis for concluding whether and in what manner these phenomena must be addressed. Therefore, these phenomena are not included in the § 50.46c proposed rule. The results of the ongoing research for fuel fragmentation, relocation, and dispersion may require additional changes to the provisions of the proposed § 50.46c rule to establish appropriate requirements for consideration of those phenomena. Such rule changes may require licensees and fuel vendors to perform substantial reanalysis of their ECCS and/or fuel systems. Nonetheless, the staff recommends that the § 50.46c rulemaking proceed because: (i) the schedule for staff evaluation of the applicability and significance of these phenomena, the need for additional rulemaking, and the date for development and implementation of such rulemaking is uncertain, and (ii) implementation of a final § 50.46c rule would relieve the not insignificant burden on both licensees and the NRC staff to continue to confirm plant safety using interim

processes (i.e., to ensure that current ECCS and fuel system designs are being operated safely with respect to those matters which would be addressed by the § 50.46c rule).

Reporting and Corrective Action Requirements

The proposed rule would clarify and expand the existing reporting and corrective action requirements, based upon recurring issues involving the interpretation of the current regulations' requirements. The proposed rule would distinguish three possible combinations of reporting criteria based upon predicted response, level of significance (i.e., significant or not significant, as defined by the proposed rule), and whether the error, change or operation would result in any exceeded acceptance criteria. For each scenario, the proposed rule provides the required actions, reports, and a time frame for providing the necessary reports. Section V, "Proposed Requirements for ECCS Performance during LOCAs," of Enclosure 1 describes the three scenarios, and requirements for each, in detail.

To improve the content, communications, and to inform the staff's response to future changes to or errors discovered in ECCS evaluation models, the proposed rule would expand the definition of a significant change or error to include integral time at temperature. Presently, the reporting requirements in 10 CFR 50.46(a)(3) require that licensees report changes to or errors in their evaluation model and their impact on predicted peak cladding temperature only. In addition, the proposed rule would require licensees to report the results of breakaway oxidation for each reload batch.

Applicability to Various Types of Licensees and Applicants

The proposed rule would be applicable to applicants for and holders of construction permits, operating licenses, combined licenses and standard design approvals and by applicants for certified designs and for manufacturing licenses. The only exception to the rule's applicability would be for any licensee which has submitted certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, in accordance with § 50.82(a)(1).

Operating Plant Safety

In response to the research findings in Research Information Letter (RIL) 0801, "Technical Basis for Revision of Embrittlement Criteria in 10 CFR 50.46" (ADAMS Accession No. ML081350225), the NRC performed a preliminary safety assessment of currently operating reactors (ADAMS Accession No. ML081620302 (Proprietary), ML090340073 (Non-Proprietary)). This assessment found that, due to measured cladding performance under LOCA conditions, realistic fuel rod power history, and current analytical conservatisms, sufficient safety margin exists for operating reactors. Therefore, the staff determined that immediate regulatory action was not required, and that changes to the ECCS acceptance criteria to account for these new findings can reasonably be addressed through the rulemaking process.

Recognizing that finalization and implementation of the new ECCS requirements would take several years, the staff decided that a more detailed safety assessment was necessary. As a voluntary industry effort and alternative to responding to an NRC request for information under 10 CFR 50.54(f), the PWR Owners Group (ADAMS Accession No. ML11139A309) and BWR Owners Group (ADAMS Accession No. ML111950139), under the auspices of NEI, submitted

ECCS margin assessment reports. After grouping plants based on similar design features, cladding alloys, or evaluation models and defining cladding alloy-specific analytical limits, the Owners Group (OG) reports identified, where necessary, analytical credits or performed new LOCA analyses to demonstrate that the limiting plant within each grouping had positive margin relative to the research findings. The NRC conducted an audit of the OG reports and supporting GEH, AREVA, and Westinghouse engineering calculations. Based on the OG reports and supplemental information collected during the audits, the staff was able to confirm, for every operating reactor, current safe operation. As documented in the audit report and safety assessment (ADAMS Accession No. ML12041A078), the staff intends to verify, on an annual basis, continued safe operation until each licensee has implemented the new ECCS requirements (*see* discussion on *Implementation* below).

Implementation

Implementation of the proposed rule will require many steps, including model development by vendors, subsequent NRC review of these models, plant-specific ECCS performance analyses, and NRC review of license amendment requests/updated final safety analysis reports. The staff has developed a three-track implementation approach to reduce the burden of implementing this rule on both the NRC staff and industry. Nuclear power plants are grouped into one of these three tracks based on the number of steps required to demonstrate compliance with the proposed rule and each track has a distinct implementation time frame related to this level of effort. Using this implementation approach, licensees in the third track would be required to fully comply with the new requirements by five years after the effective date of the rule.

Staff Resources Required to Support Implementation

The NRC staff estimates that the Office of Nuclear Reactor Regulation (NRR) and the Office of New Reactors (NRO) will require an estimated average of 3.25 full-time equivalent (FTE)/year to support the five year, staged implementation following the effective date of the rule. These FTEs will be required to review topical reports submitted by the vendors for hydrogen update models and updated LOCA models, and license amendment requests submitted by licensees upon application of these updated models, etc.

Cumulative Effects of Regulation

The staff has fully engaged external stakeholders throughout this rulemaking, beginning with the publication of an Advance Notice of Proposed Rulemaking (ANPR) on August 12, 2009 (74 FR 40767). The ANPR provided interested stakeholders an opportunity to comment on the options under consideration by the NRC during a formal, 75-day public comment period. In addition, the NRC solicited responses to 12 questions based on the following categories: Applicability Considerations, New Embrittlement Criteria Considerations, Testing Considerations, Revised Reporting Requirements Considerations, Crud Analysis Considerations, and Cost Considerations.

In developing this proposed rule, the NRC has had public interaction in areas related to possible implementation approaches for this rule. A public workshop was conducted on April 28-29, 2010. The first day was dedicated to discussing the draft rule language and comment response to major comments; the second day was the start of the related public

discussions on the information exchange necessary for the confirmation of current plant safety. The summary of this public workshop can be found at ADAMS Accession No. ML101300490.

In response to stakeholder feedback, including the BWR and PWR Owner Groups' reports, the staff developed a staged implementation schedule to reduce the burden on the licensees and NRC staff. This is reflected in paragraph (o) and Table 1 of the proposed rule.

Additionally, to address the cumulative effects of regulation, the staff included in the FRN for the proposed rule a request for specific comment on the cost estimates provided in the Regulatory Analysis, implementation schedule, and potential unintended consequences of the proposed rule. Staff is also publishing draft guidance along with the proposed rule: 1) Conducting Periodic Testing for Breakaway Oxidation Behavior (ADAMS Accession No. ML110840089); 2) Testing for Post Quench Ductility (ADAMS Accession No. ML110840283); and 3) Establishing Analytical Limits for Zirconium-Based Alloy Cladding (ADAMS Accession No. ML110871607). The availability of these draft regulatory guides is necessary and essential to the implementation of the proposed, performance-based requirements because they provide guidance on the new provisions of the proposed rule; the availability of these draft regulatory guides meets the intent of SRM-SECY-11-0032, "Consideration of the Cumulative Effects of Regulation in the Rulemaking Process," dated October 11, 2011. In addition to these new draft regulatory guides, the staff has also identified existing guidance[2] which may need to be updated to "conform" the guidance to the proposed requirements (e.g., to add references to specific paragraphs of the proposed rule, add new discussion which explain how the current rule's provisions and existing guidance relate to the new requirements in the proposed rule). The conforming changes, while they would be desirable to ensure that all guidance documents represent a complete, integrated set of guidance on ECCS requirements in §§ 50.46, 50.46a and 50.46c, would not be needed to provide guidance to licensees on how to comply with the proposed rule. Because of the resources and scope of effort required to revise this guidance, the staff has determined that it would not be prudent to revise these guides prior to publication of the proposed rule and receipt of public comments.

RECOMMENDATIONS:

The staff recommends that the Commission:

(1) Approve the enclosed proposed rule (Enclosure 1) for publication in the *Federal Register*.

(2) Note the following:

a. The staff has prepared a draft regulatory analysis for this rulemaking (Enclosure 2).

[2] This guidance includes: Regulatory Guide (RG) 1.157, "Best Estimate ECCS Calculations," RG-1.203, "Transient and Accident Analysis Methods," Standard Review Plan (SRP) 4.2, "Fuel System Design," SRP 4.4, "Thermal and Hydraulic Design," SRP 6.2.1, "Containment Functional Design," SRP 6.3, "Emergency Core Cooling System," SRP 15.0, "Transient and Accident Analyses," SRP 15.02, "Review of Transient and Accident Analyses Methods," and SRP 15.6.5, "Loss-of-Coolant Accidents Resulting from Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary."

b. The staff will publish three draft regulatory guides for public comment concurrent with the publication of the proposed rule.

c. The staff will inform the appropriate congressional committees.

d. The Office of Public Affairs will issue a press release when the NRC publishes the proposed rule in the FR.

RESOURCES:

Estimated resources needs of $22K and 3.3 FTE are included in the fiscal year (FY) 2012 President's Budget and $142K and 3.3 FTE in the FY 2013 Budget Request. If additional resources are required beyond FY 2013, they will be addressed through the Planning, Budget and Performance (PBPM) process.

Office	Product Line	Product	FY 2012 Resources $/FTE	FY 2013 Resources $/FTE
RES	Rulemaking	Rulemaking	$22K/1.0	$142K/1.0
NRO	Rulemaking	Rulemaking	--/ 0.1	--/0.1
NRR	Rulemaking	Rulemaking	--/ 2.0	--/2.0
OGC	Rulemaking	Rulemaking	--/0.1	--/0.1
ADM	Rulemaking	Rulemaking	--/0.1	--/0.1
OIS	Information Management	Information Services	--/0.1	--/0.1
Total:			$22K and 3.4 FTE	$142K and 3.4 FTE

COORDINATION:

This paper has been prepared by NRR. The Office of the Chief Financial Officer has reviewed this Commission paper for resource implications and has no objection. The Office of the General Counsel has no legal objection to this paper. The ACRS is not required to review the proposed rulemaking package, but the Committee requested to review the proposed rulemaking package and prepared a letter. Meetings with the ACRS were held as follows: Sub-Committee (regulatory guidance): May 10, 2011, Sub-Committee (expanded regulatory basis): June 23, 2011, Sub-Committee (rule package): December 15, 2011, Full Committee (regulatory guidance): June 8, 2011, Full Committee (expanded regulatory basis): July 13, 2011, Full Committee (rule): January 19, 2012.

/RA by Martin J. Virgilio for/

R. W. Borchardt
Executive Director
for Operations

Enclosures:
1. *Federal Register* Notice
2. Draft Regulatory Analysis

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1. *Federal Register* Notice
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WITS 200300049/EDATS: SECY-2010-0507
ADAMS Accession No: ML112620346 (Pkg.); ML112520186 (SECY); ML112520249 (FRN); ML112520277 (Reg. Analysis) * via e-mail

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