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Compilation for
First Quarter 1996
January – March

U.S. Nuclear Regulatory Commission

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PREFACE

This compilation consists of bibliographic data and abstracts for the formal regulatory and technical reports issued by the U.S. Nuclear Regulatory Commission (NRC) Staff and its contractors. It is NRC's intention to publish this compilation quarterly and to cumulate it annually. Your comments will be appreciated. Please send them to:

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The main citations and abstracts in this compilation are listed in NUREG number order: NUREG-XXXX, NUREG/CP-XXXX, NUREG/CR-XXXX, and NUREG/IA-XXXX. These precede the following indexes:

Secondary Report Number Index
Personal Author Index
Subject Index
NRC Originating Organization Index (Staff Reports)
NRC Originating Organization Index (International Agreements)
NRC Contract Sponsor Index (Contractor Reports)
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Licensed Facility Index

A detailed explanation of the entries precedes each index.

The bibliographic elements of the main citations are the following:

Staff Report

NUREG-0808: MARK II CONTAINMENT PROGRAM EVALUATION AND ACCEPTANCE CRITERIA. ANDERSON, C. J. Division of Safety Technology. August 1981. 90 pp. 8109140048. 09570:200.

Where the entries are (1) report number, (2) report title, (3) report author, (4) organizational unit of author, (5) date report was published, (6) number of pages in the report, (7) the NRC Document Control System accession number, (8) the microfiche address (for internal NRC use).

Conference Report

NUREG/CP-0017: EXECUTIVE SEMINAR ON THE FUTURE ROLE OF RISK ASSESSMENT AND RELIABILITY ENGINEERING IN NUCLEAR REGULATION. JANERP, J.S. Argonne National Laboratory. May 1981. 141 pp. 8105280299. ANL-81-3. 08632:070.

Where the entries are (1) report number, (2) report title, (3) report author, (4) organization that compiled the proceedings, (5) date report was published, (6) number of pages in the report, (7) the NRC Document Control System accession number, (8) the report number of the originating organization, (9) the microfiche address (for NRC internal use).

Contractor Report

NUREG/CR-1556: STUDY OF ALTERNATE DECAY HEAT REMOVAL CONCEPTS FOR LIGHT WATER REACTORS-CURRENT SYSTEMS AND PROPOSED OPTIONS. BERRY, D.L.; BENNETT, P.R. Sandia Laboratories. May 1981. 100 pp. 8107010449. SAND80-0929. 08912:242.

Where the entries are (1) report number, (2) report title, (3) report authors, (4) organizational unit of authors or publisher, (5) date report was published, (6) number of pages in the report, (7) the NRC Document Control System accession number, (8) the report number of the originating organization (if given), (9) the microfiche address (for NRC internal use).

Grant Report

NUREG/GR-0013: APPLICATIONS OF A NEW MAGNETIC MONITORING TECHNIQUE TO IN SITU EVALUATION OF FATIGUE DAMAGE IN FERROUS COMPONENTS. JILES, D.C.; BINER, S.B.; GOVINDARAJU, M.; et al. Iowa State Univ., Ames, IA. June 1994. 41 pp. 9407250286. 80328:195.

Where the entries are (1) report number, (2) report title, (3) report authors, (4) organizational unit of authors or publisher, (5) date report was published, (6) number of pages in the report, (7) the NRC Document Control System accession number, (8) the report number of the originating organization (if given), (9) the microfiche address (for NRC internal use).

International Agreement Report

NUREG/IA-0001: ASSESSMENT OF TRAC-PD2 USING SUPER CANNON AND HDR EXPERIMENTAL DATA. NEUMANN, U. Kraftwerk Union. August 1986. 223 pp. 8608270424. 37659:138.

Where the entries are (1) report number, (2) report title, (3) report author, (4) organizational unit of author, (5) date report was published, (6) number of pages in the report, (7) the NRC Document Control System accession number, (8) the report number of the originating organization (if given), and (9) the microfiche address (for NRC internal use).

The following abbreviations are used to identify the document status of a report:

ADD	- addendum
APP	- appendix
DRFT	- draft
ERR	- errata
N	- number
R	- revision
S	- supplement
V	- volume

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NRC Report Codes

The NUREG designation, NUREG-XXXX, indicates that the document is a formal NRC staff-generated report. Contractor-prepared formal NRC reports carry the report code NUREG/CR-XXXX. This type of identification replaces contractor-established codes such as ORNL/NUREG/TM-XXX and TREE-NUREG-XXXX, as well as various other numbers that could not be correlated with NRC sponsorship or the work being reported.

In addition to the NUREG and NUREG/CR codes, NUREG/CP is used for NRC-sponsored conference proceedings NUREG/GR is used for NRC grant reports, and NUREG/IA is used for international agreement reports.

All these report codes are controlled and assigned by the staff of the Technical Publications Section of the NRC Division of Freedom of Information and Publications Services.

Main Citations and Abstracts

The report listings in this compilation are arranged by report number, where NUREG-XXXX is an NRC staff-originated report, NUREG/CP-XXXX is an NRC-sponsored conference report, NUREG/CR-XXXX is an NRC contractor-prepared report, and NUREG/IA-XXXX is an international agreement report. The bibliographic information (see Preface for details) is followed by a brief abstract of this report.

NUREG-0040 V19 N04: LICENSEE CONTRACTOR AND VENDOR INSPECTION STATUS REPORT. Quarterly Report, October-December 1995. (White Book) * Office of Nuclear Reactor Regulation (Post 941001). February 1996. 73pp. 9603190117. 87510:219.

This periodical covers the results of inspections performed by the NRC's Special Inspection Branch, Vendor Inspection Section, that have been distributed to the inspected organizations during the period from October through December 1995.

NUREG-0090 V18 N02: REPORT TO CONGRESS ON ABNORMAL OCCURRENCES. April-June 1995. * Office for Analysis & Evaluation of Operational Data, Director. October 1995. 29pp. 9602120369. 87081:158.

Section 208 of the Energy Reorganization Act of 1974 identifies abnormal occurrence (AO) as an unscheduled incident or event that the Nuclear Regulatory Commission determines to be significant from the standpoint of public health or safety requires a quarterly report of such occurrences to be made to Congress. This report provides a description of those incidents and events that have been determined to be AOs during the period of April 1 through June 30, 1995. This report addresses five AOs at NRC-licensed facilities. One involved a reactor coolant system blowdown at a pressurized water reactor (PWR) nuclear power plant, one involved a previously unidentified path for the potential release of radioactivity at a PWR nuclear power plant, two involved medical brachytherapy misadministrations, and one involved a medical therapeutic radiopharmaceutical misadministration. Four AOs submitted by the Agreement States are included. One involved a medical teletherapy misadministration, two involved medical brachytherapy misadministrations, and one involved the overexposure of personnel at a medical center. The report also contains an update of one AO previously reported by an NRC licensee and two AOs previously reported by the Agreement States. No "Other Events of Interest" items are being reported.

NUREG-0090 V18 N03: REPORT TO CONGRESS ON ABNORMAL OCCURRENCES. July-September 1995. * Office for Analysis & Evaluation of Operational Data, Director. February 1996. 23pp. 9602280295. 87272:268.

Section 208 of the Energy Reorganization Act of 1974 identifies an abnormal occurrence (AO) as an unscheduled incident or event that the Nuclear Regulatory Commission determines to be significant from the standpoint of public health or safety and requires a quarterly report of such occurrences to be made to Congress. This report provides a description of those incidents and events that have been determined to be AOs during the period of July 1 through September 30, 1995. This report addresses three AOs at NRC-licensed facilities. Two involved medical brachytherapy misadministrations and one involved ingestion of radioactive material by research workers. One AO submitted by the Agreement States is included. It involved importation into the United States of a package having excessive radiation. No updates of previously reported AOs are included in this report. No "Other Events of Interest" items are being reported.

NUREG-0304 V20 N03: REGULATORY AND TECHNICAL REPORTS (ABSTRACT INDEX JOURNAL). Compilation for Third Quarter 1995, July-September. * Division of Freedom of Information & Publications Services (Post 940714). January 1996. 48pp. 9602220246. 87210:306.

This journal includes all formal reports in the NUREG series prepared by the NRC staff and contractors; proceedings of conferences and workshops; as well as international agreement reports. The entries in this compilation are indexed for access by title and abstract, secondary report number, personal author, subject, NRC organization for staff and international agreements, contractor, international organization, and licensed facility.

NUREG-0325 R19: U.S. NUCLEAR REGULATORY COMMISSION ORGANIZATION CHARTS AND FUNCTIONAL STATEMENTS. January 31, 1996. * Ofc of Personnel (Post 870413). January 1996. 67pp. 9603190108. 87510:293.

Functional statements and organization charts for the U.S. Nuclear Regulatory Commission offices, divisions, and branches are presented.

NUREG-0390 V10: TOPICAL REPORT REVIEW STATUS. (Blue Book) * Office of Nuclear Reactor Regulation (Post 941001). March 1996. 36pp. 9604150318. 87865:283.

This report provides industry with procedures for submitting topical reports, guidance on how the U.S. Nuclear Regulatory Commission (NRC) processes and responds to topical report submittals, and an accounting, with review schedules, of all topical reports currently accepted for review by the NRC. This report is published annually.

NUREG-0540 V17 N11: TITLE LIST OF DOCUMENTS MADE PUBLICLY AVAILABLE. November 1-30, 1995. * Division of Freedom of Information & Publications Services (Post 940714). January 1996. 286pp. 9602220190. 87212:001.

This document is a monthly publication containing descriptions of information received and generated by the U.S. Nuclear Regulatory Commission (NRC). This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials, and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The following indexes are included: Personal Author, Corporate Source, Report Number, and Cross Reference of Enclosures to Principal Documents.

NUREG-0540 V17 N12: TITLE LIST OF DOCUMENTS MADE PUBLICLY AVAILABLE. December 1-31, 1995. * Division of Freedom of Information & Publications Services (Post 940714). February 1996. 298pp. 9603260311. 87641:001.

See NUREG-0540, V17, N11 abstract.

NUREG-0713 V16: OCCUPATIONAL RADIATION EXPOSURE AT COMMERCIAL NUCLEAR POWER REACTORS AND OTHER FACILITIES, 1994. Twenty-Seventh Annual Report. THOMAS, M.L. Division of Regulatory Applications (Post 941217). HAGEMeyer, D. Science Applications International Corp. (formerly Science Applications, Inc.). January 1996. 302pp. 9602220240. 87211:001.

2 Main Citations and Abstracts

This report summarizes the occupational radiation exposure information that has been reported to the NRC's Radiation Exposure Information Reporting System (REIRS) by nuclear power facilities and certain other categories of NRC licensees during the years 1969 through 1994. The bulk of the data presented in the report was obtained from annual radiation exposure reports submitted in accordance with the requirements of 10 CFR 20.220 and the technical specifications of nuclear power plants. The 1994 annual reports submitted by about 303 licensees indicated that approximately 152,028 individuals were monitored, 141,901 of whom were monitored by nuclear power facilities. They incurred an average individual dose of 0.1 rem (cSv) and an average measurable dose of about 0.31 rem (cSv). Analyses of transient worker data indicate that 18,178 individuals completed work assignments at two or more licensees during the monitoring year. The dose distributions are adjusted each year to account for the duplicate reporting of transient workers by multiple licensees. In 1994, the average measurable dose calculated from reported data was 0.28 cSv (rem). The corrected dose distribution resulted in an average measurable dose of 0.31 cSv (rem).

NUREG-0750 V41: NUCLEAR REGULATORY COMMISSION ISSUANCES. Opinions And Decisions Of The Nuclear Regulatory Commission With Selected Orders. January-June 1995. * Division of Freedom of Information & Publications Services (Post 940714). February 1996. 547pp. 9604020257. 87709:001.

Legal issuances of the Commission, the Atomic Safety and Licensing Board Panel, the Administrative Law Judges, and NRC Program Offices are presented.

NUREG-0750 V42 I02: INDEXES TO NUCLEAR REGULATORY COMMISSION ISSUANCES. July-December 1995. * Division of Freedom of Information & Publications Services (Post 940714). March 1996. 40pp. 9604020329. 87710:255.

Digests and indexes for issuances of the Commission, the Atomic Safety and Licensing Board Panel, the Administrative Law Judges, the Directors' Decisions, and the Decisions on Petitions for Rulemaking are presented.

NUREG-0750 V42 N05: NUCLEAR REGULATORY COMMISSION ISSUANCES FOR NOVEMBER 1995. Pages 181-219. * Division of Freedom of Information & Publications Services (Post 940714). January 1996. 45pp. 9602090022. 87066:244.

See NUREG-0750, V41 abstract.

NUREG-0750 V42 N06: NUCLEAR REGULATORY COMMISSION ISSUANCES FOR DECEMBER 1995. Pages 221-258. * Division of Freedom of Information & Publications Services (Post 940714). February 1996. 44pp. 9602280302. 87272:185.

See NUREG-0750, V41 abstract.

NUREG-0750 V43 N01: NUCLEAR REGULATORY COMMISSION ISSUANCES FOR JANUARY 1996. Pages 1-11. * Division of Freedom of Information & Publications Services (Post 940714). March 1996. 17pp. 9603260308. 87624:289.

See NUREG-0750, V41 abstract.

NUREG-0837 V15 N04: NRC TLD DIRECT RADIATION MONITORING NETWORK. Progress Report. October-December 1995. STRUCKMEYER, R. Region 1 (Post 820201). March 1996. 326pp. 9603260299. 87623:001.

This report provides the status and results of the NRC Thermoluminescent Dosimeter (TLD) Direct Radiation Monitoring Network. It presents the radiation levels measured in the vicinity of NRC licensed facilities throughout the country for the fourth quarter of 1995.

NUREG-0847 S20: SAFETY EVALUATION REPORT RELATED TO THE OPERATION OF WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2. Docket Nos. 50-390 And 50-391. (Tennessee Valley Authority) TAM, P.S. Office of Nuclear Reactor Regulation (Post 941001). February 1996. 36pp. 9602280321. 87272:231.

Supplement No. 20 to the Safety Evaluation Report for the application filed by the Tennessee Valley Authority for license to operate Watts Bar Nuclear Plant, Units 1 and 2, Docket Nos. 50-390 and 50-391, located in Rhea County, Tennessee, has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. The purpose of this supplement is to update the Safety Evaluation with (1) additional information submitted by the applicant since Supplement No. 19 was issued, and (2) matters that the staff had under review when Supplement No. 19 was issued.

NUREG-0910 R02 S02: NRC COMPREHENSIVE RECORDS DISPOSITION SCHEDULE. * Information & Records Management Branch (Post 890827). February 1996. 200pp. 9605220230. 88332:076.

The approved records disposition schedules specify the appropriate duration of retention and the final disposition for records created or maintained by the NRC. NUREG-0910, Revision 2, Supplement 2 makes editorial and administrative changes to the National Archives and Records Administration's General Record Schedule (GRS) and forwards an entire updated set of the General Records Schedule including GRS Subject and Forms Indexes.

NUREG-0936 V14 N02: NRC REGULATORY AGENDA. Semiannual Report. July-December 1995. * Division of Freedom of Information & Publications Services (Post 940714). February 1996. 57pp. 9602280332. 87272:290.

The NRC Regulatory Agenda is a compilation of all rules on which the NRC has recently completed action, or has proposed action, or is considering action, and all petitions for rulemaking which have been received by the Commission and are pending disposition by the Commission. The Regulatory Agenda is updated and issued semiannually.

NUREG-0940 V14N3&4P1: ENFORCEMENT ACTIONS: SIGNIFICANT ACTIONS RESOLVED INDIVIDUAL ACTIONS. Semiannual Progress Report, July-December 1995. * Ofc of Enforcement (Post 870413). February 1996. 363pp. 9603050127. 87335:001.

This compilation summarizes significant enforcement actions that have been resolved during the period (July - December 1995) and includes copies of Orders and Notices of Violation sent by the Nuclear Regulatory Commission to individuals with respect to these enforcement actions. It is anticipated that the information in this publication will be widely disseminated to managers and employees engaged in activities licensed by the NRC. The Commission believes this information may be useful to licensees in making employment decisions.

NUREG-0940 V14N3&4P2: ENFORCEMENT ACTIONS: SIGNIFICANT ACTIONS RESOLVED REACTOR LICENSEES. Semiannual Progress Report, July-December 1995. * Ofc of Enforcement (Post 870413). February 1996. 241pp. 9603040093. 87314:095.

This compilation summarizes significant enforcement actions that have been resolved during the period (July - December 1995) and includes copies of letters, Notices, and Orders sent by the Nuclear Regulatory Commission to reactor licensees with respect to these enforcement actions. It is anticipated that the information in this publication will be widely disseminated to managers and employees engaged in activities licensed by the NRC, so that actions can be taken to improve safety by avoiding future violations similar to those described in this publication.

NUREG-0940 V14N3&4P3: ENFORCEMENT ACTIONS: SIGNIFICANT ACTIONS RESOLVED MATERIAL LICENSEES. Semiannual Progress Report, July-December 1995. * Ofc of Enforcement (Post 870413). February 1996. 250pp. 9603260287. 87620:001.

This compilation summarizes significant enforcement actions that have been resolved during the period (July - December

1995) and includes copies of letters, Notices, and Orders sent by the Nuclear Regulatory Commission to material licensees with respect to these enforcement actions. It is anticipated that the information in this publication will be widely disseminated to managers and employees engaged in activities licensed by the NRC, so that actions can be taken to improve safety by avoiding future violations similar to those described in this publication.

NUREG-1100 V12: BUDGET ESTIMATES. Fiscal Year 1997. • Division of Budget & Analysis (Post 890205). March 1996. 168pp. 9604020325. 87714:001.

This report contains the fiscal year budget justification to Congress. The budget provides estimates for salaries and expenses and for the Office of the Inspector General for fiscal year 1997.

NUREG-1531: DRAFT ENVIRONMENTAL IMPACT STATEMENT RELATED TO RECLAMATION OF THE URANIUM MILL TAILINGS AT THE ATLAS SITE, MOAB, UTAH. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation) BLASING, T.S.; EASTERLY, C.E. Oak Ridge National Laboratory. FLIEGEL, M.; et al. Division of Waste Management (NMSS 940403). January 1996. 300pp. 9602050062. 86981:001.

This Draft Environmental Impact Statement (DEIS) has been prepared by the Nuclear Regulatory Commission (NRC), Office of Nuclear Material Safety and Safeguards, to address potential environmental impacts associated with a request by Atlas Corporation to amend its existing NRC License No. SUA-917 to reclaim an existing uranium mill tailings pile near Moab, Utah. The proposed reclamation would allow Atlas to (1) reclaim the tailings pile for permanent disposal and long-term custodial care by a government agency in its current location on the Moab site, (2) prepare the 162-ha (400 acre) Moab site for site closure, and (3) relinquish responsibility of the site after having its NRC license terminated. The DEIS describes and evaluates (1) the purpose of and need for the proposed action, (2) alternatives considered, (3) potentially affected environmental resources, (4) environmental consequences of the proposed action, and (5) costs and benefits associated with reclamation alternatives. Public and agency comments on this DEIS will be considered in the Final Environmental Impact Statement.

NUREG-1532: DRAFT TECHNICAL EVALUATION REPORT FOR THE PROPOSED REVISED RECLAMATION PLAN FOR THE ATLAS CORPORATION MOAB MILL. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation) BRUMMETT, E.; FLIEGEL, M.; IBRAHIM, A.; et al. Division of Waste Management (NMSS 940403). January 1996. 128pp. 9602070045. 87015:139.

This Draft Technical Evaluation Report (DTER) summarizes the U.S. Nuclear Regulatory Commission staff's review of Atlas Corporation's proposed reclamation plan for its uranium mill tailings pile near Moab, Utah. The proposed reclamation would allow Atlas to (1) reclaim the tailings pile for permanent disposal and long-term custodial care by a government agency in its current location on the Moab site, (2) prepare the site for closure, and (3) relinquish responsibility of the site after having its NRC license terminated. The NRC staff review has identified open issues in geology, seismology, geotechnical engineering, erosion protection, water resources protection and radon attenuation. The NRC will not approve the proposed reclamation plan until Atlas adequately resolves these open issues.

NUREG-1536 DRAFT FC: STANDARD REVIEW PLAN FOR DRY SPENT FUEL STORAGE SYSTEMS. Draft Report For Comment. • Office of Nuclear Material Safety & Safeguards. February 1996. 172pp. 9603190122. 87516:147.

The Standard Review Plan (SRP) for Dry Cask Storage Systems provides guidance to the Nuclear Regulatory Commission staff in the Spent Fuel Project Office for performing safety reviews of dry cask storage systems. The SRP is intended to ensure the quality and uniformity of the staff reviews and present a basis for the review scope and requirements. Part 72, Supert B generally specifies the information needed in a license

application for the independent storage of spent nuclear fuel and high level radioactive waste. Regulatory Guide 3.61 "Standard Format and Content for a Topical Safety Analysis Report for a Spent Fuel Dry Storage Cask" contains an outline of the specific information required by the staff. The SRP is divided into 14 sections which reflect the standard application format. Regulatory requirements, staff position, industry codes and standards, acceptance criteria, and other information are discussed. Comments on this draft, will be considered and incorporated into the SRP as appropriate. The SRP is scheduled for publication as an NRC NUREG document late in 1996. Comments, errors or omissions, and suggestions for improvement should be sent to the Director, Spent Fuel Project Office, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

NUREG-1537 PT01: GUIDELINES FOR PREPARING AND REVIEWING APPLICATIONS FOR THE LICENSING OF NON-POWER REACTORS. Part 1: Format And Content. • Office of Nuclear Reactor Regulation (Post 941001). February 1996. 523pp. 9604020335. 87711:001.

NUREG-1537, Part 1 gives guidance to non-power reactor licensees and applicants on the format and content of applications to the Nuclear Regulatory Commission for licensing actions. These licensing actions include construction permits and initial operating licenses, license renewals, amendments, conversions from highly enriched uranium to low-enriched uranium, decommissioning, and license termination.

NUREG-1537 PT02: GUIDELINES FOR PREPARING AND REVIEWING APPLICATIONS FOR THE LICENSING OF NON-POWER REACTORS. Part 2: Standard Review Plan And Acceptance Criteria. • Office of Nuclear Reactor Regulation (Post 941001). February 1996. 300pp. 9604020339. 87713:001.

NUREG-1537, Part 2 gives guidance on the conduct of licensing action reviews to NRC staff who review non-power reactor licensing applications. These licensing actions include construction permits and initial operating licenses, license renewals, amendments, conversions from highly enriched uranium to low-enriched uranium, decommissioning, and license termination.

NUREG-1544: STATUS REPORT: INTERGRANULAR STRESS CORROSION CRACKING OF BWR CORE SHROUDS AND OTHER INTERNAL COMPONENTS. • Office of Nuclear Reactor Regulation (Post 941001). March 1996. 115pp. 9604150308. 87877:165.

On July 25, 1994, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 94-03 to obtain information needed to assess compliance with regulatory requirements regarding the structural integrity of core shrouds in domestic boiling water reactors (BWRs). This report begins with a brief description of the safety significance of intergranular stress corrosion cracking (IGSCC) as it relates to the design and function of BWR core shrouds and other internal components. It then presents a brief history of shroud cracking events both in the U.S. and abroad, followed by an indepth summary of the industry actions to address the issue of IGSCC in BWR core shrouds and other internal components. This report summarizes the staff's basis for issuing GL 94-03, as well as the staff's assessment of plant-specific responses to GL 94-03. The staff is continually evaluating the licensee inspection programs and the results from examinations of BWR core shrouds and other internal components. This report is representative of submittals to and evaluations by the staff as of September 30, 1995. An update of this report will be issued at a later date.

NUREG/CP-0149 V01: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Plenary Session, High Burnup Fuel Behavior, Thermal Hydraulic Research. MONTELEONE, S. Brookhaven National Laboratory. March 1996. 278pp. 9604150352. 87868:001.

This three-volume report contains papers presented at the Twenty-Third Water Reactor Safety Information Meeting held at the Bethesda Marriott Hotel, Bethesda, Maryland, October 23-

4 Main Citations and Abstracts

25, 1995. The papers are printed in the order of their presentation in each session and describe progress and results of programs in nuclear safety research conducted in this country and abroad. Foreign participation in the meeting included papers presented by researchers from France, Italy, Japan, Norway, Russia, Sweden, and Switzerland. The titles of the papers and the names of the authors have been updated and may differ from those that appeared in the final program of the meeting.

NUREG/CP-0149 V02: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Human Factors Research, Advanced I&C Hardware & Software, Severe Accident Research, Probabilistic Risk Assessment Topics, Individual Plant Examination. MONTELEONE, S. Brookhaven National Laboratory. March 1996. 542pp. 9604150357. 87866:001.

See NUREG/CP-0149,V01 abstract.

NUREG/CP-0149 V03: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Structural & Seismic Engineering, Primary Systems Integrity, Equipment Operability And Aging, ECCS Strainer Blockage Research & Regulatory Issues. MONTELEONE, S. Brookhaven National Laboratory. March 1996. 246pp. 9604150363. 87865:037.

See NUREG/CP-0149,V01 abstract.

NUREG/CR-2850 V14: DOSE COMMITMENTS DUE TO RADIOACTIVE RELEASES FROM NUCLEAR POWER PLANT SITES IN 1992. AABERG, R.L.; BAKER, D.A. Battelle Memorial Institute, Pacific Northwest Laboratory. March 1996. 196pp. 9604170363. PNL-4221. 87903:120.

Population and individual radiation dose commitments have been estimated from reported radionuclide releases from commercial power reactors operating during 1992. Fifty-year dose commitments for a one-year exposure from both liquid and atmospheric releases were calculated for four population groups (infant, child, teenager, and adult) residing between 2 and 80 km from each of 72 reactor sites. This report tabulates the results of these calculations, showing the dose commitments for both water and airborne pathways for each age group and organ. Also included for each of the sites is an estimate of individual doses that are compared with 10 CFR Part 50, Appendix I design objectives. The total collective dose commitments (from both liquid and airborne pathways) for each site ranged from a high of 3.7 person-rem to a low of 0.0015 person-rem for the sites with plants in operation and producing power during the year. The arithmetic mean was 0.66 person-rem. The total population dose for all sites was estimated at 47 person-rem for the 130 million people considered at risk. The individual dose commitments estimated for all sites were below the Appendix I design objectives.

NUREG/CR-4667 V20: ENVIRONMENTALLY ASSISTED CRACKING IN LIGHT WATER REACTORS. Semiannual Report, October 1994 - March 1995. CHUNG, H.M.; CHOPRA, O.K.; GAVENDA, D.J.; et al. Argonne National Laboratory. January 1996. 72pp. 9602050045. ANL-95/41. 86980:234.

This report summarizes work performed by Argonne National Laboratory on fatigue and environmentally assisted cracking (EAC) in light water reactors (LWRs) from October 1994 to March 1995. Topics that have been investigated include (a) fatigue of carbon and low-alloy steel used in reactor piping and pressure vessels, (b) EAC of Alloy 600 and 690, and (c) irradiation-assisted stress corrosion cracking (IASCC) of Type 304 SS. Fatigue tests were conducted on ferritic steels in water with several dissolved-oxygen (DO) concentrations to determine whether a slow strain rate applied during different portions of a tensile-loading cycle are equally effective in decreasing fatigue life. Tensile properties and microstructures of several heats of Alloy 600 and 690 were characterized for correlation with EAC of the alloys in simulated LWR environments. Effects of DO and electrochemical potential on susceptibility to intergranular cracking of high- and commercial-purity Type 304 SS specimens from control-blade absorber tubes and a control-blade sheath irradi-

ated in boiling water reactors were determined in slow-strain-rate-tensile tests at 289 degrees C. Microchemical changes in the specimens were studied by Auger electron spectroscopy and scanning electron microscopy to determine whether trace impurity elements may contribute to IASCC of these materials.

NUREG/CR-5753: AGING OF SAFETY CLASS 1E TRANSFORMERS IN SAFETY SYSTEMS OF NUCLEAR POWER PLANTS. ROBERTS, E.W.; EDSON, J.L.; UDY, A.C. Idaho National Engineering Laboratory. February 1996. 64pp. 9603010296. INEL-95/0573. 87307:067.

This report discusses aging effects on safety-related power transformers in nuclear power plants. It also evaluates maintenance, testing, and monitoring practices, with respect to their effectiveness in detecting and mitigating the effects of aging. The study follows the U.S. Nuclear Regulatory Commission's (NRC) Nuclear Plant-Aging Research approach. It investigates the materials used in transformer construction, identifies stressors and aging mechanisms, presents operating and testing experience with aging effects, analyzes transformer failure events reported in various databases, and evaluates maintenance practices. Databases that were analyzed included the NRC's Licensee Event Report (LER) system and the Institute for Nuclear Power Operations' Nuclear Plant Reliability Data System (NPRDS).

NUREG/CR-5985 S01: REVIEW OF P-SCAN COMPUTER-BASED ULTRASONIC INSERVICE INSPECTION SYSTEM. HARRIS, R.V.; ANGEL, L.J. Battelle Memorial Institute, Pacific Northwest Laboratory. December 1995. 129pp. 9604090369. PNL-8919. 87807:001.

This supplement reviews the P-scan system, a computer-based ultrasonic system used for inservice inspection of piping and other components in nuclear power plants. The supplement was prepared using the methodology described in detail in Appendix A of NUREG/CR-5985, and is based on one month of using the system in a laboratory. This supplement describes and characterizes: computer system, ultrasonic components, and mechanical components; scanning, detection, digitizing, imaging, data interpretation, operator interaction, data handling, and record-keeping. It includes a general description, a review checklist, and detailed results of all tests performed.

NUREG/CR-6096: APACHE LEAP TUFF INTRAVAL EXPERIMENTS. Results And Lessons Learned. RASMUSSEN, T.C. Georgia, Univ. of, Athens, GA. RHODES, S.C.; GUZMAN, A.; et al. Arizona, Univ. of, Tucson, AZ. March 1996. 110pp. 9604020277. 87714:170.

Data from laboratory and field experiments in unsaturated fractured rock are summarized and interpreted for the purpose of evaluating conceptual and numerical models of fluid, heat and solute transport. The experiments were conducted at four scales, in small cores (2.5-cm long by 6-cm across), a large core (12-cm long by 10-cm across), a small block containing a single fracture (20 x 21 x 93 cm), and at field scales in boreholes (30-m long by 10-cm across) at three scales (1/2-, 1- and 3-meters). The smallest scale in the laboratory provided isothermal hydraulic and thermal properties of unfractured rock. Non-isothermal heat, fluid and solute transport experiments were conducted using the large core. Isothermal gas and liquid flow experiments were conducted in the fractured block. Field-scale experiments using air were used to obtain in situ permeability estimates as a function of the measurement scale. Interpretation of experimental results provides guidance for resolving uncertainties related to radionuclide migration from high level waste repositories in unsaturated fractured rock.

NUREG/CR-6124: CHARACTERIZATION OF RADIONUCLIDE-CHELATING AGENT COMPLEXES FOUND IN LOW-LEVEL RADIOACTIVE DECONTAMINATION WASTE. Literature Review. SERNE, R.J.; FELMY, A.R.; CANTRELL, K.J.; et al. Battelle Memorial Institute, Pacific Northwest Laboratory. March 1996. 168pp. 9604160360. PNL-8856. 87884:011.

The U.S. Nuclear Regulatory Commission is responsible for regulating the safe land disposal of low-level radioactive wastes that may contain organic chelating agents. Such agents include EDTA, DTPA, picolinic acid, and citric acid, which can form radionuclide-chelate complexes that may enhance the migration of radionuclides from disposal sites. Data from the available literature indicate that chelates, can leach from solidified decontamination wastes in moderate concentration and can potentially complex certain radionuclides in the leachates. The effects of the formation of such radionuclide-chelate complexes on the migration of radionuclides in groundwater systems is still difficult to quantitatively predict. However, in general it appears that both EDTA and DTPA have the potential to mobilize radionuclides from waste disposal sites because such chelates can leach in moderate concentration, form strong radionuclide-chelate complexes, and can be recalcitrant to biodegradation. It also appears that oxalic acid and citric acid will not greatly enhance the mobility of radionuclides from waste disposal sites because these chelates do not appear to leach in high concentration tend to form relatively weak radionuclide-chelate complexes, and can be readily biodegraded. In the case of picolinic acid, insufficient data are available to make definitive predictions.

NUREG/CR-6230: RADIOANALYTICAL TECHNOLOGY FOR 10 CFR PART 61 AND OTHER SELECTED RADIONUCLIDES. Literature Review. THOMAS, C.W.; THOMAS, V.W.; ROBERTSON, D.E. Battelle Memorial Institute, Pacific Northwest Laboratory. March 1996. 42pp. 9604150341. PNL-9444. 87865:319.

A comprehensive literature review and assessment was conducted to identify and evaluate radioanalytical technology and procedures used for measuring 10CFR61 radionuclides and other long-lived isotopes. This review evaluated radiochemical procedures currently in use at a number of laboratories in the US, as well as identifying new advanced methods and techniques which could be adapted for routine radiochemical analyses of low-level radioactive waste. The 10CFR61 radionuclides include (14)C, (60)Co, (59,63) Ni, (90)Sr, (94)Nb, (99)Tc, (129)I, (137)Cs and TRU Isotopes with half-lives greater than five years. The other low-level radionuclides of interest include (7,10)Be, (26)Al, (36)Cl, (93)Mo, (109,113m)Cd, and (121m,126)Sn, which may be present in various types of waste streams from nuclear power stations.

NUREG/CR-6246: EFFECTS OF AGING AND SERVICE WEAR ON MAIN STEAM ISOLATION VALVES AND VALVE OPERATORS. CLARK, R.L. Oak Ridge National Laboratory. March 1996. 108pp. 9603260298. ORNL-6814. 87640:001.

In recent years main steam isolation valve (MSIV) operating problems have resulted in significant operational transients (e.g., spurious reactor trips, steam generator dry out, excessive valve seat leakage), increased cost, and decreased plant availability. A key ingredient to an engineering-oriented reliability improvement effort is a thorough understanding of relevant historical experience. A detailed review of historical failure data available through the Institute of Nuclear Power Operation's Nuclear Plant Reliability Data System has been conducted for several types of MSIVs and valve operators for both boiling-water reactors and pressurized-water reactors. The focus of this review is on MSIV Failures modes, actuator failure modes, consequences of failure on plant operations method of failure detection, and major stressors affecting both valves and valve operators.

NUREG/CR-6279: APPLICATION OF FRACTURE TOUGHNESS SCALING MODELS TO THE DUCTILE-TO-BRITTLE TRANSITION. LINK, R.E. Navy, Dept. of. JOYCE, J.A. U.S. Naval Academy, Annapolis, MD. January 1996. 42pp. 9602220350. 87234:102.

An experimental investigation of fracture toughness in the ductile-brittle transition range was conducted. A large number of ASTM A533, Grade B steel, bend and tension specimens with varying crack lengths were tested throughout the transition

region. Cleavage fracture toughness scaling models were utilized to correct the data for the loss of constraint in short crack specimens and tension geometries. The toughness scaling models were effective in reducing the scatter in the data, but tended to over-correct the results for the short crack bend specimens. A proposed ASTM Test Practice for Fracture Toughness in the Transition Range, which employs a master curve concept, was applied to the results. The proposed master curve over predicted the fracture toughness in the mid-transition and a modified master curve was developed that more accurately modeled the transition behavior of the material. Finally, the modified master curve and the fracture toughness scaling models were combined to predict the as-measured fracture toughness of the short crack bend and the tension specimens. It was shown that when the scaling models over correct the data for loss of constraint, they can also lead to non-conservative estimates of the increase in toughness for low constraint geometries.

NUREG/CR-6280: TECHNOLOGY, SAFETY, AND COSTS OF DECOMMISSIONING A REFERENCE LARGE IRRADIATOR AND REFERENCE SEALED SOURCES. HAFFNER, D.R.; VILLEGAS, A.J. Battelle Memorial Institute, Pacific Northwest Laboratory. January 1996. 109pp. 9602290251. 87295:001.

This report contains the results of a study sponsored by the U.S. Nuclear Regulatory Commission (NRC) to examine the decommissioning of large radioactive irradiators and their respective facilities, and a broad spectrum of sealed radioactive sources and their respective devices. Conceptual decommissioning activities are identified, and the technology, safety, and costs (in early 1993 dollars) associated with decommissioning the reference large irradiator and sealed source facilities are evaluated. The study provides bases and background data for possible future NRC rulemaking regarding decommissioning, for evaluation of the reasonableness of planned decommissioning actions, and for determining if adequate funds are reserved by the licensees for decommissioning of their large irradiator or sealed source facilities. Another purpose of this study is to provide background and information to assist licensees in planning and carrying out the decommissioning of their sealed radioactive sources and respective facilities.

NUREG/CR-6336: AGING ASSESSMENT OF LARGE ELECTRIC MOTORS IN NUCLEAR POWER PLANTS. VILLARAN, M.; SUBUDHI, M. Brookhaven National Laboratory. March 1996. 136pp. 9603260290. BNL-NUREG-52460. 87640:106.

Large electric motors serve as the prime movers to drive high capacity pumps, fans, compressors, and generators in a variety of nuclear plant systems. This study examined the stressors that cause degradation and aging in large electric motors operating in various plant locations and environments. The operating history of these machines in nuclear plant service was studied by review and analysis of failure reports in the NPRDS and LER databases. This was supplemented by a review of motor designs, and their nuclear and balance of plant applications, in order to characterize the failure mechanisms that cause degradation, aging, and failure in large electric motors. A generic failure modes and effects analysis for large squirrel cage induction motors was performed to identify the degradation and aging mechanisms affecting various components of these large motors, the failure modes that result, and their effects upon the function of the motor. The effects of large motor failures upon the systems in which they are operating, and on the plant as a whole, were analyzed from failure reports in the databases. The effectiveness of the industry's large motor maintenance programs was assessed based upon the failure reports in the databases and reviews of plant maintenance procedures and programs.

NUREG/CR-6337: SUMMARY OF RESULTS FROM THE IPIRG-2 ROUND-ROBIN ANALYSES. RAHMAN,S.; OLSON,R.; ROSENFELD,A.; et al. Battelle Memorial Institute, Columbus Laboratories. February 1996. 182pp. 9602290264. BMI-2186. 87295:113.

This report presents a summary of the results from three one-day international round-robin workshops which were organized by Battelle in conjunction with the Second International Piping Integrity Research Group (IPIRG-2) Program. The objective of these workshops was to develop a consensus in handling difficult analytical problems in leak-before-break and pipe flaw evaluations. The workshops, which were held August 5, 1993, March 4, 1994, and October 21, 1994 at Columbus, Ohio, involved various technical presentations on the related research efforts by the IPIRG-2 member organizations and solutions to several round-robin problems. Following review by the IPIRG-2 members, four sets of round-robin problems were developed. They involved: (1) evaluations of fracture properties and pipe loads, (2) crack-opening and leak-rate evaluations, (3) dynamic analysis of cracked pipes, and (4) fracture evaluations of elbows. A total of 18 organizations from the United States, Japan, Korea, and Europe solved these round-robin problems. The analysis techniques employed by the participants included both finite element and engineering methods. Based on the results from these analyses, several important observations were made concerning the predictive capability of the current fracture-mechanics and thermal-hydraulics models for their applications in nuclear piping and piping welds.

NUREG/CR-6338: RESOLUTION OF THE DIRECT CONTAINMENT HEATING ISSUE FOR ALL WESTINGHOUSE PLANTS WITH LARGE DRY CONTAINMENTS OR SUBATMOSPHERIC CONTAINMENTS. PILCH,M.M.; ALLEN,M.D.; KLAMERUS,E.W. Sandia National Laboratories. February 1996. 241pp. 9603260307. SAND95-2381. 87624:001.

This report uses the scenarios described in NUREG/CR-6075 and NUREG/CR-6075, Supplement 1, to address the direct containment heating (DCH) issue for all Westinghouse plants with large dry or subatmospheric containments. DCH is considered resolved if the conditional containment failure probability (CCFP) is less than 0.1. Loads versus strength evaluations of the CCFP were performed for each plant using plant-specific information. The DCH issue is considered resolved for a plant if a screening phase results in a CCFP less than 0.01, which is more stringent than the overall success criterion. If the screening phase CCFP for a plant is greater than 0.01, then refined containment loads evaluations must be performed and/or the probability of high pressure at vessel breach must be analyzed. These analyses could be used separately or could be integrated together to re-calculate the CCFP for an individual plant to reduce the CCFP to meet the overall success criterion of less than 0.1. The CCFPs for all of the Westinghouse plants with dry containments were less than 0.01 at the screening phase, and thus, the DCH issue is resolved for these plants based on containment loads alone. No additional analyses are required.

NUREG/CR-6339: AGING ASSESSMENT OF WESTINGHOUSE PWR AND GENERAL ELECTRIC BWR CONTAINMENT ISOLATION FUNCTIONS. LEE,B.S.; TRAVIS,R.; GROVE,E.; et al. Brookhaven National Laboratory. March 1996. 154pp. 9604020321. BNL-NUREG-52462. 87715:001.

A study was performed to assess the effects of aging on the Containment Isolation (CI) functions of Westinghouse Pressurized Water Reactors and General Electric Boiling Water Reactors. This study is part of the Nuclear Plant Aging Research (NPAR) program, sponsored by the U.S. Nuclear Regulatory Commission. The objectives of this program are to provide an understanding of the aging progress and how it affects plant safety so that it can be properly managed. This is one of a number of studies performed under the NPAR program which provide a technical basis for the identification and evaluation of degradation caused by age. The failure data from national databases, Nuclear Plant Reliability Data System (NPRDS) and Li-

censee Event Reports (LERs), as well as plant specific data were reviewed and analyzed to understand the effects of aging on the CI functions. This study provided information on the effects of aging on component failure frequency, failure modes, and failure causes. Current inspection, surveillance, and monitoring practices were also reviewed.

NUREG/CR-6340: AGING ASSESSMENT OF SURGE PROTECTIVE DEVICES IN NUCLEAR POWER PLANTS. DAVIS,J.F.; SUBUDHI,M. Brookhaven National Laboratory. CARROLL,D.P. Florida, Univ. of, Gainesville, FL. January 1996. 179pp. 9603040082. BNL-NUREG-52463. 87317:001.

A study has been performed that assesses the effects of aging on the performance and availability of surge protective devices (SPDs), commonly called surge arresters and surge suppressors, used in electrical power and control systems in U.S. commercial nuclear power plants. This study is one of a number of studies performed under the Nuclear Plant Aging Research (NPAR) program. One of the many purposes of that program is to provide a technical basis for the identification and evaluation of degradation caused by age. Although surge protective devices have not been classified as safety-related, they are risk important because they can minimize the initiating event frequencies associated with loss of offsite power (LOOP) and reactor trip. Conversely, their failure due to age, or other causes, might increase the initiating event frequencies. Because of their importance, especially those in (lightning) high flash density regions to the U.S., the proper application and coordination of high voltage and low voltage SPDs are important in ensuring that overvoltage transients will not increase plant risk.

NUREG/CR-6346: HYDROLOGIC EVALUATION METHODOLOGY FOR ESTIMATING WATER MOVEMENT THROUGH THE UNSATURATED ZONE AT COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES. MEYER,P.D.; ROCKHOLD,M.L.; NICHOLS,W.E.; et al. Battelle Memorial Institute, Pacific Northwest Laboratory. January 1996. 134pp. 9603010318. PNL-10843. 87311:068.

This report identifies key technical issues related to hydrologic assessment of water flow in the unsaturated zone at low-level radioactive waste (LLW) disposal facilities. In addition, a methodology for incorporating these issues in the performance assessment of proposed LLW disposal facilities is identified and evaluated. The issues discussed fall into four areas: estimating the water balance at a site (i.e., infiltration, runoff, water storage, evapotranspiration, and recharge); analyzing the hydrologic performance of engineered components of a facility; evaluating the application of models to the prediction of facility performance; and estimating the uncertainty in predicted facility performance. To illustrate the application of the methodology, two examples are presented. The first example is of a below ground vault located in a humid environment. The second example looks at a shallow land burial facility located in an arid environment. The examples utilize actual site-specific data and realistic facility designs. The two examples illustrate the issues unique to humid and arid sites as well as the issues common to all LLW sites. Strategies for addressing the analytical difficulties arising in any complex hydrologic evaluation of the unsaturated zone are demonstrated.

NUREG/CR-6353: COMMENTS RECEIVED ON PROPOSED RULE ON RADIOLOGICAL CRITERIA FOR DECOMMISSIONING AND RELATED DOCUMENTS. PAGE,G.; CAPLIN,J.; SMITH,D.; et al. Advanced Systems Technology, Inc. March 1996. 166pp. 9604020352. 87712:160.

The Nuclear Regulatory Commission (NRC) is conducting an enhanced participatory rulemaking to establish radiological criteria for the decommissioning of NRC licensed facilities. As a part of this action, the Commission published in the Federal Register (59 FR 43200), on August 22, 1994, a proposed rule on radiological criteria for decommissioning, soliciting comments both on the rule as proposed and on certain specific items as identi-

fied in its supplementary statement of considerations. A draft Generic Environmental Impact Statement (GEIS) in support of the rule, also published in August 1994 as NUREG-1496, along with its Appendix A (NUREG-1501), were also made available for comment. A staff working draft on regulatory guidance (NUREG-1500) was also made available. This report summarized the 1,309 comments on the proposed rule and supplementary items and the 311 comments on the GEIS as excerpted from 101 docketed letters received as solicited in the Federal Register notice. Comments from two NRC/Agreement-States meetings are also summarized.

NUREG/CR-6366: POLYRES: A POLYGON-BASED RICHARDS EQUATION SOLVER. HILLS,R.G. New Mexico State Univ., Las Cruces, NM. MEYER,P.D.; ROCKHOLD,M.L. Battelle Memorial Institute, Pacific Northwest Laboratory. December 1995. 68pp. 9605220418. PNL-10709. 88314:235.

This document describes the theory, implementation, and use of a software package designed to solve the transient, two-dimensional, Richards equation for water flow in unsaturated-saturated soils. This package was specifically designed to model complex geometries with minimal input from the user. The spatial variation of the hydraulic properties can be defined across individual polygon-shaped subdomains, called objects. These objects combine to form a polygon-shaped model domain. Each object can have its own distribution of hydraulic parameters. The resulting model domain and polygon-shaped internal objects are mapped onto a rectangular, finite-volume, computational grid by a preprocessor. This allows the user to specify model geometry independently of the underlying grid and greatly simplifies user input for complex geometries. In addition, this approach significantly reduces the computational requirements since complex geometries are actually modeled on a rectangular grid. This results in well-structured, finite difference-like systems of equations that require minimal storage and are very efficient to solve. The documentation for this software package includes a user's manual, a detailed description of the underlying theory, and a detailed discussion of program flow. Several example problems are presented that show the use and features of the software package. The water flow predictions for several of these example problems are compared to those of another algorithm (Kirkland et al., 1992) to test for prediction equivalency. The computer code described in this document is available from the Energy Science and Technology Software Center, P.O. Box 1020, Oak Ridge, TN 37831-1020.

NUREG/CR-6367: EXPERIMENTAL STUDY OF HEAD LOSS AND FILTRATION FOR LOCA DEBRIS. RAO,D.V.; SOUTO,F.J. Science & Engineering Associates, Inc. February 1996. 153pp. 9603190128. SEA95-554-06A:8. 87520:130.

A series of controlled experiments were conducted to obtain head loss and filtration characteristics of debris beds formed of NUKON(TM) fibrous fragments, and obtain data to validate the semi-theoretical head loss model developed in NUREG/CR-6224. A thermally insulated closed-loop test set-up was used to conduct experiments using beds formed of fibers only and fibers intermixed with particulate debris. A total of three particulate mixes were used to simulate the particulate debris. The head loss data were obtained for theoretical fiber bed thicknesses of 0.125 inch to 4.0 inches; approach velocities of 0.15 to 1.5 ft/s; temperatures of 75 degrees F and 125 degrees F; and sludge-to-fiber nominal concentration ratios of 0 to 60. Concentration measurements obtained during the first flushing cycle were used to estimate the filtration efficiencies of the debris beds. For test conditions where the beds are fairly uniform, the head loss data were predictable within an acceptable accuracy range by the semi-theoretical model. The model was equally applicable for both pure fiber beds and the mixed beds. Typically the model over-predicted the head losses for very thin beds and for thin beds at high sludge-to-fiber mass ratios. This is attributable to the non-uniformity of such debris beds. In this range the correlation can be interpreted to provide upper bound estimates of head loss.

NUREG/CR-6396: EXAMPLES, CLARIFICATIONS, AND GUIDANCE ON PREPARING REQUESTS FOR RELIEF FROM PUMP AND VALVE INSERVICE TESTING REQUIREMENTS. RANSOM,C.B.; HARTLEY,R.S. Idaho National Engineering Laboratory. February 1996. 186pp. 9603010300. INEL-95/0512. 87307:131.

In this report, the Idaho National Engineering Laboratory reviewers discuss issues related to requests for relief from the American Society of Mechanical Engineers code requirements for inservice testing (IST) of safety-related pumps and valves at commercial nuclear power plants. This report compiles information and examples that may be useful to licensees in developing relief requests submitted to U.S. Nuclear Regulatory Commission (NRC) for their consideration and provides insights and recommendations on related IST issues. The report also gives specific guidance on relief requests acceptable and not acceptable to the NRC and advises licensees in the use of this information for application at their facilities.

NUREG/CR-6407: CLASSIFICATION OF TRANSPORTATION PACKAGING AND DRY SPENT FUEL STORAGE SYSTEM COMPONENTS ACCORDING TO IMPORTANCE TO SAFETY. MCCONNELL,J.W.; AYERS,A.L.; TYACKE,M.J. Idaho National Engineering Laboratory. February 1996. 59pp. 9603190098. INEL-95/0551. 87522:099.

This report provides a graded approach for classification of components used in transportation packaging and dry spent fuel storage systems. This approach provides a method for identifying the classification of components according to importance to safety within transportation packaging and dry spent fuel storage systems. Record retention requirements are discussed to identify the documentation necessary to validate that the individual components were fabricated in accordance with their assigned classification. A review of the existing regulations pertaining to transportation packaging and dry storage systems was performed to identify current requirements. The general types of transportation packaging and dry storage systems were identified. Discussions were held with suppliers and fabricators of packaging and storage systems to determine current practices. The methodology used in this report is based on Regulatory Guide 7.10, Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material. This report also includes a list of generic components for each of the general types of transportation packaging and spent fuel storage systems. The safety importance of each component is discussed, and a classification category is assigned.

NUREG/CR-6415: APPLICATIONS OF RELIABILITY DEGRADATION ANALYSIS. VESELY,W.E. Science Applications International Corp. (formerly Science Applications, Inc.). SAMANTA,P.K. Brookhaven National Laboratory. February 1996. 47pp. 9603260303. BNL-NUREG-52488. 87624:242.

Reliability degradation analysis is the analysis of the occurrences of degradations and the times of maintenance to determine their reliability and risk implications. A program is presented for applying reliability degradation analyses to maintenance data collected at nuclear power plants. As a specific part of the program, time trending of maintenance data is illustrated. Maintenance data on residual heat removal (RHR) pumps and service water (SW) pumps at selected boiling water reactor (BWR) plants are evaluated to show how trends in maintenance data, which generally do not involve failures, can be used to understand effectiveness of maintenance. These trends also are translated to specific impacts on pump unavailability and on core-damage frequency (assuming that the trends in failure rate are the same as those observed for degradation rate). The second application shows the use of reliability degradation analysis to quantitatively evaluate the effect of maintenance, i.e., the quantitative change in component unavailability when no maintenance is performed. Assessment of these impacts are important since they measure the reliability and risk impacts of main-

8 Main Citations and Abstracts

tenance and can be fed back to the maintenance program to improve its effectiveness.

NUREG/CR-6419: SOLUBILITY TESTING OF ACTINIDES ON BREATHING-ZONE AND AREA AIR SAMPLES. METZGER, R.L.; JESSOP, B.H.; MCDOWELL, B.L. Radiation Safety Engineering, Inc. February 1996. 55pp. 9603180378. 87509:248.

A solubility testing method for several common actinides has been developed with sufficient sensitivity to allow profiles to be determined from routine breathing zone and area air samples in the workplace. Air samples are covered with a clean filter to form a filter-sample-filter sandwich which is immersed in an extracellular lung serum simulant solution. The sample is moved to a fresh beaker of the lung fluid simulant each day for one week, and then weekly until the end of the 28-day test period. The soak solutions are wet ashed with nitric acid and hydrogen peroxide to destroy the organic components of the lung simulant prior to the extraction of the nuclides of interest directly into an extractive scintillator for subsequent counting on a photon-electron rejecting alpha liquid scintillation (PEARLS) spectrometer. Solvent extraction methods utilizing the extractive scintillators have been developed for the isotopes of uranium, plutonium, and curium. The procedures normally produce an isotopic recovery greater than 95% and have been used to develop solubility profiles for air samples with 40 pCi or less of U3O8. Profiles developed for U3O8 samples show good agreement with in vitro and in vivo tests performed by other investigators on samples from the same uranium mills.

NUREG/CR-6421: A PROPOSED ACCEPTANCE PROCESS FOR COMMERCIAL OFF-THE-SHELF (COTS) SOFTWARE IN REACTOR APPLICATIONS. PRECKSHOT, G.G.; SCOTT, J.A. Lawrence Livermore National Laboratory. March 1996. 107pp. 9604150345. UCRL-ID-122526. 87867:179.

This paper proposes a process for acceptance of commercial off-the-shelf (COTS) software products for use in reactor systems important to safety. An initial set of four criteria establishes COTS software product identification and its safety category. Based on safety category, three sets of additional criteria, graded in rigor, are applied to approve (or disapprove) the product. These criteria fall roughly into three areas: product assurance, verification of safety function and safety impact, and examination of usage experience of the COTS product in circumstances similar to the proposed application. A report addressing the testing of existing software is included as an appendix.

NUREG/CR-6422: POWER EXCURSION ANALYSIS FOR HIGH BURNUP CORES. DIAMOND, D.J.; NEYMOTIN, L.; KOHUT, P. Brookhaven National Laboratory. February 1996. 78pp. 9603260310. BNL-NUREG-52491. 87640:242.

A study has been undertaken to determine the fuel enthalpy during a rod drop accident (RDA) and during two thermal-hydraulic transients in a boiling water reactor (BWR). The objective was to understand the consequences to high burnup fuel and the sources of uncertainty in the RDA calculations. The analysis was done with RAMONA-4B, a computer code that models the neutron kinetics throughout the core along with the thermal-hydraulics in the core, vessel, and steamline. The results showed that the calculated maximum fuel enthalpy in high burnup fuel will be affected by core design, initial conditions, and modeling assumptions. The important parameters in each of these categories are discussed in the report. An additional objective of this study was to identify BWR and pressurized water reactor (PWR) transients in which there is significant energy deposition. This determined which BWR transients were to be calculated as part of this study and which might be calculated if analysis were to be done for PWRs.

NUREG/CR-6430: SOFTWARE SAFETY HAZARD ANALYSIS. LAWRENCE, J.D. Lawrence Livermore National Laboratory. February 1996. 91pp. 9602290270. UCRL-ID-122514. 87296:001.

Techniques for analyzing the safety and reliability of analog-based electronic protection systems that serve to mitigate haz-

ards in process control systems have been developed over many years, and are reasonably well understood. An example is the protection system in a nuclear power plant. The extension of these techniques to systems which include digital computers is not well developed, and there is little consensus among software engineering experts and safety experts on how to analyze such systems. One possible technique is to extend hazard analysis to include digital computer-based systems. Software is frequently overlooked during system hazard analyses, but this is unacceptable when the software is in control of a potentially hazardous operation. In such cases, hazard analysis should be extended to fully cover the software. A method for performing software hazard analysis is proposed in this paper.

NUREG/CR-6432: ESTIMATED NET VALUE AND UNCERTAINTY FOR AUTOMATING ECCS SWITCHOVER AT PWRs. WALSH, B.; BRIDEAU, J.; COMES, L.; et al. Science & Engineering Associates, Inc. February 1996. 125pp. 9605130079. SEASF-DR-94-001. 88220:001.

A central question for resolution of GSI-24 is whether or not PWRs that currently rely on a manual system for ECCS switch-over to recirculation should be required to install an automatic system. Risk estimates are obtained by reevaluating the contributions to core damage frequencies (CDFs) associated with failures of manual and semiautomatic switch-over at a representative PWR. This study considers each separate instruction of the corresponding emergency operating procedures (EOPs), the mechanism for each control, and the relationship of each control to its neighbors. Important contributions to CDF include human errors that result in completely coupled failure of both trains and failure to enter the required EOP. This detailed study finds that changeover to a semiautomatic system is not justified on the basis of cost-benefit analysis: going from a manual to a semiautomatic system reduces the CDF by 1.7×10^{-5} per reactor year, but the probability that the net cost associated with the modification being less than \$1,000 per person-rem is about 20% without license renewal. Scoping analyses, using optimistic assumptions, were performed for a changeover to a semiautomatic system with automatic actuation and to a fully automatic system; in these cases the probability of having a net cost being less than \$1,000/person-rem is about 50% without license renewal and over 95% with license renewal.

NUREG/CR-6435: AN ANALYSIS OF THE IMPACTS OF ECONOMIC INCENTIVE PROGRAMS ON COMMERCIAL NUCLEAR POWER PLANT OPERATIONS AND MAINTENANCE COSTS. KAVANAUGH, D.C.; MONROE, W.K. Battelle Memorial Institute, Pacific Northwest Laboratory. WOOD, R.S. Office of Nuclear Reactor Regulation (Post 941001). February 1996. 47pp. 9603190137. PNL-10934. 87510:172.

This study presents an analysis of the determinants of non-fuel Operations and Maintenance expenses (O&M) for the period 1986 to 1990. Since the determinants of O&M outlays are likely to be many and varied, the potential linkages, both direct and indirect, to plant safety can be substantial. This study develops a framework to analyze the elements that affect these expenditures to provide a basis for understanding these linkages.

NUREG/CR-6438: THE EFFECT OF CYCLIC AND DYNAMIC LOADS ON CARBON STEEL PIPE. RUDLAND, D.L.; SCOTT, P.M.; WILKOWSKI, G.M. Battelle Memorial Institute, Columbus Laboratories. February 1996. 102pp. 9603190145. BML-2188. 87511:187.

This report presents the results of four 152-mm (6-inch) diameter, unpressurized, circumferential through-wall-cracked, dynamic pipe experiments fabricated from STS410 carbon steel pipe manufactured in Japan. For three of these experiments, the through-wall crack was in the base metal. The displacement histories applied to these experiments were a quasi-static monotonic, dynamic monotonic, and dynamic, cyclic ($R = -1$) history. The through-wall crack for the third experiment was in a

tungsten-inert-gas weld, fabricated in Japan, joining two lengths of STS410 pipe. The displacement history for this experiment was the same history applied to the dynamic, cyclic base metal experiment. The test temperature for each experiment was 300 C (572 F). The objective of these experiments was to compare a Japanese carbon steel pipe material with United States pipe material, to ascertain whether this Japanese steel was as sensitive to dynamic and cyclic effects as United States carbon steel pipe. In support of these pipe experiments, quasi-static and dynamic, tensile and fracture toughness tests were conducted. An analysis effort was performed that involved comparing experimental crack initiation and maximum moments with predictions based on available fracture prediction models, and calculating J-R curves for the pipe experiments using the **-factor method.

NUREG/CR-6439: DESIGN OF THE IPIRG-2 SIMULATED SEISMIC FORCING FUNCTION. OLSON,R.; SCOTT,P.M.; WILKOWSKI,G.M. Battelle Memorial Institute, Columbus Laboratories. February 1996. 86pp. 9602290278. BMI-2186. 87296:092.

A series of pipe system experiments was conducted in IPIRG-2 that used a realistic seismic forcing function. Because the seismic forcing function was more complex than the single-frequency increasing-amplitude sinusoidal forcing function used in the IPIRG-1 pipe system experiments, considerable effort went into designing the function. This report documents the design process for the seismic forcing function used in the IPIRG-2 pipe system experiments.

NUREG/CR-6442: EVIDENCE OF AGING EFFECTS ON CERTAIN SAFETY-RELATED COMPONENTS. MAGLEBY,H.L.; ATWOOD,C.L.; MACDONALD,P.E.; et al. Idaho National Engineering Laboratory. January 1996. 74pp. 9603180353. INEL-95/0654. 87511:281.

In response to interest shown by the Nuclear Energy Agency (NEA), Principal Working Group I (PWG-1) of the Committee on the Safety of Nuclear Installations (CSNI) conducted a generic study on the effects of aging of active components in nuclear power plants. (This focus on active components is consistent with PWG-1's mandate; passive components are primarily within the mandate of PWG-3.) Representatives from France, Sweden, Finland, Japan, the United States, and the United Kingdom participated in the study by submitting reports documenting aging studies performed in their countries. This report consists of

summaries of those reports, along with a comparison of the various statistical analysis methods used in the studies. The studies indicate that with some exceptions, active components generally do not present a significant aging problem in nuclear power plants. Design criteria and effective preventative maintenance programs, including timely replacement of components, are effective in mitigating potential aging problems. However, aging studies (such as qualitative and statistical analyses of failure modes and maintenance data) are an important part of efforts to identify and solve potential aging problems. Solving these problems typically includes such strategies as replacing suspect components with improved components, and implementing improved maintenance programs.

NUREG/CR-6448 V01: EVALUATION OF NATIONAL SEISMOGRAPH NETWORK DETECTION CAPABILITIES. Annual Report, July 1994 - July 1995. MCLAUGHLIN,K.L.; BENNETT,T.J. S-Cubed. March 1996. 58pp. 9604150331. SSS-TR-95-15216. 87867:286.

This first annual report presents detection thresholds, detection probabilities, and location error ellipse projections for the United States National Seismic Network (USNSN) with and without cooperative stations in the eastern United States. Network simulation methods are used with spectral noise levels at stations to simulate the processes of excitation, propagation, detection, and processing of seismic phases. The USNSN alone should be capable of detecting 4 or more P waves for shallow crustal earthquakes in nearly all of the eastern and central United States at the magnitude 3.8 level. When cooperative stations are added, the network should be capable of detecting 4 or more P waves from events 0.2 to 0.3 magnitude units lower. The planned expansion of the USNSN and cooperative stations should improve detection levels by an additional 0.2 to 0.3 magnitudes units in any areas. Location uncertainties for the USNSN can be significantly improved by addition of real-time cooperative stations. Median error ellipses for magnitude 4.5 earthquakes depend strongly on location, but uncertainties should be less than 100 km(2) in the central United States and degrade to 200 km(2) or more off-shore and south and north of the international boundaries. Close cooperation with the Canadian National Network should substantially improve detection thresholds and location uncertainties along the Canadian border.

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NUREG/CR-6442: EVIDENCE OF AGING EFFECTS ON CERTAIN SAFETY-RELATED COMPONENTS.

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NUREG-0910 R02 S02: NRC COMPREHENSIVE RECORDS DISPOSITION SCHEDULE.

Sealed Source

NUREG/CR-6280: TECHNOLOGY, SAFETY, AND COSTS OF DECOMMISSIONING A REFERENCE LARGE IRRADIATOR AND REFERENCE SEALED SOURCES.

Seismic

NUREG/CR-6439: DESIGN OF THE IPIRG-2 SIMULATED SEISMIC FORCING FUNCTION.

Seismic Engineering

NUREG/CP-0149 V03: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Structural & Seismic Engineering, Primary Systems Integrity, Equipment Operability And Aging, ECCS Strainer Blockage Research & Regulatory Issues.

Seismograph

NUREG/CR-6448 V01: EVALUATION OF NATIONAL SEISMOGRAPH NETWORK DETECTION CAPABILITIES. Annual Report, July 1994 - July 1995.

Service Life

NUREG/CR-6339: AGING ASSESSMENT OF WESTINGHOUSE PWR AND GENERAL ELECTRIC BWR CONTAINMENT ISOLATION FUNCTIONS.
NUREG/CR-6415: APPLICATIONS OF RELIABILITY DEGRADATION ANALYSIS.

Service Wear

NUREG/CR-6246: EFFECTS OF AGING AND SERVICE WEAR ON MAIN STEAM ISOLATION VALVES AND VALVE OPERATORS.

Severe Accident

NUREG/CP-0149 V02: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Human Factors

Research, Advanced I&C Hardware & Software, Severe Accident Research, Probabilistic Risk Assessment Topics, Individual Plant Examination.

Software

NUREG/CR-6430: SOFTWARE SAFETY HAZARD ANALYSIS.

Spent Fuel

NUREG-1536 DRFT FC: STANDARD REVIEW PLAN FOR DRY SPENT FUEL STORAGE SYSTEMS. Draft Report For Comment.
NUREG/CR-6407: CLASSIFICATION OF TRANSPORTATION PACKAGING AND DRY SPENT FUEL STORAGE SYSTEM COMPONENTS ACCORDING TO IMPORTANCE TO SAFETY.

Standard Review Plan

NUREG-1536 DRFT FC: STANDARD REVIEW PLAN FOR DRY SPENT FUEL STORAGE SYSTEMS. Draft Report For Comment.
NUREG-1537 PT02: GUIDELINES FOR PREPARING AND REVIEWING APPLICATIONS FOR THE LICENSING OF NON-POWER REACTORS. Part 2: Standard Review Plan And Acceptance Criteria.

Storage Cask

NUREG-1536 DRFT FC: STANDARD REVIEW PLAN FOR DRY SPENT FUEL STORAGE SYSTEMS. Draft Report For Comment.

Storage System

NUREG/CR-6407: CLASSIFICATION OF TRANSPORTATION PACKAGING AND DRY SPENT FUEL STORAGE SYSTEM COMPONENTS ACCORDING TO IMPORTANCE TO SAFETY.

Stress Corrosion Cracking

NUREG/CR-4667 V20: ENVIRONMENTALLY ASSISTED CRACKING IN LIGHT WATER REACTORS. Semiannual Report, October 1994 - March 1995.

Subatmospheric Containment

NUREG/CR-6338: RESOLUTION OF THE DIRECT CONTAINMENT HEATING ISSUE FOR ALL WESTINGHOUSE PLANTS WITH LARGE DRY CONTAINMENTS OR SUBATMOSPHERIC CONTAINMENTS.

Subsurface Flow

NUREG/CR-6366: POLYRES: A POLYGON-BASED RICHARDS EQUATION SOLVER.

Surface Crack

NUREG/CR-6337: SUMMARY OF RESULTS FROM THE IPIRG-2 ROUND-ROBIN ANALYSES.
NUREG/CR-6439: DESIGN OF THE IPIRG-2 SIMULATED SEISMIC FORCING FUNCTION.

Surge Protective Device

NUREG/CR-6340: AGING ASSESSMENT OF SURGE PROTECTIVE DEVICES IN NUCLEAR POWER PLANTS.

System Analysis

NUREG/CR-6415: APPLICATIONS OF RELIABILITY DEGRADATION ANALYSIS.

TLD

NUREG-0837 V15 N04: NRC TLD DIRECT RADIATION MONITORING NETWORK. Progress Report. October-December 1995.

Tailing

NUREG-1531: DRAFT ENVIRONMENTAL IMPACT STATEMENT RELATED TO RECLAMATION OF THE URANIUM MILL TAILINGS AT THE ATLAS SITE, MOAB, UTAH. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation)
NUREG-1532: DRAFT TECHNICAL EVALUATION REPORT FOR THE PROPOSED REVISED RECLAMATION PLAN FOR THE ATLAS CORPORATION MOAB MILL. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation)

Technical Evaluation Report

NUREG-1532: DRAFT TECHNICAL EVALUATION REPORT FOR THE PROPOSED REVISED RECLAMATION PLAN FOR THE ATLAS CORPORATION MOAB MILL. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation)

Thermal Hydraulic Research

NUREG/CP-0149 V01: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Plenary Session, High Burnup Fuel Behavior, Thermal Hydraulic Research.

Thermoluminescent Dosimeter

NUREG-0837 V15 N04: NRC TLD DIRECT RADIATION MONITORING NETWORK. Progress Report. October-December 1995.

Title List

NUREG-0540 V17 N11: TITLE LIST OF DOCUMENTS MADE PUBLICLY AVAILABLE. November 1-30, 1995.
NUREG-0540 V17 N12: TITLE LIST OF DOCUMENTS MADE PUBLICLY AVAILABLE. December 1-31, 1995.

Topical Report

NUREG-0390 V10: TOPICAL REPORT REVIEW STATUS. (Blue Book)

Transformer

NUREG/CR-5753: AGING OF SAFETY CLASS 1E TRANSFORMERS IN SAFETY SYSTEMS OF NUCLEAR POWER PLANTS.

Transient Worker

NUREG-0713 V16: OCCUPATIONAL RADIATION EXPOSURE AT COMMERCIAL NUCLEAR POWER REACTORS AND OTHER FACILITIES, 1994. Twenty-Seventh Annual Report.

Transportation Packaging

NUREG/CR-6407: CLASSIFICATION OF TRANSPORTATION PACKAGING AND DRY SPENT FUEL STORAGE SYSTEM COMPONENTS ACCORDING TO IMPORTANCE TO SAFETY.

Ultrasonic

NUREG/CR-5985 S01: REVIEW OF P-SCAN COMPUTER-BASED ULTRASONIC INSERVICE INSPECTION SYSTEM.

Underground Disposal

NUREG/CR-6346: HYDROLOGIC EVALUATION METHODOLOGY FOR ESTIMATING WATER MOVEMENT THROUGH THE UNSATURATED ZONE AT COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES.

Unsaturated Zone

NUREG/CR-6346: HYDROLOGIC EVALUATION METHODOLOGY FOR ESTIMATING WATER MOVEMENT THROUGH THE UNSATURATED

ZONE AT COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES.

NUREG/CR-6366: POLYRES: A POLYGON-BASED RICHARDS EQUATION SOLVER.

Uranium

NUREG/CR-6419: SOLUBILITY TESTING OF ACTINIDES ON BREATHING-ZONE AND AREA AIR SAMPLES.

Uranium Mill

NUREG-1531: DRAFT ENVIRONMENTAL IMPACT STATEMENT RELATED TO RECLAMATION OF THE URANIUM MILL TAILINGS AT THE ATLAS SITE, MOAB, UTAH. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation)

NUREG-1532: DRAFT TECHNICAL EVALUATION REPORT FOR THE PROPOSED REVISED RECLAMATION PLAN FOR THE ATLAS CORPORATION MOAB MILL. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation)

Valve Operator

NUREG/CR-6246: EFFECTS OF AGING AND SERVICE WEAR ON MAIN STEAM ISOLATION VALVES AND VALVE OPERATORS.

Valve Testing

NUREG/CR-6396: EXAMPLES, CLARIFICATIONS, AND GUIDANCE ON PREPARING REQUESTS FOR RELIEF FROM PUMP AND VALVE INSERVICE TESTING REQUIREMENTS.

Vendor Inspection

NUREG-0040 V19 N04: LICENSEE CONTRACTOR AND VENDOR INSPECTION STATUS REPORT. Quarterly Report, October-December 1995. (White Book)

Waste-Form Leachate

NUREG/CR-6124: CHARACTERIZATION OF RADIONUCLIDE-CHELATING AGENT COMPLEXES FOUND IN LOW-LEVEL RADIOACTIVE DECONTAMINATION WASTE. Literature Review.

NRC Originating Organization Index (Staff Reports)

This index lists those NRC organizations that have published staff reports. The index is arranged alphabetically by major NRC organizations (e.g., program offices) and then by sub-sections of these (e.g., divisions, branches) where appropriate. Each entry is followed by a NUREG number and title of the report(s). If further information is needed, refer to the main citation by NUREG number.

OFFICE OF EXECUTIVE DIRECTOR FOR OPERATIONS (EDO)

REGION 1 (POST 820201)

NUREG-0837 V15 N04: NRC TLD DIRECT RADIATION MONITORING NETWORK. Progress Report, October-December 1995.

OFC OF ENFORCEMENT (POST 870413)

NUREG-0940 V14N3&4P1: ENFORCEMENT ACTIONS: SIGNIFICANT ACTIONS RESOLVED INDIVIDUAL ACTIONS. Semiannual Progress Report, July-December 1995.

NUREG-0940 V14N3&4P2: ENFORCEMENT ACTIONS: SIGNIFICANT ACTIONS RESOLVED REACTOR LICENSEES. Semiannual Progress Report, July-December 1995.

NUREG-0940 V14N3&4P3: ENFORCEMENT ACTIONS: SIGNIFICANT ACTIONS RESOLVED MATERIAL LICENSEES. Semiannual Progress Report, July-December 1995.

OFC OF PERSONNEL (POST 870413)

NUREG-0325 R19: U.S. NUCLEAR REGULATORY COMMISSION ORGANIZATION CHARTS AND FUNCTIONAL STATEMENTS. January 31, 1996.

EDO - OFFICE OF ADMINISTRATION (PRE 870413 & POST 890205)

DIVISION OF FREEDOM OF INFORMATION & PUBLICATIONS SERVICES (POST 940714)

NUREG-0304 V20 N03: REGULATORY AND TECHNICAL REPORTS (ABSTRACT INDEX JOURNAL). Compilation for Third Quarter 1995, July-September.

NUREG-0540 V17 N11: TITLE LIST OF DOCUMENTS MADE PUBLICLY AVAILABLE, November 1-30, 1995.

NUREG-0540 V17 N12: TITLE LIST OF DOCUMENTS MADE PUBLICLY AVAILABLE, December 1-31, 1995.

NUREG-0750 V41: NUCLEAR REGULATORY COMMISSION ISSUANCES. Opinions And Decisions Of The Nuclear Regulatory Commission With Selected Orders. January-June 1995.

NUREG-0750 V42 I02: INDEXES TO NUCLEAR REGULATORY COMMISSION ISSUANCES. July-December 1995.

NUREG-0750 V42 N05: NUCLEAR REGULATORY COMMISSION ISSUANCES FOR NOVEMBER 1995. Pages 181-219.

NUREG-0750 V42 N06: NUCLEAR REGULATORY COMMISSION ISSUANCES FOR DECEMBER 1995. Pages 221-258.

NUREG-0750 V43 N01: NUCLEAR REGULATORY COMMISSION ISSUANCES FOR JANUARY 1996. Pages 1-11.

NUREG-0936 V14 N02: NRC REGULATORY AGENDA. Semiannual Report, July-December 1995.

EDO - OFFICE OF THE CONTROLLER (PRE 820418 & POST 890205)

DIVISION OF BUDGET & ANALYSIS (POST 890205)

NUREG-1100 V12: BUDGET ESTIMATES. Fiscal Year 1997.

EDO - OFFICE FOR ANALYSIS & EVALUATION OF OPERATIONAL DATA

OFFICE FOR ANALYSIS & EVALUATION OF OPERATIONAL DATA, DIRECTOR

NUREG-0090 V18 N02: REPORT TO CONGRESS ON ABNORMAL OCCURRENCES. April-June 1995.

NUREG-0090 V18 N03: REPORT TO CONGRESS ON ABNORMAL OCCURRENCES. July-September 1995.

EDO - OFFICE OF INFORMATION RESOURCES MANAGEMENT & ARM (POST 861109)

INFORMATION & RECORDS MANAGEMENT BRANCH (POST 890827)
NUREG-0910 R02 S02: NRC COMPREHENSIVE RECORDS DISPOSITION SCHEDULE.

EDO - OFFICE OF NUCLEAR MATERIAL SAFETY & SAFEGUARDS

OFFICE OF NUCLEAR MATERIAL SAFETY & SAFEGUARDS

NUREG-1536 DRFT FC: STANDARD REVIEW PLAN FOR DRY SPENT FUEL STORAGE SYSTEMS. Draft Report For Comment.

DIVISION OF WASTE MANAGEMENT (NMSS 940403)

NUREG-1531: DRAFT ENVIRONMENTAL IMPACT STATEMENT RELATED TO RECLAMATION OF THE URANIUM MILL TAILINGS AT THE ATLAS SITE, MOAB, UTAH. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation)

NUREG-1532: DRAFT TECHNICAL EVALUATION REPORT FOR THE PROPOSED REVISED RECLAMATION PLAN FOR THE ATLAS CORPORATION MOAB MILL. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation)

EDO - OFFICE OF NUCLEAR REGULATORY RESEARCH (POST 820405)

DIVISION OF REGULATORY APPLICATIONS (POST 941217)

NUREG-0713 V16: OCCUPATIONAL RADIATION EXPOSURE AT COMMERCIAL NUCLEAR POWER REACTORS AND OTHER FACILITIES, 1994. Twenty-Seventh Annual Report.

EDO - OFFICE OF NUCLEAR REACTOR REGULATION (POST 800428)

OFFICE OF NUCLEAR REACTOR REGULATION (POST 941001)

NUREG-0040 V19 N04: LICENSEE CONTRACTOR AND VENDOR INSPECTION STATUS REPORT. Quarterly Report, October-December 1995. (White Book)

NUREG-0390 V10: TOPICAL REPORT REVIEW STATUS. (Blue Book)

NUREG-0847 S20: SAFETY EVALUATION REPORT RELATED TO THE OPERATION OF WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2. Docket Nos. 50-390 And 50-391. (Tennessee Valley Authority)

NUREG-1537 PT01: GUIDELINES FOR PREPARING AND REVIEWING APPLICATIONS FOR THE LICENSING OF NON-POWER REACTORS. Part 1: Format And Content.

NUREG-1537 PT02: GUIDELINES FOR PREPARING AND REVIEWING APPLICATIONS FOR THE LICENSING OF NON-POWER REACTORS. Part 2: Standard Review Plan And Acceptance Criteria.

NUREG-1544: STATUS REPORT: INTERGRANULAR STRESS CORROSION CRACKING OF BWR CORE SHROUDS AND OTHER INTERNAL COMPONENTS.

NUREG/CR-6435: AN ANALYSIS OF THE IMPACTS OF ECONOMIC INCENTIVE PROGRAMS ON COMMERCIAL NUCLEAR POWER PLANT OPERATIONS AND MAINTENANCE COSTS.

NRC Originating Organization Index (International Agreements)

This index lists those NRC organizations that have published international agreement reports. The index is arranged alphabetically by major NRC organizations (e.g., program offices) and then by subsections of these (e.g., divisions, branches) where appropriate. Each entry is followed by a NUREG number and title of the report(s). If further information is needed, refer to the main citation by NUREG number.

There were no NUREG/IA reports published during this quarter.

NRC Contract Sponsor Index (Contractor Reports)

This index lists the NRC organizations that sponsored the contractor reports listed in this compilation. It is arranged alphabetically by major NRC organization (e.g., program office) and then by subsections of these (e.g., divisions) where appropriate. The sponsor organization is followed by the NUREG/CR number and title of the report(s) prepared by that organization. If further information is needed, refer to the main citation by the NUREG/CR number.

EDO - OFFICE FOR ANALYSIS & EVALUATION OF OPERATIONAL DATA

DIVISION OF SAFETY PROGRAMS (POST 870413)
NUREG/CR-6442: EVIDENCE OF AGING EFFECTS ON CERTAIN SAFETY-RELATED COMPONENTS.

EDO - OFFICE OF NUCLEAR MATERIAL SAFETY & SAFEGUARDS

DIVISION OF INDUSTRIAL & MEDICAL NUCLEAR SAFETY (POST 870729)
NUREG/CR-6407: CLASSIFICATION OF TRANSPORTATION PACKAGING AND DRY SPENT FUEL STORAGE SYSTEM COMPONENTS ACCORDING TO IMPORTANCE TO SAFETY.

EDO - OFFICE OF NUCLEAR REGULATORY RESEARCH (POST 820405)

DIVISION OF ENGINEERING TECHNOLOGY (POST 941217)
NUREG/CR-4667 V20: ENVIRONMENTALLY ASSISTED CRACKING IN LIGHT WATER REACTORS. Semiannual Report, October 1994 - March 1995.
NUREG/CR-5753: AGING OF SAFETY CLASS 1E TRANSFORMERS IN SAFETY SYSTEMS OF NUCLEAR POWER PLANTS.
NUREG/CR-5985 S01: REVIEW OF P-SCAN COMPUTER-BASED ULTRASONIC INSERVICE INSPECTION SYSTEM.
NUREG/CR-6246: EFFECTS OF AGING AND SERVICE WEAR ON MAIN STEAM ISOLATION VALVES AND VALVE OPERATORS.
NUREG/CR-6279: APPLICATION OF FRACTURE TOUGHNESS SCALING MODELS TO THE DUCTILE-TO-BRITTLE TRANSITION.
NUREG/CR-6336: AGING ASSESSMENT OF LARGE ELECTRIC MOTORS IN NUCLEAR POWER PLANTS.
NUREG/CR-6337: SUMMARY OF RESULTS FROM THE IPIRG-2 ROUND-ROBIN ANALYSES.
NUREG/CR-6339: AGING ASSESSMENT OF WESTINGHOUSE PWR AND GENERAL ELECTRIC BWR CONTAINMENT ISOLATION FUNCTIONS.
NUREG/CR-6340: AGING ASSESSMENT OF SURGE PROTECTIVE DEVICES IN NUCLEAR POWER PLANTS.
NUREG/CR-6367: EXPERIMENTAL STUDY OF HEAD LOSS AND FILTRATION FOR LOCA DEBRIS.
NUREG/CR-6415: APPLICATIONS OF RELIABILITY DEGRADATION ANALYSIS.
NUREG/CR-6432: ESTIMATED NET VALUE AND UNCERTAINTY FOR AUTOMATING ECCS SWITCHOVER AT PWRs.
NUREG/CR-6438: THE EFFECT OF CYCLIC AND DYNAMIC LOADS ON CARBON STEEL PIPE.
NUREG/CR-6439: DESIGN OF THE IPIRG-2 SIMULATED SEISMIC FORCING FUNCTION.
NUREG/CR-6448 V01: EVALUATION OF NATIONAL SEISMOGRAPH NETWORK DETECTION CAPABILITIES. Annual Report, July 1994 - July 1995.

DIVISION OF REGULATORY APPLICATIONS (POST 941217)

NUREG/CR-6096: APACHE LEAP TUFF INTRAVAL EXPERIMENTS. Results And Lessons Learned.
NUREG/CR-6124: CHARACTERIZATION OF RADIONUCLIDE-CHELATING AGENT COMPLEXES FOUND IN LOW-LEVEL RADIOACTIVE DECONTAMINATION WASTE. Literature Review.
NUREG/CR-6230: RADIOANALYTICAL TECHNOLOGY FOR 10 CFR PART 61 AND OTHER SELECTED RADIONUCLIDES. Literature Review.
NUREG/CR-6280: TECHNOLOGY, SAFETY, AND COSTS OF DECOMMISSIONING A REFERENCE LARGE IRRADIATOR AND REFERENCE SEALED SOURCES.
NUREG/CR-6346: HYDROLOGIC EVALUATION METHODOLOGY FOR ESTIMATING WATER MOVEMENT THROUGH THE UNSATURATED ZONE AT COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES.
NUREG/CR-6353: COMMENTS RECEIVED ON PROPOSED RULE ON RADIOLOGICAL CRITERIA FOR DECOMMISSIONING AND RELATED DOCUMENTS.
NUREG/CR-6366: POLYRES: A POLYGON-BASED RICHARDS EQUATION SOLVER.
NUREG/CR-6419: SOLUBILITY TESTING OF ACTINIDES ON BREATHING-ZONE AND AREA AIR SAMPLES.
DIVISION OF SYSTEMS TECHNOLOGY (POST 941217)
NUREG/CR-6338: RESOLUTION OF THE DIRECT CONTAINMENT HEATING ISSUE FOR ALL WESTINGHOUSE PLANTS WITH LARGE DRY CONTAINMENTS OR SUBATMOSPHERIC CONTAINMENTS.
NUREG/CR-6422: POWER EXCURSION ANALYSIS FOR HIGH BURNUP CORES.

EDO - OFFICE OF NUCLEAR REACTOR REGULATION (POST 800428)

OFFICE OF NUCLEAR REACTOR REGULATION (POST 941001)
NUREG/CR-2850 V14: DOSE COMMITMENTS DUE TO RADIOACTIVE RELEASES FROM NUCLEAR POWER PLANT SITES IN 1992.
NUREG/CR-6396: EXAMPLES, CLARIFICATIONS, AND GUIDANCE ON PREPARING REQUESTS FOR RELIEF FROM PUMP AND VALVE INSERVICE TESTING REQUIREMENTS.
NUREG/CR-6421: A PROPOSED ACCEPTANCE PROCESS FOR COMMERCIAL OFF-THE-SHELF (COTS) SOFTWARE IN REACTOR APPLICATIONS.
NUREG/CR-6430: SOFTWARE SAFETY HAZARD ANALYSIS.
NUREG/CR-6435: AN ANALYSIS OF THE IMPACTS OF ECONOMIC INCENTIVE PROGRAMS ON COMMERCIAL NUCLEAR POWER PLANT OPERATIONS AND MAINTENANCE COSTS.

Contractor Index

This index lists, in alphabetical order, the contractors that prepared the NUREG/CR reports listed in this compilation. Listed below each contractor are the NUREG/CR numbers and titles of their reports. If further information is needed, refer to the main citation by the NUREG/CR number.

ADVANCED SYSTEMS TECHNOLOGY, INC.

NUREG/CR-6353: COMMENTS RECEIVED ON PROPOSED RULE ON RADIOLOGICAL CRITERIA FOR DECOMMISSIONING AND RELATED DOCUMENTS.

ARGONNE NATIONAL LABORATORY

NUREG/CR-4667 V20: ENVIRONMENTALLY ASSISTED CRACKING IN LIGHT WATER REACTORS. Semiannual Report, October 1994 - March 1995.

ARIZONA, UNIV. OF, TUCSON, AZ

NUREG/CR-6096: APACHE LEAP TUFF INTRAVAL EXPERIMENTS. Results And Lessons Learned.

BATTELLE MEMORIAL INSTITUTE, COLUMBUS LABORATORIES

NUREG/CR-6337: SUMMARY OF RESULTS FROM THE IPIRG-2 ROUND-ROBIN ANALYSES.

NUREG/CR-6438: THE EFFECT OF CYCLIC AND DYNAMIC LOADS ON CARBON STEEL PIPE.

NUREG/CR-6439: DESIGN OF THE IPIRG-2 SIMULATED SEISMIC FORCING FUNCTION.

BATTELLE MEMORIAL INSTITUTE, PACIFIC NORTHWEST LABORATORY

NUREG/CR-2850 V14: DOSE COMMITMENTS DUE TO RADIOACTIVE RELEASES FROM NUCLEAR POWER PLANT SITES IN 1992.

NUREG/CR-5985 S01: REVIEW OF P-SCAN COMPUTER-BASED ULTRASONIC INSERVICE INSPECTION SYSTEM.

NUREG/CR-6124: CHARACTERIZATION OF RADIONUCLIDE-CHELATING AGENT COMPLEXES FOUND IN LOW-LEVEL RADIOACTIVE DECONTAMINATION WASTE. Literature Review.

NUREG/CR-6230: RADIOANALYTICAL TECHNOLOGY FOR 10 CFR PART 61 AND OTHER SELECTED RADIONUCLIDES. Literature Review.

NUREG/CR-6280: TECHNOLOGY, SAFETY, AND COSTS OF DECOMMISSIONING A REFERENCE LARGE IRRADIATOR AND REFERENCE SEALED SOURCES.

NUREG/CR-6346: HYDROLOGIC EVALUATION METHODOLOGY FOR ESTIMATING WATER MOVEMENT THROUGH THE UNSATURATED ZONE AT COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES.

NUREG/CR-6366: POLYRES: A POLYGON-BASED RICHARDS EQUATION SOLVER.

NUREG/CR-6435: AN ANALYSIS OF THE IMPACTS OF ECONOMIC INCENTIVE PROGRAMS ON COMMERCIAL NUCLEAR POWER PLANT OPERATIONS AND MAINTENANCE COSTS.

BROOKHAVEN NATIONAL LABORATORY

NUREG/CP-0149 V01: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Plenary Session, High Burnup Fuel Behavior, Thermal Hydraulic Research.

NUREG/CP-0149 V02: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Human Factors Research, Advanced I&C Hardware & Software, Severe Accident Research, Probabilistic Risk Assessment Topics, Individual Plant Examination.

NUREG/CP-0149 V03: PROCEEDINGS OF THE TWENTY-THIRD WATER REACTOR SAFETY INFORMATION MEETING. Structural & Seismic Engineering, Primary Systems Integrity, Equipment Operability And Aging, ECCS Strainer Blockage Research & Regulatory Issues.

NUREG/CR-6336: AGING ASSESSMENT OF LARGE ELECTRIC MOTORS IN NUCLEAR POWER PLANTS.

NUREG/CR-6339: AGING ASSESSMENT OF WESTINGHOUSE PWR AND GENERAL ELECTRIC BWR CONTAINMENT ISOLATION FUNCTIONS.

NUREG/CR-6340: AGING ASSESSMENT OF SURGE PROTECTIVE DEVICES IN NUCLEAR POWER PLANTS.

NUREG/CR-6415: APPLICATIONS OF RELIABILITY DEGRADATION ANALYSIS.

NUREG/CR-6422: POWER EXCURSION ANALYSIS FOR HIGH BURNUP CORES.

FLORIDA, UNIV. OF, GAINESVILLE, FL

NUREG/CR-6340: AGING ASSESSMENT OF SURGE PROTECTIVE DEVICES IN NUCLEAR POWER PLANTS.

GEORGIA, UNIV. OF, ATHENS, GA

NUREG/CR-6096: APACHE LEAP TUFF INTRAVAL EXPERIMENTS. Results And Lessons Learned.

IDAHO NATIONAL ENGINEERING LABORATORY

NUREG/CR-5753: AGING OF SAFETY CLASS 1E TRANSFORMERS IN SAFETY SYSTEMS OF NUCLEAR POWER PLANTS.

NUREG/CR-6396: EXAMPLES, CLARIFICATIONS, AND GUIDANCE ON PREPARING REQUESTS FOR RELIEF FROM PUMP AND VALVE INSERVICE TESTING REQUIREMENTS.

NUREG/CR-6407: CLASSIFICATION OF TRANSPORTATION PACKAGING AND DRY SPENT FUEL STORAGE SYSTEM COMPONENTS ACCORDING TO IMPORTANCE TO SAFETY.

NUREG/CR-6442: EVIDENCE OF AGING EFFECTS ON CERTAIN SAFETY-RELATED COMPONENTS.

LAWRENCE LIVERMORE NATIONAL LABORATORY

NUREG/CR-6421: A PROPOSED ACCEPTANCE PROCESS FOR COMMERCIAL OFF-THE-SHELF (COTS) SOFTWARE IN REACTOR APPLICATIONS.

NUREG/CR-6430: SOFTWARE SAFETY HAZARD ANALYSIS.

NAVY, DEPT. OF

NUREG/CR-6279: APPLICATION OF FRACTURE TOUGHNESS SCALING MODELS TO THE DUCTILE-TO-BRITTLE TRANSITION.

NEW MEXICO STATE UNIV., LAS CRUCES, NM

NUREG/CR-6366: POLYRES: A POLYGON-BASED RICHARDS EQUATION SOLVER.

OAK RIDGE NATIONAL LABORATORY

NUREG-1531: DRAFT ENVIRONMENTAL IMPACT STATEMENT RELATED TO RECLAMATION OF THE URANIUM MILL TAILINGS AT THE ATLAS SITE, MOAB, UTAH. Source Material License No. SUA-917, Docket No. 40-3453. (Atlas Corporation)

NUREG/CR-6246: EFFECTS OF AGING AND SERVICE WEAR ON MAIN STEAM ISOLATION VALVES AND VALVE OPERATORS.

RADIATION SAFETY ENGINEERING, INC.

NUREG/CR-6419: SOLUBILITY TESTING OF ACTINIDES ON BREATHING-ZONE AND AREA AIR SAMPLES.

S-CUBED

NUREG/CR-6448 V01: EVALUATION OF NATIONAL SEISMOGRAPH NETWORK DETECTION CAPABILITIES. Annual Report, July 1994 - July 1995.

SANDIA NATIONAL LABORATORIES

NUREG/CR-6338: RESOLUTION OF THE DIRECT CONTAINMENT HEATING ISSUE FOR ALL WESTINGHOUSE PLANTS WITH LARGE DRY CONTAINMENTS OR SUBATMOSPHERIC CONTAINMENTS.

SCIENCE & ENGINEERING ASSOCIATES, INC.

NUREG/CR-6367: EXPERIMENTAL STUDY OF HEAD LOSS AND FILTRATION FOR LOCA DEBRIS.

NUREG/CR-6432: ESTIMATED NET VALUE AND UNCERTAINTY FOR AUTOMATING ECCS SWITCHOVER AT PWRs.

30 Contractor Index

**SCIENCE APPLICATIONS INTERNATIONAL CORP. (FORMERLY
SCIENCE APPLICATIONS,**
NUREG-0713 V16: OCCUPATIONAL RADIATION EXPOSURE AT COM-
MERICAL NUCLEAR POWER REACTORS AND OTHER
FACILITIES, 1994. Twenty-Seventh Annual Report.

NUREG/CR-6415: APPLICATIONS OF RELIABILITY DEGRADATION
ANALYSIS.

U.S. NAVAL ACADEMY, ANNAPOLIS, MD
NUREG/CR-6279: APPLICATION OF FRACTURE TOUGHNESS SCAL-
ING MODELS TO THE DUCTILE-TO-BRITTLE TRANSITION.

International Organization Index

This index lists, in alphabetical order, the countries and performing organizations that prepared the NUREG/IA reports listed in this compilation. Listed below each country and performing organization are the NUREG/IA numbers and titles of their reports. If further information is needed, refer to the main citation by the NUREG/IA number.

There were no NUREG/IA reports published during this quarter.

Licensed Facility Index

This index lists the facilities that were the subject of NRC staff or contractor reports. The facility names are arranged in alphabetical order. They are preceded by their Docket number and followed by the report number. If further information is needed, refer to the main citation by the NUREG number.

40-3453	Atlas Corp., Denver, CO,	NUREG-1531	50-391	Watts Bar Nuclear Plant, Unit 2, Tennessee	NUREG-0847 S20
40-3453	Atlas Corp., Denver, CO,	NUREG-1532		Valley Authority	
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(See Instructions on the reverse)

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M. A. Sheehan, Project Manager

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