

File



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

Mar. 31, 2001

To: Apostolakis, Bonaca, Sieber, Larkins, Lyons, Savio, Sorensen
From: August W. Cronenberg, ACRS Senior Fellow
Subject: 2nd Quarter FY-2001 Fellow Activities Report

Attached is an updated "table-of-activities" which summarizes my ACRS fellow efforts to date, including efforts this quarter. All primary activities are listed since my joining ACRS in June-95. Efforts this quarter (at 1/2-time FTE) include:

Activities Current Quarter: Jan. 1, 2001 through Mar. 31, 2001

- 1) **Memo AWC-101.2001:** Fuels Section of ACRS Research Report. A 7-page memo to Dr. Powers for incorporation into the 2001 Research Report. Memo centered on research programs/needs for high-burnup/long-cycle fuel, needs for review of upcoming license applications for use of MOX in commercial reactors, and research needs for licensing of advanced Zirconium-based claddings (ZIRLO and M-5). Subject memo was largely incorporated into research report.
- 2) **Memo AWC-102.2001:** Work Scope---Estimation of Margin Reductions for Multiple License Actions. Work scope outline of investigation into of reductions in safety margins for aged plants, operated at ever higher power, longer fuel duty times, higher fuel burnups, reduced inspections, etc.
- 3) **Memo AWC-103.2001:** MOX Review Activities for ACRS. Memo summarizes primary issues for ACRS review related to the upcoming License and Construction Application (LCA) for the MOX fuel fabrication facility and subsequent License Amendment Request (LAR) for MOX fuel use in the McGuire & Catawaba reactors.
- 4) **Report AWC-105.2001:** Assessment of Potential Margin Reductions for Re-Licensed, Uprated Plants---Draft. Attached is a first draft of said report, which indicates progress made to date. Progress has been made on identification of plant parameters impacted by power uprates (Ch.-3) and how changes in such parameters can be used to quantify associated margin reductions. Hatch-BWR is the was chosen for examination being it had 2 uprates and is in the process of license renewal approval. The major problem thus far has been the difficulty of gleaning from plant FSARs, LARs, SERs, a consistent set of plant parameters for self-consistent comparison at the different power levels. This has been a time consuming task, although some success is evident. The focus of my efforts next quarter will center on estimation of margin reductions associated with plant life extension.

Courses Attended: Introduction to *Power-Point* Slide Presentations (1 day)

Anticipated Activities Next Quarter: Continue progress on Report AWC-105.2001, with regards to evaluation of margin impact for plant life extension for Hatch plant-specific parameters (similar to evaluation for Hatch power uprate).

ACRS FELLOW STATUS REPORT

August W. Cronenberg

Project Description	Effort	Report	ACRS Use
Performance Period: 2nd Qt FY2001 (Jan. 1/2001 to Mar. 31/2001, ½-time @ 6 FTE work weeks)			
1) <u>Memo: Fuels Section of 2001 Research Report.</u> 7-page discussion of research needs on high-burnup fuel, MOX, advanced claddings.	1 wk	AWC-101.2001	ACRS Members & Staff
2) <u>Memo: Work Scope for Safety Margin Assessment,</u> scope of effort to estimate potential safety margin reductions for multiple license actions (plant life extension/ageing, power uprates, high-burnup, etc).	3 dy	AWC-102.2001	ACRS Members & Staff
3) <u>Memo: Outline of MOX issues for ACRS related to review of license applications for the MOX fabrication facility and MOX use in McGuire & Catawaba reactors.</u>	3 dy	AWC-103.2001	ACRS Members & Staff
4) <u>Report-Draft: Evaluation of Safety Margin Reductions,</u> 1 st draft of report on margins reductions. Accomplished this reporting period, Ch.-1 introduction, Ch.-2 use of margins in regulatory process, Ch.-3 estimation of margin impact for power uprates.	5 wk	AWC-105.2001 (DRAFT)	Bonaca, Sieber, Apostolakis, Larkins, Lyons, Savio, Sorensen
5) Courses: Introduction to Power-Point Slide Presentations	1 dy		
Performance Period: 1st Qt FY2001 (Oct. 1/2000 to Dec.30/2000, ½-time @ 6 FTE work weeks)			
1) <u>Final Report: Consideration of Spent Fuel Pool (SFP) Heatup and Source Term Issues for Shutdown Plants.</u> Review of SFP heatup, Zry-Air/UF ₆ -Air oxidation, fuel decrepitation and impact on source terms. Concluded that current agency practice of reviewing plant-specific analysis for exemptions requests should be continued until phenomena uncertainties are removed to proceed with generic rule-making.	4 wk	AWC-108.2000	ACRS Members & Staff
2) <u>Memo: Summary Thoughts on Revised SFP Risk Study.</u> Summarizes thoughts/comments related to participation in the Oct. 18/00 Subcommittee meeting on Revised SFP Risk Study	1 wk	AWC-113.2000	ACRS Members & Staff
3) <u>Memo: Boron Dilution Issues and Regulatory Actions.</u> Summarizes issues related to licensee events on accidental boron addition during shutdown and maintenance activities. Prepared for Larkins presentation to German-RSK board.	2.5 dy	AWC-114.2000	Larkins, Kress, Bonaca, Uhrig, Powers, Apostolakis
4) Courses: Retirement Benefits Application Seminar	1 dy		

ACRS FELLOW STATUS REPORT
August W. Cronenberg

Project Description	Effort	Report	ACRS Use
Performance Period: 4th Quarter FY2000 (Oct. 1-Sept. 30/2000, ½-time at 6 FTE work weeks)			
1) Comments on J. Sorensen paper: Safety Culture	2 dy	AWC-107.2000	Sorensen, Powers
2) Continuation of Spent Fuel Pool report/basis for prior exemptions for decommissioned plants	3wk	AWC-108.2000	Kress
3) Papers/Reports on MOX and Safety Issues	3 dy	AWC-109.2000	Savio/Larkins
4) Summary: Beaver Valley Uprate & Licensee Renewal	1 dy	AWC-110.2000	ACRS Members & Staff
5) Summary: Duane Arnold Uprate Status Mtg.	1 dy	AWC-111.2000	ACRS Members & Staff
6) Draft of Fuels Section for ACRS Research Report	1 wk	AWC-112.2000	ACRS Members & Staff
Performance Period: 3rd Quarter FY2000 (Apr. 1-June 30/2000, ½-time at 6 FTE work weeks)			
1) Travel Report: ANS San Diego Mtg	1 wk	AWC-105.2000	ACRS Members & Staff
2) Memo on Central Issues Related to Staff Review of Requests for Power Uprate	4 dy	AWC-106.2000	ACRS Members & Staff
3) DRAFT: Report in preparation on technical issues and uncertainties in risk for Spent Fuel Pools	4 wk	AWC-101.2000 (Partial DRAFT)	Powers, Apostolakis, Savio Larkins, Larson, Sorensen
Performance Period: 2nd Quarter FY2000 (Jan. 1-Mar. 31/2000, ½-time at 6 FTE work weeks)			
1) Outline of Work Scope for FY2000: Assessment of Uncertainties in Spent Fuel Pool LOCA Analysis	1 wk	AWC-101.2000	ACRS Members & Staff
2) Central Observations from Power Uprate Review	1 dy	AWC-102.2000	ACRS Members & Staff
3) Status of Power Uprate Standard Review Plan	1 dy	AWC-103.2000	ACRS Members & Staff
4) Observations from Review of Staff Risk Assessment on Spent Fuel Pool Accidents for Decommissioned Plants	3 wk	AWC-104.2000	ACRS Members & Staff
5) Other: a) Attend ACRS Retreat: b) Presentations to ACRS (- Assessment of Power Uprate Reviews, Spent Fuel Pool Work Scope	2 wk	Slides on File	
Performance Period: 1st Quarter FY-2000 (Oct. 1/99-Dec. 30/99, ½-time at 6 FTE work weeks)			
1) Revisions to Power Uprate Report per ACRS comments (Uhrig, Powers, Savio, Peralta, Sorensen), and submittal to NRR staff for review	3 wk	AWC-106.99	Savio to pass on to NRR Staff
2) Draft-ANS Summary: <i>Synergistic Safety Issues Related to Reactor Power Uprates</i>	2 day	AWC-107.99	Savio, Larkins, Powers, Apostolakis, Sorensen
3) International Programs for ACRS Research Report	3 day	AWC-108.99	ACRS Members & Staff
4) Finalized Power Uprate Report and ANS Summary	1.5 wk	AWC-109.99	ACRS Members & Staff

Project Description	Effort	Report	ACRS Use
Performance Period: 4th Quarter FY99 (July 1/99-Sept. 30/99, ½-time at 6 FTE work weeks)			
1) Memo: Closure Plan for Power Uprate Review Effort	2 day	AWC-105.99	Apostolakis, Powers, Uhrig, Larkins, Savio, Peralta, Sorenson
2) DRAFT: ANS Summary on Power Uprates	1 wk	Draft form	Apostolakis, Powers Larkins, Savio, Sorensen
3) DRAFT: Conference Paper on Power Uprates	2 wk	Draft form	Apostolakis, Powers Larkins, Savio, Sorensen
4) Other: 2-Day ADAMS Course Gather Reports on International Research	1 wk	---	Savio
Performance Period: 3rd Quarter FY99 (Ap. 1/99-June 30/99, ½-time at 6 FTE work weeks)			
1) Report: Review of Power Uprate Applications & Potential Synergistic Safety Issues	5.5 wk	AWC-101.99	ACRS & Staff
2) Other: ADAMS Survey Course NR&C News Article-July Issue	0.5 wk		
Performance Period: 2nd Quarter FY99 (Jan. 1/99-Mar. 31/99, ½-time at 6-FTE work weeks)			
1) Progress Report: Work-in-progress report entitled "Review of Power Uprate Applications and Potential Synergistic Safety Issues"	3 wk	AWC-101.99	ACRS & Staff
2) Memo: Response to Saito Questions to the National Advisory Committees Working Group on High Burnup Fuel	4 day	AWC-102.99	ACRS & Staff
3) Memo: Response to Charter Questions for the National Advisory Committee Group on High Burnup Fuels	3 day	AWC-103.99	ACRS & Staff
4) Memo: Assist R. Uhrig in several working revisions of the ACRS Research Report	1.5 wk	AWC-104.99	Uhrig, Savio, Larkins
Performance Period: 1st Quarter FY99 (Oct. 1/98-Dec. 30/98, ½-time at 6 FTE work weeks)			
1) Memo: Travel Report, Intrn. Mtg. Safety Operating Reactors, paper description and discussion of sessions.	2 dy	AWC-111.98	ACRS & Staff
2) Memo: Response to Beal on Japan Aging Paper	2 dy	AWC-112.98	Shack, Seale, Powers, Savio, Dudley, Larkins
3) Memo: Draft Research Report to Commission 5 focus areas (PRA, Fuels, I&C, T-H, and Plant Life Extensions).	3.5 wk	AWC-113.98	ACRS & Staff
4) Paper: At ANS Mtg. On Safety of Operating Reactors	3 dy		

Project Description	Effort	Report Status	ACRS Use
Performance Period: 4th Quarter FY98 (July 1, 1998 - Sept. 30, 1998, ½ time at 6 FTE work weeks)			
1) Memo: Paper On Nuclear Plant Ageing for the Japan Quadru-Partite Meeting.	2.5 wk	AWC-107.98	ACRS & Staff
2) Memo: Final edit of prior draft paper on High Burn-up and Other Fuel Related Safety Issues (AWC-106.98), for the Japan Quadru-Partite Meeting	0.5 wk	AWC-108.98	ACRS & Staff
3) Viewgraphs: Viewgraphs for Dr. Seale's presentation of Nuclear Plant Ageing in Japan.	1.0 wk	AWC-109.98	ACRS & Staff
4) Memo: FY99 Fellow Topics. Suggestions included safety issues for power upgrades, lessons learned from shutdown LERs, and water hammer in auxiliary systems	1.0 wk	AWC-110.98	ACRS & Staff
Performance Period: 3rd Quarter FY98 (April 1, 1998 - June 30, 1998, ½ time at 6 FTE work weeks)			
1) Memo: draft for comment, paper on Insights into GSIs from Operating Events, sent to NRC staff and ACRS	2 wk	AWC-104.98	ACRS & Staff, Limited NRC Staff
2) Memo: Final paper on <i>Insights on Generic Safety Issues Noted from Licensee Operating Events</i> , for Oct. Topical Mtg. Safety of Operating Reactors, San Francisco	1 wk	AWC-105.98	ACRS & Staff
3) Memo: draft for comment, ACRS Review of High Burn-up Fuel Issues, paper for Quadru-partite Japan Mtg.	2.5 wk	AWC-106.98	ACRS & Staff
4) ACRS Fuels Subcommittee, Ap 23-24/98	0.5 wk		
Performance Period: 2nd Quarter FY98 (Jan. 1/98 - March 31/98, ½ time at 6 FTE work weeks)			
1) Memo: Summary of AHP Prioritization effort for research project ranking based on RES and NRR inputs.	1.5 wk	AWC-101.98	ACRS & Staff
2) Memo: Follow up memo AWC-101.98, where arguments are made for use of single (safety significance) criteria when using AHP method	1.5 wk	AWC-102.98	ACRS & Staff
3) Memo: Proposal for FY98 Fellow activities on fuel issues (high-burn-up, MOX, and Li-Al targets for tritium)	2.5 wk	AWC-103.98	ACRS & Staff
4) Support of ACRS Letter of Mar. 16/98: Mechanisms for Addressing Generic Safety Issues	0.5 wk		
Performance Period: 1st Quarter FY 98 (Oct. 1/97 to Dec. 30/97)			
1) Memo: ACRS Fellow Input for ACRS Research Letter to Congress (Outline of Responsibilities)	2 dy	AWC-117.97	ACRS & Staff
2) Memo: ACRS Fellow Input: "NRC Research Needs For a Deregulated Nuclear Power Industry"	1 wk	AWC-118.97	ACRS & Staff
3) Memo: Agency Activities on MOX Fuel	1.5 wk	AWC-119.97	ACRS & Staff
4) Memo: Travel Report & Presentation at Albuquerque-ANS Meeting (time includes attendance at Meeting)	2 wk	AWC-120.97	ACRS & Staff

Performance Period: 4th Quarter FY97 (July 1/97 to Sept. 30/97)			
1) Slides/presentation for 442nd ACRS Mtg. on AP600 Containment Spray Policy Issues	2 wk	AWC-112.97	ACRS & Staff
2) Memo: Pros/Cons on Job Sharing ACRS-Fellow	1 wk	AWC-113.97	Powers, Savio, Larkins
3) Memo: GSI-87: Reliability of MOVs in BWR Reactor Water Cleanup Systems	5 wk	AWC-114.97	ACRS & Staff
4) Memo: Fellow Contributions to ACRS Review of RES	1 wk	AWC-115.97	ACRS & Staff
5) Memo: Review of RES Programs by Fellows	3 wk	AWC-116.97	ACRS & Staff
6) Courses: WordPerfect for Windows	2 hr		
Performance Period: 3rd Quarter FY97 (April 1/97 to June 30/97)			
1) Memo: AP600 Design Certification Issues & Schedule for ACRS Hearings	2 wk	AWC-107.97	ACRS Members & Staff
2) Memo: Response to Dave Williams Letter on Resolution of Direct Containment Heating Issues	4 wk	AWC-108.97	Kress, Seale, Larkins, Savio Sherry
3) Memo: on Overview of AP600 Containment Spray Policy Issues	3 wk	AWC-109.97	ACRS Members & Staff
4) Paper Summary: for ANS-Albuquerque Mtg: Insights into Generic Issues from Operational Events	0.5 wk	AWC-110.97	Powers, Sherry Larkins, Savio
5) Memo: Overview of High Burn-up Fuels Issues for ACRS Fuels Subcommittee	3.5 wk	AWC-111.97	ACRS & Staff
Performance Period: 2nd Quarter FY97 (Jan. 1/97 to Mar. 30/97)			
1) Memo: Comments on Power's memo on High Burn-up Fuel	1 wk	AWC-101.97	ACRS
2) Memo: Comments on INPO Report on operational problems with high burn-up cores	2 wk	AWC-102.97	ACRS & Fuels Subcommittee
3) Memo: Comments on ACRS Draft Letter on Risk for Low-Power & Shutdown Conditions	1 wk	AWC-103.97	ACRS & Staff
4) Memo: ACRS Annual Report to Congress	1 wk	AWC-104.97	ACRS & Staff
5) Memo: Insights into the Generic Issues Program from Operational Events	8 wk	AWC-105.97	ACRS & Staff
6) Memo: Safety Issues on Tritium Production	2 wk	AWC-106.97	ACRS & Staff
Performance Period: 1st Quarter FY97 (Oct. 1/96 to Dec.30/96)			
1) Travel Report: PSA-96 Topical Mtg.	1 wk	AWC-109.96	ACRS & Staff
2) Memo: Concerns per EPRI Letter on AP600 Policy Issues	2 wk	AWC-110.96	ACRS & Staff
3) Memo: NRR Resolution per EPRI Letter on AP600 Policy Issues (SECY-96-128)	1 wk	AWC-111.96	ACRS & Staff
4) Memo: Insights into Generic Issues Program from Licensee Operating Reports (LERs)	4 wk	AWC-XXX.96	ACRS & Staff
5) Courses: PRA-IRRAS Code Basics	4 dy	Dec. 10-13	

Project Description	Effort	Report Status	ACRS Use
Performance Period: 4th Quarter FY96 (Oct. 1, 1996 to Sept. 30/96)			
1) Memo: AP600 Design Review Issues (Memo:AWC-106.96) for AP600 Subcommittee Meeting of 7/19/96	2 wk	AWC-106.96	West-AP600 Subcommittee
2) Memo: Changes to System-80 ⁺ Design Documentation	2 wk	AWC-107.96	ALWR/Sys-80 ⁺ Subcommittee
3) Memo: AP600 Aerosol Depletion Considerations, With and Without Sprays	7 wk	AWC-108.96	ACRS & Staff
4) Slides: Overhead-slides for PSA-96 Paper (Park City, Sept 30-Oct 3/96)	1 wk		
5) Courses/Prof. Development - None			
Performance Period: 3rd Quarter FY96 (Apr. 1, 1996 to June 30/96)			
1) Memo: Summary for LWR Fuels Meeting (Portland, Mar-97): Analysis of High Burn-up Fuel Behavior During LOCA, PCM, and Operational Transients"	1 wk	AWC-102.96	Reactor Fuels Subcommittee
2) Memo: Draft Report: High Burn-up Fuel Behavior During Simulated LOCAs	3 wk	AWC-103.96	Reactor Fuels Subcommittee
3) Paper: "Multiple System Responses and Interaction Issues: Adequacy of Treatment in IPE/IPEEEs	2 wk	AWC-104.96	Reactor Fuels Subcommittee
4) Memo: Analysis of Control Rod Insertion Problems Noted in High Burn-up Assemblies	2 wk	AWC-105.96	Reactor Fuels Subcommittee
5) Memo: NRC Staff and Westinghouse Positions on AP600 Design Review Issues	3 wk	AWC-106.96	ALWR/AP600 Subcommittee
6) Courses/Prof. Development - UNIX C, C++, Fortran, 4/15-17 - Ethics Training, 4/22 - Human Reliability, 5/15-17 - Advanced Harvard Graphics, 6/26	3 dy 2 hr 3 dy 1 dy		

Project Description	Effort	Report Status	ACRS Use
Performance Period: 2nd Quarter FY96 (Jan. 01/96 to Mar. 30/96)			
1) Memo: Fellow Proposal on Safety Implications of High Burn-up Fuel Performance Under LOCA Conditions	1 wk	AWC-101.96	Reactor Fuels Subcommittee
2) Memo: Observations from Review of Multiple System Responses Program (MSRP)	2 wk	Letter: 12/96	ACRS & Staff
3) Install/Run FRAPCON & FRAPT6 codes on ACE3-Sun	3 wk	---	Reactor Fuels Subcommittee
4) Perform test runs with codes to high burn-up (80 MWD/kg-U) fuel conditions	4 wk	---	Reactor Fuels Subcommittee
5) Courses/Prof. Development: <ul style="list-style-type: none"> - UNIX-Getting Started (Self-paced) - Internet: Fact & Fiction - Applied Statistics - Beginning Federal Service, 2/13 - UNIX The Basics, 3/18-19 	2 hr 2 hr 1 wk 1 dy 2 dy		
Performance Period: 1st Quarter FY96 (Oct. 1/95 to Dec. 30/95)			
1) Review/report to ACRS members on proposed resolution of Multiple System Responses Program (MSRP)	8 wk	Draft	ACRS & Staff
2) Draft ACRS letter on MSRP, prepare 22 overhead slides for committee presentation	2 wk	ACRS-Letter (Draft)	ACRS & Staff
3) Summary: 1000 word summary for conference paper on results of MSRP investigation (PSA-96, Park City, Ut, Sept-96)	1 wk	Summary for Conf. Paper	
4) Courses/Prof. Development <ul style="list-style-type: none"> - Harvard Graphics for Windows - PRA Basics for Reg. Application 	1 dy 3 dy		
Performance Period: 4th Quarter FY95 (June 12/95 to Sept. 30/95)			
1) Memo: Safety Implications Related to High Burn-up Fuel Performance	8 wk	AWC-101.95	Reactor Fuels Subcommittee
2) Bibliography: Mixed-oxide Fuels (for support of NRC/DOE feasibility studies for burning of weapons-grade Pu in commercial reactors)	2 wk	AWC-102.95	Reactor Fuels Subcommittee
3) Attend/report on Steam Explosion Review Group Meeting (SERG-2), Annapolis, MD, 6/15-16/95	2 wk	Letter: 6/30/95	ACRS & Staff
4) Memo: Observations from high burn-up fuel contractor (PNL) status meeting of 7/12/95	½ wk	AWC-103.95	ACRS & Staff
5) Memo: Summary of ACRS office team building efforts	½ wk	AWC-104.95	ACRS-Staff
6) Courses: <ul style="list-style-type: none"> - Windows-3.1 - WordPerfect-6.1 Windows 	1 dy 1 dy		