



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

March 31, 1999

To: Apostolakis, Powers, Larkins, Savio, Sorensen
From: August W. Cronenberg, ACRS Senior Fellow
Subject: 2nd Quarter-FY99 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 include:

Activities Current Quarter: Jan. 1/99 -Mar. 31/99

1) Report AWC-101.99 (DRAFT): Attached is a draft report of *work in progress*, entitled *Review of Power Uprate Applications and Potential Synergistic Safety Issues*. The basic framework of this investigation is as outlined and progress is shown for the first few chapters. It is noted that this effort is sandwiched between other work commitments to ACRS, so that final investigative results are not anticipated until near the end of FY99.

2) Memo AWC-102.99: Provides a response to questions posed by the Japanese delegate (Saito) to the National Advisory Committees Working Group on High Burnup Fuels. This memo provides additional comments/input to the initial response by Dr. Powers. My input primarily stems from the US regulatory framework for review of fuel assurance issues as enunciated in Section 4.2 of the Standard Review Plan for Review of Safety Analysis Reports for Nuclear Power Plants (NUREG-0800).

3) Memo AWC-103.99: My input to the 10 Charter Questions for the National Advisory Committees Working Group on High Burnup Fuels. A response to each of the 10 questions was provided.

4) Memo AWC-104.99: One of several edited versions of the ACRS Research Report to the Commission for FY-99.

Anticipated Activities Next Quarter: Apr. 01/99 through June 30/99; at ½-FTE

- Assist in final preparation of ACRS Research Report to Commission
- Continue work on Power Uprate Project

ACRS FELLOW STATUS REPORT

August W. Cronenberg

Project Description	Effort	Report Status	ACRS Use
Performance Period (June 12/95 to Sept. 30/95)			
1) Draft Report: Safety Implications Related to High Burnup Fuel Performance	8 wk	Draft Report: 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	Memo: 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 Report 6/30/95	ACRS members & Staff
4) Observations from high burnup fuel contractor (PNL) status meeting of 7/12/95	½ wk	Memo: AWC-103.95	ACRS members & Staff
5) Summary of ACRS office team building efforts	½ wk	Memo: AWC-104.95	ACRS Staff
6) Courses/Prof. Development - Windows-3.1 - WordPerfect-6.1 for Windows	1 dy 1 dy		
Performance Period (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 members & staff
2) Draft ACRS letter on MSRP, prepare 22 overhead slides for committee presentation	2 wk	ACRS-Letter (Draft)	ACRS members & staff
3) Prepare conference paper on results of MSRP investigation for PSA-96, Park City, (Sept-96)	1 wk	Summary for Conf. Paper	
4) Courses/Prof. Development - Harvard Graphics for Windows - PRA Basics for Reg. Application	1 dy 3 dy		

Project Description	Effort	Report Status	ACRS Use
Performance Period (Jan. 01/96 to Mar. 30/96)			
1) Proposal: Safety Implications of High Burnup Fuel Performance Under LOCA Conditions	1 wk	Memo: AWC-101.96	Reactor Fuels Subcommittee
2) Final Report to ACRS: Observations from Review of Multiple System Responses Program (MSRP) Reports and Memoranda	2 wk	Memo Letter: Jan. 12/96	ACRS members & staff
3) Install/Run FRAPCON & FRAPT6 codes on ACE3-Sun	3 wk	---	Reactor Fuels Subcommittee
4) Perform test runs with codes to high burnup (80 MWD/kg-U) fuel conditions	4 wk	---	Reactor Fuels Subcommittee
5) Courses/Prof. Development - UNIX-Getting Started (Selfpaced) - UNIX-System User (Selfpaced) - Internet: Fact & Fiction - Applied Statistics - Beginning Federal Service, 2/13 - UNIX The Basics, 3/18-19	2 hr 2 hr ½ dy 1 wk 1 dy 2 dy		
Performance Period (Apr. 1/96 to June 30/96)			
1) Summary for LWR Fuels Meeting (Portland, Mar-97): Analysis of High Burnup Fuel Behavior During LOCA, PCM, and Operational Transients"	1 wk	Memo: AWC-102.96	Reactor Fuels Subcommittee
2) Draft Report: High Burnup Fuel Behavior During Simulated LOCAs	3 wk	Memo: AWC-103.96	Reactor Fuels Subcommittee
3) Final PSA-96 Paper: "Multiple System Responses and Interaction Issues: Adequacy of Treatment in IPE/IPEE Submittals"	2 wk	Conf. Paper AWC-104.96	Reactor Fuels Subcommittee
4) Discussion and Analysis Related to Control Rod Insertion Problems Noted in Several High-burnup Fuel Assemblies	2 wk	Memo: AWC-105.96	Reactor Fuels Subcommittee
5) NRC Staff and Westinghouse Positions on AP600 Design Review Issues	3 wk	Memo: 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 (July 1/96 to Sept. 30/96)			
1) Revise Memo on AP600 Design Review Issues (Memo:AWC-106.96) for AP600 Subcommittee Meeting of 7/19/96	2 wk	Revise Memo: AWC-106.96	West-AP600 Subcommittee
2) Changes to System-80+ Design Documentation	2 wk	AWC-107.96	ALWR/Sys-80+ Subcommittee
3) AP600 Aerosol Depletion Considerations, With and Without Sprays	7 wk	AWC-108.96	ACRS members & staff
4) Prepare Overhead-slides for PSA-96 Paper (Park City, Sept 30-Oct 3/96)	1 wk		
5) Courses/Prof. Development - None			
Performance Period (Oct. 1/96 to Dec.30/96)			
1) Travel Report: PSA-96 Topical Mtg.	1 wk	Memo: AWC-109.96	ACRS members & staff
2) ACRS Concerns per EPRI Letter on AP600 Policy Issues	2 wk	Memo: AWC-110.96	ACRS members & staff
3) NRR Resolution per EPRI Letter on AP600 Policy Issues (SECY-96-128)	1 wk	Memo: AWC-111.96	ACRS members & staff
4) Insights into Generic Issues Program from Licensee Operating Reports (DRAFT)	4 wk	Memo: AWC-XXX.96	ACRS members & staff
5) Courses/Prof. Development - PRA: IRRAS Code Basics	4 dy	Dec. 10-13	

Project Description	Effort	Report Status/#	ACRS Use
<u>Performance Period (Jan. 1/97 to Mar. 30/97)</u>			
1) Comments on Power's memo on High Burnup Fuel Issues	1 wk	AWC-101.97	ACRS & Fuels Subcommittee
2) Comments on INPO Report on operational problems with high burnup cores	2 wk	AWC-102.97	ACRS & Fuels Subcommittee
3) Comments on ACRS Draft Letter on Risk for Low-Power & Shutdown Conditions	1 wk	AWC-103.97	ACRS members & staff
4) Comments on ACRS Annual Report to Congress	1 wk	AWC-104.97	ACRS members & staff
5) Insights into the Generic Issues Program from Survey of Operational Events	8 wk (4 wk last Qt)	AWC-105.97	ACRS members & staff
6) Safety Issues on Tritium Production in LWRs	2 wk	AWC-106.97	ACRS members & staff
7) Courses/Prof. Development - None this quarter			
<u>Performance Period (April 1/97 to June 30/97)</u>			
1) AP600 Design Certification Issues & Schedule for ACRS Hearings	2 wk	AWC-107.97	ACRS Members & Staff
2) 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) Summary for ANS-Albuquerque Mtg: Insights into Generic Issues Noted from Licensee Operational Events	0.5 wk	AWC-110.97	Powers, Sherry Larkins, Savio
5) Overview of High Burnup Fuels Issues for ACRS Fuels Subcommittee	3.5 wk	AWC-111.97	ACRS Members & Staff

Project Description	Effort	Report Status	ACRS Use
<u>Performance Period (July 1/97 to Sept. 30/97)</u>			
1) Slides/presentation for 442nd ACRS Mtg. on AP600 Containment Spray Policy Issues	2 wk	AWC-112.97	ACRS Members & Staff
2) Memo: Pros & Cons on Job-Shared ACRS Fellow Position	1 wk	AWC-113.97	Powers, Savio Larkins, Sherry
3) Memo on GSI-87: Reliability of MOVs in BWR Reactor Water Cleanup Systems	5 wk	AWC-114.97	ACRS members & Staff
4) Memo: ACRS Fellow Activities Related to ACRS Review of Agency Research Program	1 wk	AWC-115.97	ACRS Staff & Powers
5) Memo: Review of Agency Research Programs (DRAFT)	3	AWC-116.97	ACRS Staff, Powers, Seale
6) Courses/Prof. Development - Overview of WordPerfect 6.1 for Windows	2 hr		
<u>Performance Period (Oct. 1/97 to Dec. 30/97)</u> (NOTE: At 20 hr Work Week (½-Time FTE), Effective 10/11/97)			
1) Memo: ACRS Fellow Input for ACRS Research Letter to Congress (Outline of Responsibilities)	2 dy	AWC-117.97	Powers, Seale ACRS Staff & Fellows
2) Memo: ACRS Fellow Input Related Theme "NRC Research Needs For a Deregulated Nuclear Power Industry"	1 wk	AWC-118.97	Powers, Seale ACRS Staff & Fellows
3) Memo: Agency Activities on MOX Fuel	1.5 wk	AWC-119.97	Powers, Seale ACRS Staff & Fellows
4) Memo: Travel Report & Presentation at Albuquerque-ANS Meeting (time includes attendance at Meeting)	2 wk	AWC-120.97	Powers, Seale ACRS Staff & Fellows
5) Memo: Assignments for AP600 Review			
6) - WordPerfect 6.1 Making the Transition	1 dy		

Project Description	Effort	Report Status	ACRS Use
<u>Performance Period (Jan. 1/98-March 31/98, based on 6 FTE work weeks)</u>			
1) Memo: Summary of AHP Prioritization effort for research project ranking based on RES and NRR inputs.	1.5 wk	AWC-101.98	ACRS Members and 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 Members and Staff
3) Memo: Proposal for FY98 Fellow activities on fuel issues (high-burnup, MOX, and Li-Al targets for tritium)	2.5 wk	AWC-103.98	ACRS Members and Staff
4) Support of ACRS Letter of Mar.16/98: Mechanisms for Addressing Generic Safety Issues	0.5 wk	---	
<u>Performance Period (April 1/98-June 30/98, based on 6 FTE work weeks)</u>			
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 Members & 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 Members and Staff
3) Memo: draft for comment, ACRS Review of High Burnup Fuel Safety Issues, paper for Quadru-partite Japan Mtg.	2.5 wk	AWC-106.98	ACRS Members and Staff
4) Participation in ACRS Fuels Subcommittee, Ap 23-24/98	0.5 wk		

Project Description	Effort	Report Status	ACRS Use
<u>Performance Period (July 1/98-Sept. 30/98, based on 6 FTE work weeks)</u>			
1) Memo: Paper On Nuclear Plant Ageing for the Japan Quadru-Partite Meeting.	2.5 wk	AWC-107.98	ACRS Members and 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 Members and Staff
3) Viewgraph: Prepared set of viewgraph for Dr. Seale's presentation of Nuclear Plant Ageing in Japan.	1.0 wk	AWC-109.98	ACRS Members and Staff
4) Memo to solicit input for FY99 Fellow topics. Suggestions included safety implications for power upgrades, lessons learned from shutdown LERs, and water hammer in auxiliary fluid systems	1.0 wk	AWC-110.98	ACRS Members and Staff
<u>Performance Period (Oct. 1/98-Dec. 30/98, based on 6 FTE work weeks)</u>			
1) Memo: Travel Report, Intrn. Mtg. Safety Operating Reactors, paper description and discussion of sessions.	2 dy	AWC-111.98	ACRS Members & Staff
2) Memo: Response Beal concerns on reference to Surry event in Japan Aging Paper.	2 dy	AWC-112.98	Shack/Seale Powers/Savio Dudley Larkins
3) Memo: Draft Research Report to Commission, recommends 5 focus areas (PRA, Fuels, I&C, T-H, and Plant Life Extensions). Presents preliminary views in each area.	3.5 wk	AWC-113.98	ACRS Members & Staff
4) Give paper at San Francisco ANS Mtg. Safety Operating Reactors, Oct 11-14/98	3 dy		

Project Description	Effort	Report	ACRS Use
<u>Performance Period (Jan. 1/99-Mar. 31/99; ½-time at 6-FTE work weeks)</u>			
1) Progress Report: Work-in-progress report entitled "Review of Power Uprate Applications and Potential Synergistic Safety Issues	3 wk	AWC-101.99	ACRS Members & Staff
2) Memo: Response to Saito Questions to the National Advisory Committees Working Group on High Burnup Fuel	4 day	AWC-102.99	ACRS Members & Staff
3) Memo: Response to Charter Questions for the National Advisory Committees Working Group on High Burnup Fuel	3 day	AWC-103.99	ACRS Members & Staff
4) Memo: Assist R. Uhrig in several working revisions of the ACRS Research Report to the Commissions	1.5 wk	AWC-104.99	Uhrig, El-Zeftawy, Savio, Larkins
<u>Performance Period (Apr. 1/99-June 30/99, based on 6 FTE work weeks)</u>			