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

October 7, 2003

MEMORANDUM TO: ACRS Members

FROM: Hossein Nourbakhsh, Senior Fellow

SUBJECT: Supporting Documents for 2003 ACRS Annual Review of Research Program

ATTACHMENTS:
1. RES' Advanced Procurement Plan for FY 2003
2. Overview of the Research Programs
3. A Working Document Prepared by Link Technologies

Attached are copies of three documents to support your annual review of research program.

1. RES' Advanced Procurement Plan for FY 2003
   This document provides a brief description , objective, regulatory use and work scope for each RES Project . Information on funding, contractor and period of performance for each project is also provided.

2. Overview of the Research Programs
   This document provides a summary of RES Operating Plan in tabular form.

3. A Working Document Prepared by Link Technologies
   This document contains (a) a summary analysis of NRC research projects related to various topical areas, (b) a list of questions and suggested lines of inquiry that need to be further pursued, (c) an evaluation matrix, and (d) a summary of previous ACRS recommendations related to the specific topical area. It should be noted that this document was prepared prior to more recent Dana Powers presentation to the Committee. Therefore, it may not reflect the final structure of the report to be prepared by Dana.

cc: John Larkins
Sher Bahadur
Sam Duraiswamy
Richard Savio
Howard Larson
ACRS Technical Staff

July 22, 2003

It is important to note that these documents are for planning purposes only. Therefore, funding dates and milestone schedules should be disregarded as they are not actuals. If questions arise, please contact Marianne Aitcheson, 415-5822 or email mma1@nrc.gov

The project plans are organized by branch within division.

Projects Selected For:

Division: Division of Engineering Technology

Branch: Materials Engineering Branch

Job Code	Title	PM Name	Contractor
K6266	CIR-II COOPERATIVE AGREEMENT	Moyer	EPRI
W6953	HEAVY-SECTION STEEL IRRADIATION (HSSI) PROGRAM	Fairbanks	ORNL
W6986	FRACTURE MECHANICS TECHNOLOGY FOR LWR MATERIALS	Malik	NSWC
Y6270	ENVIRONMENTALLY ASSISTED CRACKING	Moyer	HALDEN
Y6296	ISO PARTICIPATION	Norris	NIST
Y6378	INTL PRESSURE VESSEL TECH COOP PROGRAM	Malik	ORNL
Y6388	ENVIRONMENTALLY ASSISTED CRACKING OF LWRS	Cullen	ANL
Y6391	BOILING WATER REACTOR FLUENCE	Norris	BNL
Y6396	RAD. EMBRITTLEMENT DAMAGE ANAL. & PREDICTIONS II	Santos	UC-SB
Y6410	COLLABORATIVE RESEARCH ON WIRE SYSTEM AGING	Vora	BNL
Y6533	HSST-3	Kirk	ORNL
Y6534	PIPING-NDE RELIABILITY	Moyer	PNL
Y6536	PWR PRI SYS COMP SEVERE ACCIDENTS	Page	ANL
Y6537	MATLS FOR HIGH TEMP ADVANCED REACTORS	Greene	ANL
Y6538	TECHNICAL DEV OF LOCA FREQUENCY DISTRIBUTIONS	Tregoning	BCL
Y6588	STEAM GENERATOR TUBE INTEGRITY PROGRAM - 3	Davis	ANL
Y6604	EVAL RELIABILITY OF NDE TECHNIQUES	Jackson	PNL
Y6638	STATISTICAL ANALYSIS OF RPV STEELS	Santos	M&CS
Y6649	PHASE II - ALLOY 600 CRACKING	Norris	RFP
Y6651	EFFECTS OF SWITCHGEAR AGING ON ENERGETIC FAULTS	Vora	BNL
Y6654	STANDARDS REVIEW PROCESS	Norris	RFP
Y6689	GRAPHITE DESIGN CODES, STDS AND PROPERTIES	Srinivasan	ORNL
Y6722	DEGRADATION OF RPV IN BORIC ACID	Cullen	ANL
Y6737	PEER REVIEW OF PTS TECH BASIS	Malik	TBD
Y6742	BWR REACTOR VESSEL SAMPLES	Norris	PNL
Y6744	CSNI PIPING DATABASE	Tregoning	OECD
Y6774	EXPERT PANEL - INHERENT PROT AGAINST DISPERSION	Muscara	ORNL
Y6775	EXPERT PANEL ON INHERENT PROTECTION AGAINST DISPERSION	Muscara	AMES
Y6776	EXPERT PANEL - INHERENT PROT AGAINST DISPERSION	Muscara	ANL
Y6777	EXPERT PANEL - INHERENT PROT AGAINST DISPERSION	Muscara	SWRI
Y6790	EMPLOYEE REIMBURSEMENT	Cullen	CULLEN
Y6808	UF6 CYLINDER VALVE TESTING	Kalinousky	ANL
Y6869	BARRIER INTEGRITY RESEARCH PROGRAM	Santos	UNDES
Y6882	TECH ASSESS OF BMI PENETRATIONS	Jackson	PNL
Y6884	INCORPORATE CSCL IN CERAMICRETE	Srinivasan	ANL
Y6909	EXAMINATION OF NA2 HEAD	Cullen	PNL
Y6919	MATLS DEGRADTN PIRT PRESENTATION	Greene	BOYACK
Y6921	INCORPORATE CSC1 IN GLASS	Srinivasan	PNL
Y6922	HARDENING AM-BE SEALED SOURCE	Srinivasan	AMES

JOB CODE : K6266

TITLE: CIR-II COOPERATIVE AGREEMENT
Division of Engineering Technology
Program Manager: Moyer, Carol Phone: 415-1212

OBJECTIVE: This cooperative program is to develop a better understanding of the causes of irradiation assisted stress corrosion cracking and ways of predicting its occurrence and mitigating its consequences.

REGULATORY USE: Irradiation assisted stress corrosion cracking is an important cause of problems in aging reactors, and is especially serious consideration for license renewal. The NRC has very few data and no good models for IASCC under conditions relevant to license-extended PWRs.

WORK SCOPE: NRC and numerous other organizations contribute money which is used to fund research on IASCC in PWRs. A particularly important component (from NRC's standpoint) is the study of how proton irradiation can be used to simulate neutron irradiation at high fluences, since this is the regime least well understood, where experimental data are thinnest, and where experimentation is most expensive.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	560	180	

PROCUREMENT METHOD : Cooperative Agreement (Grant).

THIS ACTION: Incrementally Fund

GRANTEE: Electric Power Research Institute GRANT NO: NRC-04-01-050

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Apr,2001 through Dec,2004

PROCUREMENT MILESTONES

Send RFFA to DCPM	3/03/2003
Rccv. Oblg. Doc DCPM	4/17/2003

JOB CODE : W6953

TITLE: HEAVY-SECTION STEEL IRRADIATION (HSSI) PROGRAM
Division of Engineering Technology
Program Manager: Fairbanks, Carolyn Phone: (301) 415-6719

OBJECTIVE: To provide an assessment of the effects of neutron irradiation on the fracture toughness properties of reactor pressure vessels; to validate this assessment through examination of service-irradiated materials; to apply these results through national codes and standards; and, to provide technical assistance to the NRC in the general area of irradiation effects on materials.

REGULATORY USE: Analysis of fracture toughness; correlation to surveillance materials; effects of thermal annealing and reirradiaton on toughness. Resolve major regulatory issues that involve RPV irradiation embrittlement such as pressurized thermal shock, operating pressure-temperature limits, LTOP, and problems related to welds with low Charpy USE. Study results will provide bases for evaluating aging behavior of LWR pressure vessels.

WORK SCOPE: Evaluate Master Curve methodology for pressure vessel (PV) applications; examine effects of thermal annealing and reirradiation on toughness and re-embrittlement rates of PV materials; examine the effects of neutron irradiation on the fracture toughness of the heat affected zone (HAZ) of plates and welds from retired PVs; provide technical support and continued collaboration for cooperative relationships with foreign institutions in the area of radiatiion effects on PV steels; develop models of radiation-induced microstructural evolution and its impact on the mechanical behavior of PV steels; operate the irradiation facilities at the Ford Reactor at the Univ. of Michigan.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	9,850	1,800	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,1998 through Dec,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	3/17/2003
Rec. Sign Form 173	4/16/2003

JOB CODE : W6986

TITLE: FRACTURE MECHANICS TECHNOLOGY FOR LWR MATERIALS

Division of Engineering Technology
Program Manager: Malik, Shah N. Phone: (301) 415-6007

OBJECTIVE: (1) To develop fundamental concepts and experimentally validate the analysis methods needed to characterize the fracture bejhavior of heavy-section reactor pressure vessels and other related components in nuclear power plants under full spectrum of loading and material operating conditions; (2) to develop fracture properties data for the materials, including test techniques and data analysis methods needed in performing pressure vessel integrityanalyses; (3) to assimilate the analysis methods, the materilas data, and the pertinent service data into a comprehensive structural integrity assessment methodology that can be used by NRC staff in performing safety analyses; (4) to reduce this technology to practice through participation in national and international codes and standards organizations, such as the ASTM testing standrads and ASME Boiler and Pressure Vessels Code.

REGULATORY USE: The result of this research will be used by the Offices of Nuclear Reactor Regulations (NRR) and the Nuclear Material Safety and Safeguards (NMSS) to make safety assessments and decisions relative to reactor pressure vessels and other components in nulcear power plants. In addition, the results from this project will be used in recommending changes to Appendix-G in the ASME Boiler and Pressure Vessels Code Section-XI and Section-III, and the ASTM test standrads on frcature toughness of materials used for reactor pressure vessels and other components of Interest to NRC.

WORK SCOPE: The contractor will develop fundamental concepts and experimentally validate fracture mechanics methodologies and develop specific frecature toughness data relevant to the prototypic operating conditions. Task 1 requires a central description of the project management efforts. Task 2 addresses fracture toughness testing codes and standards development support. Task 3 addresses investigation of fracture mechanics characterization of reactor pressure vessel materials under prototypic operating conditions in the ductile-to-brittle transition tempetarure region of the fracture toughness versus temperature behavior of the materials. Task 4 involves experimental investigation and analytical characterization of special issues such as the effect of material inhomogeneities, heat-affected zones, micro-structural anamolies (e.g. banding), and fracture mechanics investigation of materilas of interest to NRC. Task 5 involves initiating work on non-destructive examination (NDE) techniques for reactor vessel and other primary pressure-boundary components, and become familir with inservice insopection (ISI) procedures to detect and size potential crack-like defects. This would assist NRC in supplementing NDE capabilities at PNNL, and also to start providing independent exprtise in NDE and ISI areas.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,651	250	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: Modify Scope

AGENCY: Naval Surface Warfare Center IAA NO: RES-98-002

FUNDING PERIOD: Jan,2003 through Dec,2003

PERIOD OF PERFORMANCE: Feb,1998 through Dec,2003

PROCUREMENT MILESTONES

Send Startup Package	1/27/2003
Send IA Letter to Agency	2/17/2003

JOB CODE : Y6270

TITLE: ENVIRONMENTALLY ASSISTED CRACKING
Division of Engineering Technology
Program Manager: Moyer, Carol Phone: 415-1212

OBJECTIVE: To provide for the irradiation of test specimens at the Halden Reactor Project in a BWR environment. Subsequently, Argonne National Laboratory will examine and evaluate the specimens as part of the NRC's endeavor to evaluate the causes and mechanisms of irradiated assisted stress corrosion cracking in BWR environments.

REGULATORY USE: Specimens irradiated in the Halden Reactor Project are tested at Argonne National Laboratory and the results used by NRR in evaluating BWR licensee submittals.

WORK SCOPE: A group of austenitic stainless steel specimens will be irradiated in a BWR environment during FY 2002 at the Halden Reactor Project

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	430	154	

PROCUREMENT METHOD : Fund an International Agreement.

THIS ACTION: Incrementally Fund

AGENCY: Halden Institutt for Energiteknikk IA NO: RES-88-202

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2000 through Dec,2005

PROCUREMENT MILESTONES

Send Startup Package	3/10/2003
Send Oblig Doc to OCFO	3/17/2003

JOB CODE : Y6296

TITLE: ISO PARTICIPATION
Division of Engineering Technology
Program Manager: Norris, Wallace Phone: (301) 415-6796

OBJECTIVE: Support US attendance at ISO TC85 meetings to ensure that the US has voting representation relative to US technical and policy interests in the development and maintenance of international nuclear energy standards. Continued adoption of US national nuclear standards by international community.

REGULATORY USE: Continued distribution of electronic draft documents to NRC staff for comment on proposed ISO standards. Maintain existing liasions with international government agencies and national standards development organizations and development of new liasions.

WORK SCOPE: Continued development of a strong research reactor technical program within ISO/TC85/SC6.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	45	15	

PROCUREMENT METHOD : Non-DOE Interagency Agreement.

THIS ACTION: Incrementally Fund

AGENCY: National Institute of Science and Technology IAA NO: RES-00-005

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Jul,2000 through Sep,2003

PROCUREMENT MILESTONES

Send Startup Package	3/03/2003
Send IA Letter to Agency	3/18/2003
Send Oblig Memo to OCFO	4/17/2003

Nuclear Regulatory Commission

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Advance Procurement Plan for FY 2003

JOB CODE : Y6378

TITLE: INTL PRESSURE VESSEL TECH COOP PROGRAM

Division of Engineering Technology
Program Manager: Malik, Shah N. Phone: (301) 415-6007

OBJECTIVE: Objectives are: (1): Participate in IAEA International Working Group (IWG) on Life Management of Nuclear Power Plants (LMNPP) as U.S. representative; (2): Participate in interantiuonal meetings on recator pressure vessel (RPV) integrity, and coordinate U.S. participation in IAEA Cooperative Research Programs (CRPs) on RPV integrity; (3): Participate in European Network for Evaluating Structural Components (NESC) by (a) serving as Vice-Charman of the NESC Steering Commitee, (b) participating in technical task groups (TGs) for the NESC experiments, (c) performing pre- and post-test analyses of teh NESC experiments, (d) providing palnning supports for future NESC projects, and (e) reporting results to the NRC; and (4): co-organize and host international projects sponsored by teh Nuclear Energy Agency's (NEA) Committee on Safety of Nuclear Installation (CSNI) that focus on assessing RPV integrity analysis methods.

REGULATORY USE: The result of this research will be used by the Offices of Nuclear Reactor Regulations (NRR) to perform safety assessments and decisions relative to reactor pressure vessels and other structural components in nulcear power plants. In addition, the results from this project will be used in recommneding changes to Appendices A and G in the ASME Boiler and Pressure Vessels Code Section-XI and Section-III, and the ASTM test standrads on frcature toughness of materilas used for reactor pressure vessels and other components of Interest to NRC.

WORK SCOPE: Tasks 1: Project management/Assistance: This task will support planning, reporting, cost control and other administrative efforts to ensure that the project objectives are met. It will also accomodate requests from the NRC Project Manager for specific technical assistance reletive to this project.
Task 2: Continue to provide U.S. representationin in IAEA IEG-LMNPP, which is a part of the IAEA Division of Nuclear Power.
Task 3: Continue to provide "work in kind" participation in European NESC projects on RPV structural integrity technology developemnt and refinement .
Task 4: Continue to provide participation in CSNI fracture assessment activities.
Task 5: Particiapte in European Commission in projects that relate to RPV structural integrity technologies development.
Task 6: Peform modifications in ORNL/FAVOR-95 code for use by MEB/DET staff to participate in CSNI/NEA sponsored PROSIR (Probabiltistic Strucural Integrity of PWR Pressure Vessel) benchmarking exercises during 2002-2003.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	375	150	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Dec,2000 through Dec,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

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JOB CODE : Y6388

TITLE: ENVIRONMENTALLY ASSISTED CRACKING OF LWRS

Division of Engineering Technology
Program Manager: Cullen, William Phone: (301) 415-6754

OBJECTIVE: This project consists of five tasks with distinct objectives. The tasks are: (1) Environmental Effects on Fatigue Crack Initiation; (2) Evaluation of the Causes and Mechanisms of IASCC in BWRs; (3) Evaluation of the Causes and Mechanisms of IASCC in PWRs; (4) Cracking of Nickel Alloys and Weldments; and (5) Investigation of Other Modes of Degradation in High-Fluence Materials in PWR Environments. The objective of Task 1 is to provide data on such topics as synergistic effects of materials properties, surface finish, and environment on fatigue life; the combined effects of loading sequence and environment on fatigue life and fatigue crack initiation in low-carbon, low-ally and stainless steels. The objectives of Tasks 2 & 3 are similar: to evaluate the susceptibility of austenitic SSs to IASCC as a function of fluence level, material chemistry, welding process, fabrication history and water chemistry, for BWRs (Task 2) and PWRs (Task 3). The objective of Task 4 is to provide the NRC with technical data and the analytical methods on the cracking of nickel-alloy components and weldments necessary to independently estimate crack growth rates in reactor components for regulatory determinations of residual life, inspection intervals, repair critera and effective countermeasures for reactor internal components. The objective of Task 5 is to study the potential for degradation of nuclear reactor components with the various member countries of the Cooperative IASCC Research (CIR) group.

REGULATORY USE: The data generated in this program are used to make decisions on applications by licensees for regulatory relief, to assess the reasonableness of schemes to reduce regulatory burden, and to help NRC formulate approaches to and make decisions on license extension

WORK SCOPE: 1. Determine environmental effects on fatigue of steels used in LWRs.
2. Develop data on irradiation assisted stress corrosion cracking in BWRs to assess licensees' plans concerning mitigation and license renewal.
3. Develop data on irradiation assisted stress corrosion cracking in PWRs to assess licensees' plans concerning mitigation and license renewal.
4. Develop technical data on cracking behavior of nickel-alloy, reactor components and weldments concerning residual life, inspection and repair.
5. Retain an awareness of the state of the art of radiation creep, radiation-induced embrittlement, and void formation issues in reactor materials and investigate emerging other modes of degradation in reactor materials at high fluences.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	2,780	1,690	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Dec,2000 through Sep,2006

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

JOB CODE : Y6391

TITLE: BOILING WATER REACTOR FLUENCE

Division of Engineering Technology
Program Manager: Norris, Wallace Phone: (301) 415-6796

OBJECTIVE: Objectives of the effort are to provide NRC with calculated thermal and fast fluences for an operating BWR, compare those calculated values with fluences based on measurements, compare calculated BWR fluence results from a well-established computer code (DORT) with those from a newer code, and to document results.

REGULATORY USE: Aid NRC understanding and technical review of proposed licensee repair of highly irradiated components in BWRs.

WORK SCOPE: The scope of this effort involves 7 tasks. These are (1) develop a geometry model for the BWR facility for both DORT (BNL) and RAMA (subcontractor) codes, (2) collect, process, and evaluate BWR operating data for one BWR, (3) perform fluence calculations using both DORT and RAMA for the core operation of a BWR facility up to the time when dosimetry samples are taken, (4) compare the fluence results of both codes with available samples taken, (5) compare results from both codes, (6) document the results of the effort, and (7) provide data for input to the McBend Computer code as appropriate.

FUNDING ($1000):	Prior Year Obligations	FY03
	494	210

[redacted]

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Apr,2003

PERIOD OF PERFORMANCE: Mar,2001 through Apr,2003

PROCUREMENT MILESTONES

Send SOW to Lab	1/30/2003
Rcv. DOE Proposal (189)	3/03/2003
Issue Form173 to DOE	3/18/2003
Rcv. Signed Form 173	4/17/2003

JOB CODE : Y6396

TITLE: RAD. EMBRITTLEMENT DAMAGE ANAL. & PREDICTIONS II
Division of Engineering Technology
Program Manager: Santos, Cayetano G. Phone: (301) 415-6004

OBJECTIVE: Develop physical models, based on fundamental mechanisms for radiation hardeneing and embrittlement, and correlatins needed to update the calcualtional procedures used by the NRC for predicting changes in toughness of irradiated pressure vessels.

REGULATORY USE: To understand neutron radiation embrittlement of RPV steels, to improve surveillance of RPV embrittlement and to address regulatory issues such as PTS, heatup-cooldown curves, LTOP, and RG 1. 99.

WORK SCOPE: Irradiation induced changes in material properties: database of properties of irradiated materials; IVAR irradiations at UMich.; fracture testing. Microstructural characterization. Mechanism and modeling studies: micromechanics and Master Curve; Late-blooming phases and proton irradiations; thermal aging. Attenuation and dose limits. Participation in international and professional groups.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	450	200	

PROCUREMENT METHOD : Sole Source Commercial Contract.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-01-064

CONTRACTOR: University of California at Santa Barbara CONTRACT NO: NRC-04-01-064

FUNDING PERIOD: Mar,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jun,2001 through Nov,2003

PROCUREMENT MILESTONES

Send RFPA to DCPM	2/13/2003
Rcv Oblg. Doc DCPM	3/17/2003

JOB CODE : Y6410

TITLE: COLLABORATIVE RESEARCH ON WIRE SYSTEM AGING
Division of Engineering Technology
Program Manager: Vora, Jitendra P. Phone: (301) 415-5833

OBJECTIVE: The overall objective of the collaborative research program is to address safety significant technical issues related to wire system aging in operating nuclear power plants. The specific objectives of the research programs are to:
1. Define and articulate specific technical issues that should be addressed for collaborative research.
2. Provide recommendations for new science and technology (S&T) initiatives that should be pursued.
3. Pursue collaborative research with other Federal agencies and other national and international organizations and institutions.

REGULATORY USE: Evaluate the EQ (10CFR Part 50.49) process for the current license term of 40 years and for license renewal considerations. Evaluate advanced diagnostics and condition monitoring methods for determining current conditions and fro residual lifetime evaluation of installed cable sysytems

WORK SCOPE: The scope of collaborative research will include the following five specific areas:
1. Prognostics and diagnostics of wire system aging
2. Risk significance of wire system aging
3. Fire risk assessment of wire system aging
4. Reliability physics modeling of wire systems, and
5. Environmental qualification of wire systems

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	232	387	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: May,2001 through Nov,2005

PROCUREMENT MILESTONES

Send SOW to Lab	11/01/2002
Rcv. DOE Proposal (189)	12/02/2002
Issue Form173 to DOE	12/17/2002
Rcv. Signed Form 173	1/16/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

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JOB CODE : Y6533

TITLE: HSST-3
Division of Engineering Technology
Program Manager: Kirk, Mark Phone: (301) 415-6015

OBJECTIVE: The objectives of the Heavy Section Steel Technology -3 (HSST-3) project are:

1. To develop and experimentally validate the analysis methods needed to characterize the fracture behavior of heavy section reactor pressure vessels and related components and structures under the full spectrum of loading, material, and environmental conditions. Attention is to be focused on those integrity issues that have significant safety/risk significance.

2. To develop material data, including appropriate test techniques and data analysis methods needed in performing pressure vessel integrity analyses.

3. To assimilate the analysis methods, the materials data, and the pertinent service data into a comprehensive pressure integrity assessment methodology that can be used by the NRC in performing plant specific or generic pressure vessel safety analyses.

4. To participate in national and international codes and standards activities.

5. To provide technical assistance to the NRC in the general area of pressure vessel integrity. Particularly, in the area of RPV head penetrations evaluations in connection with the CRDM nozzle cracking issue.

REGULATORY USE: The results of this research will be used by the NRC to make safety and licensing decisions relative to the reactor pressure vessel integrity for current operating reactors and license renewals. The results will be used to recommend revisions to codes and standards and potential revisions of regulatory positions.

WORK SCOPE: This work in part is continuation of activities under HSST-2 program. The work emphasizes the development and validation of fracture mechanics methodology and development and validation of fracture toughness data. Development of probabilistic techniques and implemtation of these techniques in the FAVOR computer code are important tasks. The work also includes analyses and other activities carried out in connection with the CRDM nozzle cracking issue

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	804	1,390	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Feb,2002 through Mar,2006

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

JOB CODE : Y6534

TITLE: PIPING-NDE RELIABILITY
Division of Engineering Technology
Program Manager: Moyer, Carol Phone: 415-1212

OBJECTIVE: Development of an international research cooperative program on Inconel cracking with the following objectives: to complile a knowledge base on all cracking in Inconel for nuclear power plants; understand the mechanism that causes cracking in Inconel, specifically PWSCC; develop NDE methods and mockups to adequately detect, size and characterize tight cracks; determine the relationship between welding processes and crack growth rate; understand the risk assessment of cracking at all possible degradation sites; and determine the generic applicability if there is such.

REGULATORY USE: Events, domestic and international, in 2000 and 2001 year have made it apparent that additional research is needed to address the issue of cracking in Inconel. The user office for the results of this program is NRR and at some point the information may be applicable to NMSS. The foreign participants in the international cooperative will also use the research results.

WORK SCOPE: This program will also address NDE reliability for components other than piping. This program will address inconel cracking in weld metal and base metal at all degradation sites in a nuclear power plant.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	150	250	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: May,2002 through Dec,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

JOB CODE : Y6536

TITLE: PWR PRI SYS COMP SEVERE ACCIDENTS
Division of Engineering Technology
Program Manager: Page, Joel D. Phone: (301) 415-6784

OBJECTIVE: To improve current methods and models used to predict PWR reactor coolant system components behavior under severe accident loads.

REGULATORY USE: The improved methods and models developed to predict PWR RCS components severe accident behavior will be used to assist in risk-informed decision making associated with determining acceptable steam generator tube repair methods.

WORK SCOPE: Scoping study was performed during Phase I (ANL JCN Y6421). Computer modeling of PWR RCS piping will be performed during the current effort (Phase II).

FUNDING ($1000):	Prior Year Obligations	FY03
	338	25

[redacted]

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Oct,2002 through Oct,2003

PERIOD OF PERFORMANCE: May,2002 through Oct,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	1/01/2003
Issue Form173 to DOE	1/16/2003
Rcv. Signed Form 173	2/17/2003

JOB CODE : Y6537

TITLE: MATLS FOR HIGH TEMP ADVANCED REACTORS
Division of Engineering Technology
Program Manager: Greene, Charles A. Phone: 415-6177

OBJECTIVE: To evaluate behavior of materials proposed for use in advanced high temperature reactors. Evaluate the potential for corrosion, stress corrosion cracking, fatigue, and creep under the influence of temperature and coolant chemistry. Evaluate the potential for steel carburization in carbon and graphite containing reactors. Evaluate codes and standards for the design and construction of advanced reactors.

REGULATORY USE: Regulatory Use: The research results will be used by NRR to evaluate the potential long-term effects of temperature and coolant chemistry on the degradation of materials used in advanced reactors and identify and evaluate potentially major issues regarding materials applications during the licensing reviews of advanced reactors.

WORK SCOPE: Conduct corrosion, stress corrosion, fatigue, crack growth and creep tests of metals under the temperatures and coolant chemistries and impurities present in advanced reactors. Conduct carburization tests of steels, and if carburization occurs, conduct similar tests to above for carburized steels. Review and evaluate codes and standards available in the US and other countries for the design and construction of advanced reactors. Evaluate available data to define the effects of neutron irradiation on the embrittlement of high temperature pressure vessel steels. Evaluate the use of acoustic emission to detect, locate, and quantify the leakage of helium from primary system components of HTGRs. Develop a compendium of graphite property data including the effects of irradiation, temperature, and oxydation.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	250	600	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2002 through Nov,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	1/10/2003
Issue Form173 to DOE	1/24/2003
Rcv. Signed Form 173	2/17/2003

JOB CODE : Y6538

TITLE: TECHNICAL DEV OF LOCA FREQUENCY DISTRIBUTIONS
Division of Engineering Technology
Program Manager: Tregoning, Robert L. Phone: (301) 415-6657

OBJECTIVE: Provide technical support for risk-informing 10 CFR 50.46 and large-break loss of coolant accidents (LBLOCA) as well as associated pipe cracking and leak-before-break (LBB) issues.

REGULATORY USE: Support Option 3, specifically risk-informing 10 CFR 50.46, and potential development of supporting Regulatory Guide for redefinition of the LBLOCA.

WORK SCOPE: Develop analytic apporach to support risk-informing 10 CFR 50.46 and LBLOCA requirements. Assess existing information; identify areas of insufficient information and propose venues to address them; modify existing codes/develop new codes as required to fully risk-inform the LBLOCA requirements; perform uncertainty analyses; benchmark process utilizing sample plant evaluations; qa codes and results.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	420	1,026	

PROCUREMENT METHOD : Sole Source Commercial Contract.

THIS ACTION: Follow-on to Project W6854 Incrementally Fund

RFPA NUMBER: RES-02-074

CONTRACTOR: Battelle Columbus Laboratory CONTRACT NO: NRC-04-02-074

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Sep,2002 through Sep,2005

PROCUREMENT MILESTONES

Send RFPA to DCPM	2/13/2003
Rcv Oblg. Doc DCPM	3/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6588

TITLE: STEAM GENERATOR TUBE INTEGRITY PROGRAM - 3

Division of Engineering Technology
Program Manager: Davis, James A Phone: N/A

OBJECTIVE: To develop models for predicting potential degradation modes, progression rates, leak/rupture behavior, failure pressures and leak rates for new, degraded, and repaired tubes under normal operating, accident and severe accident conditions. To quantify the capability of inservice inspections (probability of detection, sizing accuracy.) To improve the understanding of the behavior of SG tubing in crevice conditions.

REGULATORY USE: The research results will be used by NRR for: a) conducting independent integrity analyses; b) predicting areas for future concerns and taking proactive action; c) validating claims related to the capability of inspections; d) supporting new regulatory activities related to steam generator tube integrity, inspection, and maintenance; e) evaluating various proposals on implementation of the new performance-based regulatory guidance; and f) resolving issues in the steam generator action plan which includes issues related to the steam generator DPO.

WORK SCOPE: Conduct corrosion tests to determine the effects of materials parameters, the operating environment, and stresses on crack initiation and growth. Conduct pressure and leak rate tests under normal, accident and severe accident temperature and pressure conditions on tubes containing crack types and morphologies of current interest. Conduct evaluation testing using commercial inservice inspection teams or inhouse teams on mock-ups and on degraded tubes removed from service followed by destructive examination to quantify the probability of detection and sizing accuracy of flaws during inservice inspections. Evaluate new and improved techniques and data analysis methods for more reliable detection and accurate sizing of flaws.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	2,200	1,900	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Follow-on to Project W6487 Modify Scope

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Feb,2002 through Nov,2006

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	1/01/2003
Issue Form173 to DOE	1/16/2003
Rcv. Signed Form 173	2/17/2003

JOB CODE : Y6604

TITLE: EVAL RELIABILITY OF NDE TECHNIQUES

Division of Engineering Technology
Program Manager: Jackson, Deborah A. Phone: (301) 415-5887

OBJECTIVE: This project is a continuation of W6275 "Assessment of Reliabilityof Ultrasonic and NDE Methods. " The objective of this project is to establish the effectiveness, reliability and adequacy of NDE methods for in-service inspection (ISI) programs to provide technical bases and improved ISI programs for important reactor systems and components, to evaluate the impact of ISI reliability on system integrity, and to provide recommendations to the ASME Code to improve the effectiveness, reliability adn adequacy of ISI programs

REGULATORY USE: The user office for the results of this program is NRR. The results are applied by NRR in plant-specific and generic licensing decisions and provide the basis for recommendations to the ASME Code for strenghening inspection requirements in the ASME Code

WORK SCOPE: The project is addressing the following: a) inspection of cast stainless steel components and dissimilar metal welds; b) evaluation of reliability and accuracy of ISI and improvements to methods adn requirements; c) application of risk-based methods to develop improved ISI programs by defining, "what, where and how often and how reliable" aspects of the revised ISI program will be; d) inability to inspect inaccessible areas of a NPP.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	930	750	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Dec,2001 through Dec,2006

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

JOB CODE : Y6638

TITLE: STATISTICAL ANALYSIS OF RPV STEELS
Division of Engineering Technology
Program Manager: Santos, Cayetano G. Phone: (301) 415-6004

OBJECTIVE: (1) To provide technical assistance to the NRC staff in developing and issuing Revision 3 to Regulatory Guide 1.99 "Radiation Embrittlement of Reactor Pressure Vessel Material" (2) To conduct statistical analysis of problems concerning the materials and mechanical behavior of reactor pressure vessels (ie developing and improving correlations for predicting embrittlement in RPV materials)

REGULATORY USE: This contract will assist the staff in issuing revision 3 to Regulatory Guide 1.99.

WORK SCOPE: Task 1 provides technical assistance to the NRC staff in issuing Revision 3 to Regulatory Guide 1.99. This includes developing the technical basis document and addressing any comments received after the draft regulatory guide is published for public comment. Task 2 involves updating and revising NUREG/CR 6551 "Improved Embrittlement Correlations for Reactor Pressure Vessel Steels." In Task 3 Dr Eason will establish a collaboration with Dr. Odette (UCSB) and reevaluate the embrittlement correlation with new surveillance data as it becomes available. Task 4 requires Dr. Eason to attend and participate in meetings of the ASTM E10.02 Committee on the Behavior and Use of Nuclear Structural Materials) as well as the NRC staff at the NRC headquarters.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	30	100	

PROCUREMENT METHOD : Sole Source Commercial Contract.

THIS ACTION: Incrementally Fund

CONTRACTOR: Modeling & Computing Services CONTRACT NO: NRC-04-02-071

FUNDING PERIOD: Apr,2003 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2002 through Mar,2006

PROCUREMENT MILESTONES

Send RFPA to DCPM	3/17/2003
Rcv Oblg. Doc DCPM	4/16/2003

JOB CODE : Y6649

TITLE: PHASE II - ALLOY 600 CRACKING
Division of Engineering Technology
Program Manager: Norris, Wallace Phone: (301) 415-6796

OBJECTIVE: Determine whether nuclear power plants detection systems are adequate for detecting the type and size cracks that have recently been reported in CRDM nozzles; if not, recommend improvements for detecting and quantifying. Develop deterministic model for NRC staff to independently verify industry probabilistic fracture mechanics analyses for CRDM cracking. Determine the failure probabilities from crack initiation to leakage, as well from leakage to failure.

REGULATORY USE: Circumferential cracks have been found in Inconel 600 reactor vessel control rod drive nozzles at several PWRs. To ensure public health and safety, the NRC staff must be able to reasonably answer the following questions: (1) how much time may pass from crack initiation to leakage; (2) after leakage is detected at a plant, how long can it operate until failure may occur. Another regulatory use of this work is analyzing and verifying the assumptions and results of the industry's efforts relative to CRDM cracking.

WORK SCOPE: Perform independent assessment of industry analyses relative to CRDM nozzle cracking and responses to NRC bulletins.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	150	

PROCUREMENT METHOD : Fully Competitive Commercial Contract.

THIS ACTION: New Project Follow-on to Project Y6453

CONTRACTOR: Request for Proposals CONTRACT NO: RES-03-046

FUNDING PERIOD: Jan,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jan,2003 through Dec,2004

PROCUREMENT MILESTONES

Send RFPA to DCPM	9/30/2002
Send Startup Package	9/30/2002
Issue Comp. Range Rpt.	11/11/2002
Issue Final Eval. Rpt.	12/26/2002
Award Contract	1/16/2003
RIMS Generated Funds Comm.	1/16/2003

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6651

TITLE: EFFECTS OF SWITCHGEAR AGING ON ENERGETIC FAULTS
Division of Engineering Technology
Program Manager: Vora, Jitendra P. Phone: (301) 415-5833

OBJECTIVE: The objective of this project is to assess the aging of medium-voltage metal-clad switchgear in order to evaluate the impact that equipment aging, bus protection relaying schemes, and operational stressors will have on switchgear performance, and to determine whether mitigating actions can be taken to prevent or reduce the occurrence of energetic electrical faults.

REGULATORY USE: 1. Understand and characterize aging of electrical switchgear components and fire effects in fire risk modeling for evaluation under the RES Fire Risk Research Program
2. Prevent or reduce the occurrence of energetic electric faults.

WORK SCOPE: The scope of this research will be limited to the following switchgear components:
1. power circuit breakers
2. electrical bus and connections
3. bus protective relaying and instrument transformers
4. voltage and current limiting devices and circuit protection schemes, and
5. control circuits and equipment

FUNDING ($1000):	Prior Year Obligations	FY03
	0	225

[redacted]

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: May,2003 through Nov,2003

PERIOD OF PERFORMANCE: May,2003 through Nov,2004

PROCUREMENT MILESTONES

Send SOW to Lab	10/03/2002
Rcv. DOE Proposal (189)	12/17/2002
Issue Form173 to DOE	1/16/2003
Rec. Signed Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6689

TITLE: GRAPHITE DESIGN CODES, STDS AND PROPERTIES

Division of Engineering Technology
Program Manager: Srinivasan, Makuteswara Phone: N/A

OBJECTIVE: The objectives of this project are to participate in the ASTM nuclear grade standards committee and obtain information on paths needed to establish standards for nuclear graphites, investigate key parameters important to HTGR service that require correlation between as-manufactured and irradiated properties of nuclear-grade graphite, and evaluate the thermodynamics and kinetics of oxidation of nuclear-grade graphites under the HTGR environment.

REGULATORY USE: To provide technical basis to develop regulatory infrastructure for licensing/design certification reviws of the high temperature gas-cooled reactors.

WORK SCOPE: Assemble information on existing standards for graphite and examin their applicability to nuclear graphites used in HTGR. Identify needs for standards for properties that are needed for the HTGR apllications. Evaluate available information on non-irradiated and irradiated properties of graphite. Examine the potential for and develop coorelations between the data and properties. Evaluate the oxidation potential of graphite.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	150	200	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Apr,2002 through Dec,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/30/2002
Rcv. DOE Proposal (189)	1/29/2003
Issue Form173 to DOE	2/13/2003
Rcv. Signed Form 173	3/17/2003

JOB CODE : Y6722

TITLE: DEGRADATION OF RPV IN BORIC ACID

Division of Engineering Technology
Program Manager: Cullen, William Phone: (301) 415-6754

OBJECTIVE: There are five tasks, plus a sixth, optional task, that are best described on a task-by-task basis. The tasks are: (1) Crack Initiation and Growth Rates of Alloys 600 & 182 Removed from Davis-Besse Nozzles and J-Weld; (2) Development of an Integrated Crack Growth Rate and INspection Frequency Determination Model; (3) Corrosion of Reactor Steels in Concentrated Boric Acid Solutions; (4) Measurement of Electrochemical Potential of Alloy 600, Alloy 182 and A533B in Concentrated Boric Acid Solutions; and (5) Technical and Organizational Assistance in the Conduct of an International Workshop on Nickel-Base Alloy Corrosion Cracking Issues. A sixth, optional taks involves the Construction of a "MockUp" of the Davis-Besse Leak and Wastage Process. The objective of Task 1 is to conduct stress-corrosion crack initiation and growth rate tests in simulated PWR coolant of materials from the head penetrations of the Davis-Besse plant. The Task 2 objective is to invoke a probabilistic approach to the development of a calculational model leading to prediction of appropriate inspection intervals for vessel penetrations. The objective of Task 3 is to measure the wastage rates of A533B and 308SS cladding steel in flowing and quiescent boric acid solutions of varying concentrations and at various temperatures. The Task 4 objective is to measure the electrochemical corrosion potential of the materials found in the head and nozzles of the Davis-Besse reactor, under the same conditions as the previous task. The objective of Task 5 is to gain assistance in securing a venue, staffing, audiovisual assistance and program development. The objective of the sixth, optional task is to construct a "mockup" of a CRDM penetration and vessel head, including a leak into the crevice, and to monitor the degree of plugging of the annulus openings, as well as the progress of the corrosion of the low-alloy steel.

REGULATORY USE: The data, models and conclusions produced by this program will assist the NRC to develop better inspection plans aimed at preventing degradation of vessel heads and other pressure boundary components.

WORK SCOPE: The scope of Task 1 is to conduct stress-corrosion crack growth rate studies of the specific materials found in the vessel head penetrations at Davis-Besse over a range of temperatures and stress intensity factors that span the likely range applied in service during the process of the degradation itself. The scope of Task 2 is to develop a calculational model for the determination of inspection intervals that could be applied to vessel head penetrations for all the US-based licensees. The scope of Tasks 3 and 4 are to determine the wastage rates, and electrochemical potential properties for the suite of alloys found in and near vessel head penetrations, such as Alloy 600, Alloy 182/82, 308/309 clading steels and the low-alloy pressure boundary steel, A533B. The scope of Task 5 is to assist the PM with the organizational tasks of holding a workshop on CRDM-related inspection and materials issues in the early Spring of 2003. The scope of the fifth, optional task to construct a mockup of the cavity, exposed clad and CRDM leak of the Davis-Besse plant is to determine the development of the cavity during the operation of the plant (if, indeed, that is when the cavity developed), and especially, to bring into focus the characteristics of the developing cavity at the time it was discovered, in order to predict better the growth morphology of the cavity if it had not been detected, andthe plant had been permitted to continue operation.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	400	432	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2002 through Mar,2004

JOB CODE : Y6737

TITLE: PEER REVIEW OF PTS TECH BASIS

Division of Engineering Technology
Program Manager: Malik, Shah N. Phone: (301) 415-6007

OBJECTIVE: Perform a peer review to assess the adequacy and reasonableness of the developed technical basis (as detailed by the draft PTS NUREG report and other supporting documents) to support a potential revision of the pressurized thermal shock (PTS) rule, 10CFR50.61

REGULATORY USE: Peer review will assist in independently determining the technical adequacy and reasonableness of the developed technical basis to support a potential revision in the PTS rule, 10CFR50.61

WORK SCOPE: 1. Review the developed methodology, technical approach, data and results in the technical basis.

2. Provide comments on the adequacy and reasonableness of the methodology used and the results obtained. This will involve assessing that the developed models, data and concepts are sufficient for their intended use. While we are not expecting the review panel to run the developed computer codes, the review panel may at their discretion perform calculations to check the validity of the results. Before undertaking such computations, any additional resources and level of effort (beyond what is authorized here) have to be requested in the form of a revision to this statement of work.

3. The review process will compare the major elements of the PTS methodology against the desired characteristics and attributes that are elaborated in a PRA standard (e.g., ASME PRA Standard RA-S-2002). The peer review will identify both strengths and weaknesses in the PTS methodology. Key assumptions are to be reviewed to determine if they are appropriate, and if they have a significant impact on the results.

4. A description of the qualifications of the peer review team members and the peer review process are documented. The results of the peer review for each of the major technical element of PTS methodology are documented including those areas where the developed methodology do not meet or exceed the desired characteristics and attributes used in the review process. This includes an assessment of the importance of any identified deficiencies on the results, and how these deficiencies could be addressed and resolved.

Review Steps:
Step-1: Perform review of the available draft reports on the PTS methodology development and draft results. This step is expected to commence in August 2003, after the peer reviewer receives available draft reports on methodology development and results. One to two days' presentation on the draft reports and results will be made by the RES staff during September 29 to October 17, 2003. Also, in this meeting the review panel would develop its charter and plan their activities. RES will provide the finalized reports on analysis procedure to the review panel by November 21, 2003. The reviewer is to develop preliminary comments on the analysis procedures and available draft results during this step, that will continue thru December 31, 2003. At the end of Step 1, a draft letter report is to be provided to RES by the reviewer on the preliminary review comments by January 16, 2004.

Step-2: Perform review of the finalized reports on results and conclusions drawn from application of the methodology and data. This step is expected to commence on January 1, 2004 and continue through April 2, 2004. During January 1 to January 16, 2004, a presentation will be made by the RES staff and contractors on the finalized results and conclusions. During this meeting, the review panel will also provide the preliminary review comments that were developed in the Step 1. The peer review panel is expected to meet again with the RES staff, at the completion of the review, during March 1 to March 12, 2004 to communicate the findings of the peer review. It is anticipated that the peer review, communication of the review findings, and reporting on the peer review will be completed by April 2, 2004 with the final report on peer review delivered to RES.

Reports:
(A): A draft letter report is to be provided to NRC at the end of Step-1 of the peer review process.
(B): A final report shall be submitted to the NRC by the end of Step-2, no later than the end of the performance period, on the peer review as stated in the Scope of Work. The chairperson (or co-chairs) will compile the comments from the other reviewers, provide his/her comments. RES review panel coordinator will provide assistance in assembling the review panel report

FUNDING ($1000): Prior Year [redacted]

Obligations	FY03	[redacted]
0	200	

PROCUREMENT METHOD : Commercial Small Purchase.

THIS ACTION: New Project

CONTRACTOR: To Be Determined REQUISITION NO: RES-03-071

FUNDING PERIOD: Sep,2003 through Apr,2004

PERIOD OF PERFORMANCE: Sep,2003 through Apr,2004

PROCUREMENT MILESTONES

Send Startup Package	6/26/2003
Send Form 30 to DCPM	7/03/2003
Complete Evaluation	9/01/2003
Award Purchase Order	9/15/2003

JOB CODE : Y6742

TITLE: BWR REACTOR VESSEL SAMPLES
Division of Engineering Technology
Program Manager: Norris, Wallace Phone: (301) 415-6796

OBJECTIVE: Analyze metallic BWR vessel component samples to determine the concentrations of various radionuclides and conduct radiometric counting.

REGULATORY USE: The determination of thermal fluence of components slightly above and below the core will be used to benchmark computer codes used to estimate thermal fluences. The areas of concern are in areas where voids may occur or where steam exists. Code currently are not equipped to adequately handle these physical parameters. After benchmarking has been completed, EPRI plans on submitting their code for formal NRC approval. BNL is modifying DORT to analyze these areas and to verify the EPRI code.

WORK SCOPE: Provide data for components not presently in the database relative to the ranges of concentrations of boron and helium in the U.S. BWR fleet for the on-going assessment of the feasibility of underwater welding of highly irradiated in-vessel components.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	150	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Mar,2003 through Sep,2003

PERIOD OF PERFORMANCE: Mar,2003 through Jul,2004

PROCUREMENT MILESTONES

Send SOW to Lab	10/31/2002
Rcv. DOE Proposal (189)	1/14/2003
Issue Form173 to DOE	2/13/2003
Rec. Signed Form 173	3/17/2003

JOB CODE : Y6744

TITLE: CSNI PIPING DATABASE
Division of Engineering Technology
Program Manager: Tregoning, Robert L. Phone: (301) 415-6657

OBJECTIVE: Participate in the OECD OPDE project with 10 other countries. The primary objective is to update international pipe failure database (original SKI database) for all US events between 1998 and 2003. Provide information on all applicable piping attribute and influence database entries (over 100 total) including metallurgical root cause information.

REGULATORY USE: Support Option 3, specifically risk-informing 10 CFR 50.46, and potential development of supporting Regulatory Guide for redefinition of the LBLOCA.

WORK SCOPE: Serve as national program coordinator and interface with the clearinghouse organization (ERIN) that is in charge of the database. Also, coordinate with EPRI, owner's groups, and licensees as appropriate to obtain piping attribute and influence data pertinent to events in question. Also, search for additional piping failures that may not be included in the list developed by the clearinghouse.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	20	

PROCUREMENT METHOD : Fund an International Agreement.

THIS ACTION: New Project

AGENCY: OECD/NEA IA NO: RES-02-350

FUNDING PERIOD: Nov,2002 through Nov,2003

PERIOD OF PERFORMANCE: May,2002 through May,2005

PROCUREMENT MILESTONES

Send Signed Int'l. Agmt	10/11/2002
Send Oblig Memo to OCFO	10/25/2002
OCFO Enter Trans FFS	11/15/2002

JOB CODE : Y6774

TITLE: EXPERT PANEL - INHERENT PROT AGAINST DISPERSION
Division of Engineering Technology
Program Manager: Muscara, Joseph Phone: (301) 415-5844

OBJECTIVE: The objective for the expert panel member is to prepare for the workshop on dispersability of irradiator sources scheduled for November 12-13, 2002, travel to the workshop, and participate in the workshop at NRC Headquarters. We hope to have representation at the workshop from the manufacturers, sealed source and device reviewers, Agreement States, and expertise in chemistry, metallurgical processing, powder metallurgy, vitrification technology/ceramics, and explosive dispersal.

The objective of the workshop is to discuss and identify ideas and methods that have a high potential for success.

REGULATORY USE: The RES/DET received a directive from the EDO's office, in conjunction with the DOE Task Force of which Carl Paperiello is a member, to research and provide methods for reducing the dispersability of certain irradiator sources without detracting from their functionality. This is a homeland security issue and the work must be completed and an answer provided by mid-2003.

WORK SCOPE: In order to develop and implement the research to provide a response to the EDO's office by mid-2003, RES must convene an expert panel to discuss and identify ideas and methods that have a high potential for success. The expert panel meeting is scheduled for November 12-13, 2002, at NRC Headquarters. This aggressive schedule is essential to meet the overall program schedule.

Dr. Charles Forsberg is a chemical engineering expert. He has conducted research and developed methods for nuclear waste separation and processing. We believe that his research results and methods could be used to reduce the dispersability of irradiator sources. We need Dr. Forsberg's participation on the panel to find out details of his work and results and how his methods could be used to meet our goals of making irradiator sources less dispersable.

He will provide a presentation on chemical engineering aspects of materials processing at the workshop and prepare a written summary of his contribution and conclusions from the workshop.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	15	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Nov,2002 through Feb,2003

PERIOD OF PERFORMANCE: Nov,2002 through Feb,2003

PROCUREMENT MILESTONES

Rcv. DOE Proposal (189)	
Send SOW to Lab	
Issue Form173 to DOE	11/06/2002
Rec. Signed Form 173	11/15/2002

JOB CODE : Y6775

TITLE: EXPERT PANEL ON INHERENT PROTECTION AGAINST DISPERSION

Division of Engineering Technology
Program Manager: Muscara, Joseph Phone: (301) 415-5844

OBJECTIVE: The objective for the expert panel member is to prepare for the workshop on dispersability of irradiator sources schedule for November 12-13, 2002, travel to the workshop, and participate in the workshop at NRC Headquarters. We hope to have representation at the workshop from the manufacturers, sealed source and device reviewers, Agreement States, and expertise in chemistry, metallurgical processing, power metallurgy, vitriciation technology/ceramics, and explosive dispersal.

The objective of the workshop is to discuss and identify ideas and methods that have a high potential for success.

REGULATORY USE: The RES/DET received a directive from the EDO's office, in conjunction with the DOE Task Force of which Carl Paperiello is a member, to research and provide methods for reducing the dispersability of certain irradiator sources without detracting from their functionality. This is a homeland security issue and the work must be completed and an answer provided by mid-2003.

WORK SCOPE: In order to develop and implement the research to provide a response to the EDO's office by mid-2003, RES must convene an expert panel to discuss and identify ideas and methods that have a high potential for success. The expert panel meeting is scheduled for November 12-13, 2002, at NRC Headquarters. This aggressive schedule is essential to meet the overall program schedule.

Dr. Iver Anderson is a materials processing expert. He has conducted research and developed methods for solid stat processing of nuclear materials. We believe that his research results and mtehods could be used to reduce the dispersability of irradiator sources. We need Dr. Anderson's participation on the panel to find out details of his work and results and how his methods could be used to meet our goals of making irradiator sources less dispersable.

He will provide a presentation on materials processing and sintering at the workshop and a written summary of his contribution and concusions from the workshop.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	15	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Ames Laboratory

FUNDING PERIOD: Nov,2002 through Feb,2003

PERIOD OF PERFORMANCE: Nov,2002 through Feb,2003

PROCUREMENT MILESTONES

Rcv. DOE Proposal (189)	
Send SOW to Lab	
Issue Form173 to DOE	11/06/2002
Rec. Signed Form 173	11/15/2002

JOB CODE : Y6776

TITLE: EXPERT PANEL - INHERENT PROT AGAINST DISPERSION
Division of Engineering Technology
Program Manager: Muscara, Joseph Phone: (301) 415-5844

OBJECTIVE: The objective for the expert panel member is to prepare for the workshop on dispersability of irradiator sources scheduled for November 12-13, 2002, travel to the workshop, an participate in the workshop at NRC Headquarters. We hope to have representation at the workshop from the manufacturers, sealed source and device reviewers, Agreement States, and expertise in chemistry, metallurgical processing, power metallurgy, vitrification technology/ceramics, and explosive dispersal.

The objective of the workshop is to discuss and identify ideas and methods that have a high potential for success.

REGULATORY USE: The RES/DET received a directive from the EDO's office, in conjunction with the DOE Task Force of which Carl Paperiello is a member, to research and provide methods for reducing the dispersability of certain irradiator sources without detracting from their functionality. This is a homeand security issue and the work must be completed and an answer provided by mid-2003.

WORK SCOPE: In order to implement the research to provide a response to the EDO's office by mid-2003, RES must convene an expert panel to discuss and identify ideas and methods that have a high potential for success. The expert panel meeting is scheduled for November 12-13, 2002, at NRC Headquarters. This aggressive schedule is essential to meet the overall program schedule.

Drs. Arun Wagh and Roger Poeppel are experts in materials processing, chemical bonding and ceramics. They have conducted research and developed methods for nuclear waste immobilization and disposal. We believe that their research results and methods could be used to reduce the dispersability of irradiator sources. We need their participation on the panel to find out details of their work and results and how their methods could be used to meet our goals of making irradiator sources less dispersable.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	30	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Nov,2002 through Feb,2003

PERIOD OF PERFORMANCE: Nov,2002 through Feb,2003

PROCUREMENT MILESTONES

Rcv. DOE Proposal (189)	
Send SOW to Lab	
Issue Form173 to DOE	11/06/2002
Rec. Signed Form 173	11/15/2002

JOB CODE : Y6777

TITLE: EXPERT PANEL - INHERENT PROT AGAINST DISPERSION
Division of Engineering Technology
Program Manager: Muscara, Joseph Phone: (301) 415-5844

OBJECTIVE: The objective for the expert panel member is to prepare for the workshop on dispersability of irradiator sources scheduled for November 12-13, 2002, travel to the workshop, and participate in the workshop at NRC Headquarters. We hope to have representation at the workshop from the manufacturers, sealed source and device reviewers, Agreement States, and expertise in chemistry, metallurgical processing, power metallurgy, vitrification technology/ceramics, and explosive dispersal.

The objective of the workshop is to discuss and identify ideas and methods that have a high potential for success.

REGULATORY USE: The RES/DET received a directive from the EDO's office, in conjunction with the DOE Task force of which Carl Paperiello is a member, to research and provide methods for reducing the dispersability of certain irradiator sources without detracting from their functionality. This is a homeland security issue and the work must be completed and an answer provided by mid-2003.

WORK SCOPE: In order to develop and implement the research to provide a response tothe EDO's office by mid-2003, RES must convene an expert panel to discuss and identify ideas and methods that have a high potential for success. The expert panel meeting is scheduled for November 12-13, 2002, at NRC Headquarters. This aggressive schedule is essential to meet the overall program schedule.

Dr. Vijay Jain is a vitrification and glass chemistry specialist. he has conducted research and developed methods for nuclear waste disposal. We believe that his research results and methods could be used to reduce the dispersability of irradiator sources. We need Dr. Jain's participation on the panel to find out details of his work and results and how his methods could be used to meet our goals of making irradiator sources less dispersable.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	9	

PROCUREMENT METHOD : Sole Source Commercial Contract.

THIS ACTION: New Project

CONTRACTOR: Southwest Research Institute CONTRACT NO: DR-03-0072

FUNDING PERIOD: Nov,2002 through Dec,2002

PERIOD OF PERFORMANCE: Nov,2002 through Dec,2002

PROCUREMENT MILESTONES

Complete Evaluation	
Send Startup Package	
RIMS Generated Funds Comm.	11/06/2002
Send RFPA to DCPM	11/06/2002
Award Contract	11/18/2002

JOB CODE : Y6808

TITLE: UF6 CYLINDER VALVE TESTING
Division of Engineering Technology
Program Manager: Kalinousky, Douglas N. Phone: N/A

OBJECTIVE: To support NMSS, Office of Investigations, and DOE in determining if possible safety defects exist in certain valves manufactured by the Hunt Valve Company and to determine whether the given group of valves meet the standards set in ANSI N14.1-1995, "Uranium Hexafluoride - Packaging for Transport." Safety concerns include cracked packing nuts, loss of material traceability, and failure to conduct hardness testing of the valve stems. If the UF6 cylinder valve were to fail, a release of UF6, a chemically hazardous and radioacive material, could result. In addition, water accidentally entering the cylinder could result in criticality.

REGULATORY USE: The NRC issued Information Notice 2002-31, "Potentially Defective UF6 Cylinder Valves (1-inch)," on 10/31/02. This information notice discusses 1-inch valves manufactured by the Hunt Valve Company. It specifies material heats from which defective packing nuts have been found; heat codes; AFB AFC AFD AFM ATE AXN AXP BXN BXP CCF CCG. It also states possible deviations from purchase orders involving loss of material traceability and failure to conduct hardness tests for valve stems. Suspect valve stem material heat codes are PEN and PFV.

USEC has found a leaking Hunt valve during laboratory pressure testing. Debris was found on the valve stem threads and a bronze ring was found on the valve stem contact surface. Further investigation is being conducted by USEC.

WORK SCOPE: Valve leak testing will be performed as described in ANSI N14.1-2001 Section 6.15.8 on each of the 40 valves. All equipment used in this testing will be properly calibrated. If any of the valves leak, they will be retested after being disassembled and repacked. Randomly, five valves will be selected from those supplied. Selection will be done to maximize the number of different valve body heats to be tested. Any valve parts or valve material sent offsite for testing will be accompanied by an ANL representative who wil be responsible for maintenance of the chain of custody and will ensure that the evidence remains separated and secured in its own evidence bag. A hardness test and a material composition analysis will be performed on each valve stem of all 40 valves. A dye penetrant test and a material composition analysis will be performed on each packing nut of all 40 valves. A material composition analysis will be performed on each valve body of all 40 valves. Randomly, 10 valves will be selected from those supplied. Selection will be done to maximize the number of different valve body heats to be tested. Optical and microscopic inspection of the ACME valve body threads will be performed to determine if any debris is present. If debris is found, the amount and type will be characterized.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	77	

PROCUREMENT METHOD : DOE Work Order for an Urgent Requirement.

THIS ACTION: New Project

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Apr,2003 through Sep,2003

PERIOD OF PERFORMANCE: Apr,2003 through Sep,2003

PROCUREMENT MILESTONES

Issue Form 173 to DOE	3/17/2003
Receive Signed Form 173	4/16/2003

JOB CODE : Y6869

TITLE: BARRIER INTEGRITY RESEARCH PROGRAM
Division of Engineering Technology
Program Manager: Santos, Cayetano G. Phone: (301) 415-6004

OBJECTIVE: The objective of this program is to establish a technical basis for improved requirements related to RCS integrity (specifically including RCS leak rates) to provide assurance that nuclear power plants do not operate with any pressure boundary leakage.

This research program is an integral part of the implementation of the NRC's Assessment of Barrier Integrity Action Plan. This was one of four action plans developed to implement the high priority recommendations made by the Davis Besse Lessons Learned Task Force.

REGULATORY USE: This research program will be used to develop a technical basis for improved requirements related to RCS integrity, including RCS leak rates. These improved requirements may be in the form of new leakage limits, procedures for identification of RCPB leakage, or required actions based on significant increased unidentified leakage. The results of this program may also be used to update NRC Regulatory Guide 1.45 (Reactor Coolant Pressure Boundary Leakage Detection Systems).

The approach for developing these new requirements will be to try to emphasize prevention of breaches to the reactor coolant pressure bounary (RCPB) because the use of leakage limits alone to ensure pressure boundary integrity may not be sufficient.

WORK SCOPE: This program will support the implementation of the Assessment of Barrier Integrity Action Plan by developing a technical basis for improved requirements for RCS integrity.

This program will review and evaluate RCS leakage operating experience at US nuclear power plants. A database describing these types of events will be created.

This program will evaluate the capabilities of the various types of leakage detection systems. This includes those systems currently used by the nuclear industry as well as "state of the art" leakage detection technology. In addition, crack monitoring systems capable of detecting crack initiation and growth will also be examined. This includes but is not limited to acoustic emission technology.

Another task in this program will be to evaluate the leak rates associated with various types of RCS degradation. This task will identify correlations between crack size and leak rates and apply them to RCS components. These leak rates can then be compared to the capabilities of the various monitoring systems examined earlier.

Finally, this program will provide technical assistance to the staff in developing recommendations for improved barrier integrity requirements.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	212	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Undesignated.

FUNDING PERIOD: Jul,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jul,2003 through Sep,2006

JOB CODE : Y6882

TITLE: TECH ASSESS OF BMI PENETRATIONS
Division of Engineering Technology
Program Manager: Jackson, Deborah A. Phone: (301) 415-5887

OBJECTIVE: To support the NRC in fully understanding the capabilities of the inspection techniques to be used during the inspection of South Texas Unit 1 bottom head penetrations.

During the refueling outage of South Texas Unit 1, a bare metal inspection of the vessel bottom head identified potential leaks from penetrations 1 and 46. Chemical analysis of the residue has confirmed that the source was primary water coolant. The licensee is planning to inspect all the bottom head penetrations using a combination of volumetric and visual techniques.

REGULATORY USE: This is the first time that leakage of this kind has been reported and it is important that the potential generic issues are considered from the beginning and that NRC has a clear understanding of the inspection techniques used by the licensee.

WORK SCOPE: The licensee will be assessing the capabilities of two vendors, Westinghouse and Framatome. The vendors will be performing a series of demonstrations of their equipment capabilities and evaluation techniques. The first phase will be carried out using a non-blind standard to enable the potential vendors to refine their procedures under realistic controlled conditions and to allow analysis of the results to determine and improve capabilities of individual techniques within the procedure.

The second phase will be a monitored blind test at the vendors' U.S. home offices (Lynchburg, VA, and Waltz Mill, PA). This phase is intended to demonstrate the vendor's capability to detect and size axial and circumferential ID and OD flaws in the tube, both as isolated flaws and in conjunction with each other. A final demonstration of capability will be made using a mockup currently being fabricated.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	25	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: May,2003 through Dec,2003

PERIOD OF PERFORMANCE: May,2003 through Dec,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/31/2002
Rcv. DOE Proposal (189)	3/17/2003
Issue Form173 to DOE	4/30/2003
Rec. Signed Form 173	5/16/2003

JOB CODE : Y6884

TITLE: INCORPORATE CSCL IN CERAMICRETE
Division of Engineering Technology
Program Manager: Srinivasan, Makuteswara Phone: N/A

OBJECTIVE: Conduct research to determine the methods for reducing the dispersibility of irradiation source materials without adverse effects on their functionality. This focused effort will involve the processing of CsCl in room temperature curing cementitious material called Ceramicrete. Scoping studies will be conducted to optimize process variables to yield a product that has high volume fraction of CsCl in order to maximize specific activity at volumes comparable to present sources while maintaining high density, high crushing strength, and low friability.

REGULATORY USE: This research fulfils the NRC's mission to ensure safeguarding, security, and safety of sealed irradiation sources by exploratory study on the fabrication of inherently strong and safe irradiator source.

WORK SCOPE: This research will establish the technical feasibility of loading CsCl in high volume fractions in a room-temperature setting cementitious material called Ceramicrete. The Ceramicrete processing will be optimized for composition of its constituents, mixing and casting variables, and curing time in order to obtain maximum CsCl loading in the concrete matrix, while maintaining adequate strength and toughness, and source size that is comparable to current designs. The resulting product will be characterized for microstructure, interfacial integrity between the CsCl and the matrix, crushing strength, hardness, and brittleness index. The end product will also be tested for flammability. Leach tests will also be conducted and these properties characterized as well. Based on prior experience and potential correlation literature, assessments will be conducted to estimate the potential radiation damage to the product as a result of CsCl irradiation over time for the specific activity achieved.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	130	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Aug,2003 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2003 through Jul,2004

PROCUREMENT MILESTONES

Send SOW to Lab	4/02/2003
Rcv. DOE Proposal (189)	6/16/2003
Issue Form173 to DOE	8/01/2003
Rec. Signed Form 173	8/15/2003

JOB CODE : Y6909

TITLE: EXAMINATION OF NA2 HEAD
Division of Engineering Technology
Program Manager: Cullen, William Phone: (301) 415-6754

OBJECTIVE: To examine the nozzles and J-welds removed from the discarded North Anna Unit 2 head for better definition of cracking and other defects, and to exam the low-alloy steel head for evidence of boric acid corrosion and leak path development, including evidence of annulus plugging.

REGULATORY USE: The agency formerly espoused an industry-preferred, leakage-based criterion for CRDM nozzle degradation, and, due to recent industry findings, including Davis-Besse, has switched to a defect-based criterion. Apparently, some of the NA2 defects were throughwall, and non-leaking. The agency will benefit from complete and accurate disposition of these flaws and possible leak paths, plugged and not-plugged, and will likely use these results to form the basis for continued regulation of vessel penetration degradation issues.

WORK SCOPE: 1. Receive, catalog and store sections from discarded Davis-Besse and North Anna 2 heads. This includes Nozzle #2 location and Nozzle #46 locations from D-B, and four sections of nozzle material from D-B. Also included are six large head sections from NA2, including Nozzles #'s 51, 54, 10, 31, 59 & 63.
2, Decontaminate the surfaces of the head sections
3. Prepare cutting and machining diagrams for all sections described above.
4. Host a one-day meeting of NRC staff, DoE staff, industry program managers and vendors
5. Host three one-week sessions during which inspection vendors will be allowed access to the samples.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	100	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Jul,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jul,2003 through Nov,2003

PROCUREMENT MILESTONES

Send SOW to Lab	3/03/2003
Rcv. DOE Proposal (189)	5/19/2003
Issue Form173 to DOE	6/18/2003
Rec. Signed Form 173	7/18/2003

JOB CODE : Y6919

TITLE: MATLS DEGRADTN PIRT PRESENTATION
Division of Engineering Technology
Program Manager: Greene, Charles A. Phone: 415-6177

OBJECTIVE: The objective of the project is for the world renowned expert, Dr. Brent E. Boyack, who developed the PIRT technique and has performed many PIRTs, to prepare a presentation on the development, history, and application of the PIRT methodology. We would like Dr. Boyack to travel to the 11th International Conference on Materials Degradation in Nuclear Systems and make an invited presentation to a meeting of international scientists who may be participating in the NRC activity on proactive materials degradation assessment. We want Dr. Boyack to address how PIRT can be modified appropriately for application to identification of materials and locations where degradation can occur.

REGULATORY USE: RES is initiating a Proactive Materials Degradation Assessment program. The first step will be to identify materials and locations where degradation can reasonably be expected in the future. RES plans to use a version of the Phenomena Identification and Ranking Tabulation (PIRT) process to accomplish this identification of locations and components where degradation can occur. PIRT was developed for the NRC and has been used for identifying and prioritizing research needs.

WORK SCOPE: Prepare a presentation on the development, history, application of the PIRT methodology, and how PIRT can be appropriately modified for application to identify materials and locations where degradation can occur. Travel to the 11th International Conference on Materials Degradation in Nuclear Systems and make a presentation to a meeting of international scientists who may be participating in the NRC activity on proactive materials degradation assessment. Provide an electronic version of presentation slides and provide on-call assistance to respond to any questions that may arise from discussions at the conference.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	4	

PROCUREMENT METHOD : Commercial Small Purchase.

THIS ACTION: New Project

CONTRACTOR: Dr. Brent Boyack REQUISITION NO: 60-380011

FUNDING PERIOD: Jul,2003 through Sep,2003

PERIOD OF PERFORMANCE: Jul,2003 through Sep,2003

PROCUREMENT MILESTONES

Send Startup Package	4/25/2003
Send Form 30 to DCPM	5/02/2003
Complete Evaluation	7/01/2003
Award Purchase Order	7/15/2003

JOB CODE : Y6921

TITLE: INCORPORATE CSC1 IN GLASS
Division of Engineering Technology
Program Manager: Srinivasan, Makuteswara Phone: N/A

OBJECTIVE: Conduct research on methods for reducing the dispersibility of irradiation source materials without adverse effects on their functionality. This focused effort will involve mainly the processing of CsCl in glass. Scoping studies will be conducted to optimize process variables to yield a product that has high volume fraction of CsCl in order to maximize specific activity at volumes comparable to present sources while maintaining high density, high crushing strength, and low friability.

REGULATORY USE: This research fulfils the NRC's mission to ensure safeguarding, security, and safety of sealed irradiation sources by exploratory study on the fabrication of inherently strong and safe irradiator source.

WORK SCOPE: This research will establish the technical feasibility of loading CsCl in high volume fractions in a glass The glass processing will be optimized for composition of its constituents in order to obtain maximum CsCl loading in the glass matrix, while maintaining adequate strength and toughness. The resulting product will be characterized for microstructure, interfacial integrity between the CsCl and the matrix, crushing strength, hardness, and brittleness index. The end product will also be tested for flammability. Leach tests will also be conducted and these properties characterized as well. Based on prior experience and potential literature correlation, assessments will be conducted to estimate the potential radiation damage to the product as a result of CsCl irradiation over time for the specific activity achieved.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	130	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Aug,2003 through Jul,2004

PERIOD OF PERFORMANCE: Aug,2003 through Jul,2004

PROCUREMENT MILESTONES

Rcv. DOE Proposal (189)	
Send SOW to Lab	
Issue Form173 to DOE	8/01/2003
Rec. Signed Form 173	8/15/2003

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6922

TITLE: HARDENING AM-BE SEALED SOURCE
Division of Engineering Technology
Program Manager: Srinivasan, Makuteswara Phone: N/A

OBJECTIVE: Conduct research on methods for reducing the dispersibility of Am-Be irradiation source materials without adverse effects on their functionality. This focused effort will involve the processing of Am-Be surrogate by the application of ceramic processing, such as hot pressing and sintering, in order to obtain a dense, hard and strong compacts compared to the currently cold pressed materials. Research will also be conducted to coat the steel casings with ceramic hard coating that will make it difficult to cut or otherwise damage the casing of the irradiator source.

REGULATORY USE: This research fulfils the NRC's mission to ensure safeguarding, security, and safety of sealed irradiation sources by exploratory study on the fabrication of inherently strong and safe irradiator source.

WORK SCOPE: (1) Optimize hot pressing/sintering process and achieve highly dense and hard surrogate Am-Be compacts.
(2) Characterize physical and mechanical properties of the surrogate Am-Be samples.

(3) Select and coat a suitable ceramic coating for hard surfacing outside steel casing.

(4) Optimize coating to provide better resistance to cutting of outer casing of the sealed source using normally available cutting tools and machinery.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	140	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Ames Laboratory

FUNDING PERIOD: Aug,2003 through Jul,2004

PERIOD OF PERFORMANCE: Aug,2003 through Jul,2004

PROCUREMENT MILESTONES

Rcv. DOE Proposal (189)	
Send SOW to Lab	
Issue Form173 to DOE	8/01/2003
Rec. Signed Form 173	8/15/2003

Projects Selected For:

Division: Division of Engineering Technology

Branch: Engineering Research Applications Branch

Job Code	Title	PM Name	Contractor
J6043	INSPECTION AGED/DEGRADED CONTAINMENT	Graves	ORNL
K6907	DIGITAL SYSTEM PERFORMANCE AND RELIABILITY	Calvert	U VA
W6081	JAPANESE COLLABORATION ON SEISMIC ISSUES	Ali	BNL
W6593	EFFECTS OF AGING AND EMERGING ISSUES ON MOV PERFORMANCE	Jackson	INEL
W6684	ASSESSMENT OF AGED & DEGRADED STRUCTURES & COMPONENTS	Chang	BNL
W6829	SEISMIC BEHAVIOR OF SPENT FUEL STORAGE CASK SYSTEMS	Shaukat	SNL
W6851	REVIEW GUIDANCE FOR LIGHTNING	Antonescu	ORNL
Y6041	ASSESS DEBRIS ACCUMULATION ON PWR SUMP PERFORMANCE	Chang	LANL
Y6164	STRUCTURAL RISK-INFORMED ASSESSMENT CONTAINMENT DEGRADATION	Graves	SNL
Y6166	COOPERATIVE GEOSCIENCE RESEARCH	Pullani	USGS
Y6233	GV DOWNHOLE SEISMIC ARRAY OP/ANAL OF DATA	Murphy	UC-SB
Y6272	CHAR ELECTROMAGNETIC CONDITIONS AT NPP'S	Antonescu	ORNL
Y6348	PACKAGE PERFORMANCE STUDY	Murphy	SNL
Y6349	HALDEN ENVIRONMENTALLY ASSISTED CRACKING	Arndt	HALDEN
Y6423	DRY CASK PRA	Shaukat	BNL
Y6475	WIRELESS	Antonescu	ORNL
Y6481	SSHAC METHOD	Murphy	UNDES
Y6590	REVIEW IEEE STDS FOR ENDORSEMENT	Shaffer	LLNL
Y6591	SOFTWARE REL CODE MEASUREMENTS	Arndt	RFP
Y6596	VULNERABILITY ASSESSMENT FOR NPPS	Tegeler	ORNL
Y6712	SAFETY SYSTEM ISOLATION STUDY	Shaffer	ORNL
Y6718	SOIL-STRUCTURE INTERACTION FOR BURIED STRUCTURES	Graves	BNL
Y6729	CLASSIFICATION OF DIGITAL SYSTEM VULNERABILITIES	Shaffer	PNL
Y6733	PROTOCOL ROBUSTNESS ANALYSES	Shaffer	PNL
Y6734	SECURITY TOOL VULNERABILITY CASE STUDY	Shaffer	ORNL
Y6757	CONTAINMENT CAPACITY STUDIES	Costello	SNL
Y6763	RETRANS CODE	Arndt	ISTEC
Y6796	IAEA COORDINATED RES PROJECT ON SEISMIC GROUND MOTION	Murphy	BNL
Y6797	EVAL OF USGS 2002 SEISMIC HAZARDS ASSESSMENTS	Murphy	USGS
Y6833	VULNERABILITY ASSESS-STRUCTURAL RESPONSE	Shaukat	BNL
Y6911	QA SNF TRANSPORTATION CASK ACQ	Murphy	TBD

JOB CODE : J6043

TITLE: INSPECTION AGED/DEGRADED CONTAINMENT
Division of Engineering Technology
Program Manager: Graves, Herman Phone: (301) 415-5880

OBJECTIVE: To understand the significant factors relating occurrence of corrosion, efficacy of inspection, and structural capacity reduction of steel containments and liners of reinforced concrete structures.

REGULATORY USE: Criteria will be provided for NRC license reviewers to establish current structural capacity margins and to estimate future structural capacity margins for steel containments and liners.

WORK SCOPE: Complete work on the assessment of available destructive and nondestructive techniques for examining steel containments and liners. Establish effectiveness and limitations of methods to prevent or mitigate corrosion and repair the damage.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	3,340	225	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Sep,1993 through Sep,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

JOB CODE : K6907

TITLE: DIGITAL SYSTEM PERFORMANCE AND RELIABILITY
Division of Engineering Technology
Program Manager: Calvert, John A. Phone: (301) 415-6323

OBJECTIVE: Establish the technical basis for review guidance and advance the state of the art for the reliability and safety assessment of digital systems.

REGULATORY USE: Understanding of the expected, unexpected and unintended error behavior of digital systems will be used to help determine the confidence and characteristics of any potential risk-aberrrant behavior of software-based digital systems. This aberrant behavior is captured in the concept of fault coverage.
This knowledge and understanding will be translated into technical bases for review guidance.

WORK SCOPE: The continued scope of the cooperative agreement is to survey the various modeling methods for digital systems produce reports that describe the merits/demerits of each and their applicability to risk modeling of digital systems. Risk in this sense means the ability to model normal, off-normal, upset, and aberrant behavior to determine the effect on the safety, reliability, failure modes, and performance of the digital system.

Also a case study of a nuclear plant safety-related COTS piece of equipment is to be done using the selected modeling methodology. This will show the practicality of the selected methodology for risk studies.
This cooperative agreement will necessarily be a multi-year effort.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,575	350	

PROCUREMENT METHOD : Cooperative Agreement (Grant).

THIS ACTION: Modify Scope

RFPA NUMBER: RES-97-067

GRANTEE: University of Virginia GRANT NO: NRC-04-97-067

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Oct,1997 through Dec,2004

PROCUREMENT MILESTONES

DCPM Send Eval. Pkg.	12/31/2002
RES Complete Review	2/14/2003
Send RFPA to DCPM	3/17/2003
Award Coop. Agmnt.	4/16/2003

JOB CODE : W6081

TITLE: JAPANESE COLLABORATION ON SEISMIC ISSUES
Division of Engineering Technology
Program Manager: Ali, Syed A. Phone: (301) 415-5704

OBJECTIVE: To continue to participate in a collaborative program with NUPEC/MITI of Japan on seismic proving tests of several systems. The BNL's main contribution, as described in Tasks 1 through 4, will be to complete the report on the main steam and feed water systems seismic tests (this task is complete and a NUREG report has been issued), interact with NUPEC on establishing collaboration on selected activities of interest to NRC (Task 4), and initiate technical work on activities when the agreements are established (Task 5) (Agreement has been signed in August 1999 as discussed below)

In addition to the above specific objective, this project will also serve to continue interactions with the Japanese organizations such as NUPEC and JAERI to promote the exchange of information and provide cognizance of ongoing research in Japan. The continued large-scale testing as well as extensive development in the seismic risk assessment methodology will provide valuable insights to the NRC regulatory functions.

In August 1999, a five year collaboration agreement has been signed between ANRE/NUPEC and NRC. Collaboration includes activities related to: Ultimate piping strength, energy absorbing supports, bi-axial shear wall tests, and structure to structure interactions. In addition, collaboration also includes potential cooperation in seismic behavior of casks, degraded piping, fragility testing, and other areas for information exchange.

REGULATORY USE: Verify calculation assumptions and confirm that current and emerging analytical techniques are capable of identifying failure modes and failure levels. This information will be used in seismic PRA and seismic margin assessments, for implementation of risk-informed regulatory practice, evaluation of ASME standard, and to assess impact of aging. This information is also necessary for evaluating operating reactor actions and for review of non-power reactor facilities.

WORK SCOPE: Interact with METI/NUPEC representatives on the main steam and feed water system proving tests providing input on support selection, test procedures, and excitation levels. Perform applicable pre- and post-test analyses (Completed) Obtain results from large scale tests on a computer system and reactor shutdown cooling system performed earlier (Completed). Interact with Japanese orgqnizqtions to develop mutually beneficial information exchange activities. BNL is completing the current phase of the analysis of the soil-structure interaction experiments conducted by NUPEC during which moderate scale NPP reinforced concrete models were subjected to actual earthquake and small scale models were shaken on shake tables.

Activities have been initiated on the following items included in August 1999 agreement: multi-axial shear wall program, testing of eroded piping, effects of aging and degradation, and seismic fragilities. In most of the activities NRC will conduct analysis of multi-million dollar tests conducted by NUPEC

Project status (September 02):
The following projects were initiated under an agreement established in August 1999; in adition to the ongoing technical efforts, discussions for a renewed agreement will discussed in FY 2003. The report on soil-structure interaction analysis will be complete in the first quater of FY 2003. The analysis of the seismic shear wall data is progressing well with additional exchanges planned for FY 2003 & 2004. The review of the Tadotsu shake table tests for heavy component supports is underway.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	3,508	300	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: May,1993 through Nov,2004

JOB CODE : W6593

TITLE: EFFECTS OF AGING AND EMERGING ISSUES ON MOV PERFORMANCE

Division of Engineering Technology
Program Manager: Jackson, Jerry E. Phone: (301) 415-6656

OBJECTIVE: Complete stem-stem nut lubricant and stellite corrosion/friction tests, complete evaluations of the research results and issue final reports. Determine the effects of both elevated lubricant temperature and lubricant aging on stem-stem nut friction coefficients and the impact on output torques of typical configurations. Determine the effects of corrosion on Stellite 6 valve surface friction. Support the NRC project manager regarding the effects of both elevated lubricant temperature and lubricant aging on stem-stem nut friction coefficents, and the effects of corrosion on Stellite 6 valve surface friction. Complete validation of the modified MISTA computer program incorporating the dc-powered motor-actuator model. Perform tasks related to ASME code activities and the participation in various symposium/conferences to present research results.

REGULATORY USE: The regulatory staff will utilize the results of the lubricant research and the stellite friction tests for evaluating licensees' MOV margins for extended operations as related to MOVs inservice testing. This research will also be used to evaluate the results from the joint owners group valve testing program which forms the industry-wide response to age-related valve degradation as it effects various motor operated valves capabilities to perform their safety functions.

WORK SCOPE: Conduct tests on specific stem-stem nut configurations and measure the impact that elevated temperature and aging of lubricants have on reducing the output torques of typical motor-actuators. Conduct stellite friction verification tests. Evaluate the results of the tests and present results to the NRC and to the industry. Resolve all comments and issue final reports on the lubricant and stellite friction tests.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	2,867	30	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Jan,2003

PERIOD OF PERFORMANCE: Jan,1996 through Jan,2003

PROCUREMENT MILESTONES

Rcv. DOE Proposal (189)	
Send SOW to Lab	
Issue Form173 to DOE	12/12/2002
Rcv. Signed Form 173	1/16/2003

JOB CODE : W6829

TITLE: SEISMIC BEHAVIOR OF SPENT FUEL STORAGE CASK SYSTEMS

Division of Engineering Technology
Program Manager: Shaukat, Syed K. Phone: (301) 415-6592

OBJECTIVE: The objective of this project is to provide the technical basis for the evaluation of the seismic safety of a Dry Cask Storage System, which will generally consist of an array (one or more) free-standing storage casks resting on a concrete pad. The issues of concern include: how the casks would behave seismically, how much sliding and tipping is likely to take place, how the casks impact each other.

REGULATORY USE: The research products will be used in establishing review criteria (for seismic loads) to aid in the safety review of licensing applications for dry cask storage systems.

WORK SCOPE: The Phase I of this effort entailed a collection and review of information and state-of-the-art related to seismic behavior of dry cask storage systems. Relevant parameters and areas for further research were identified, and peer review recommendations were evaluated and incorporated as appropriate. The Phase II includes plant-specific and generic analyses to develop easy-to-use tools such as tables and nomograms which characterize limiting conditions for parameters important to seismic stability of dry cask systems. Cooperation with EPRI with this program is also sought. The Phase III, if warranted will include testing to validate the analyses performed in the Phase II.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	961	315	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Apr,1999 through Sep,2003

PROCUREMENT MILESTONES

Send SOW to Lab	11/01/2002
Rcv. DOE Proposal (189)	12/02/2002
Issue Form173 to DOE	12/17/2002
Rcv. Signed Form 173	1/16/2003

JOB CODE : W6851

TITLE: REVIEW GUIDANCE FOR LIGHTNING
Division of Engineering Technology
Program Manager: Antonescu, Christina E. Phone: (301) 415-6792

OBJECTIVE: The objective of this project is to establish the technical basis for guidance on lightning protecion for safety-related instrumentation and control (I&C) system.

REGULATORY USE: Support NRR clarify the requirements of GDC2 for lightning protection and provide regulatory guidance on lightning for the design of safety-related I&C. In addition, the ACRS has recently indicated a special interest in the area of lightning protection with respect to computer-based system.

WORK SCOPE: The project is conceptualized to be a three-year confirmatory research effort and consist of the development of the technical basis for lightning protection and consolidation of findings from the development effort into recommendations for guidance. Some of the main tasks include:
Evaluation of standards and practices on lightning protection, investigation of the consequences of lightning-induced failure and development of the technical basis to establish recommendations for regulatory guidance of lightning protection. Specifically, the main task in FY2000 was to identify existing approaches to lightning protection. That is assess the protection practices presently being followed in military and industrial applications. In FY 2001 the work consisted in evaluation of selected relevant standards to assess applicability to the nuclear power plant environment and also involved recommendations on endorsement of specific standards. For FY 2002 research activities consist of concluding the evaluation of current lightning standards and practices (IEEE, ANSI, IEC, DOD, etc.) for their applicability to the nuclear power plant environment and the development of the technical basis for lightning protection guidance. Technical findings will serve to establish recommendations for regulatory guidance on lightning protection.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	390	205	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2000 through Nov,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	12/16/2002
Rec. Sign Form 173	1/15/2003

JOB CODE : Y6041

TITLE: ASSESS DEBRIS ACCUMULATION ON PWR SUMP PERFORMANCE

Division of Engineering Technology
Program Manager: Chang, Tsun-Yung Phone: (301) 415-6450

OBJECTIVE: The goals of the NRC's reassessment are to (1) determine if the transport and accumulation of debris in containment following a LOCA will impede the operation of the ECCS in operating PWRs, (2) if it is shown that debris accumulation will impede ECCS operation, develop the technical basis for revising NRC's regulations or guidance to ensure that debris accumulation in containment will not prevent ECCS operation, and (3) if it is shown that debris accumulation will impede ECCS operation, provide NRC technical reviewers with sufficient information on phenomena involved in debris accumulation and how it effects ECCS operation to facilitate the review of any changes to plants that may be warranted. Also, the laboratory will provide the necessary support to the NRC staff in preparation for and during public and internal meetings concerning the assessment of the effect of debris accumulation in PWR containment on the operation of ECCS.

REGULATORY USE: The results of this RES program will be used to determine whether the exisiting rules and guidance concerning sump avaliability and ECCS operation are adequate to ensure public health and safety.

Develop Guidelines that NRC technical reviewers or inspectors can use to assess licensees' analyses.

WORK SCOPE: see objective

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	3,421	559	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Los Alamos National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Sep,1998 through Jul,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	5/16/2003
Rec. Sign Form 173	6/16/2003

JOB CODE : Y6164

TITLE: STRUCTURAL RISK-INFORMED ASSESSMENT CONTAINMENT DEGRADATION

Division of Engineering Technology
Program Manager: Graves, Herman Phone: (301) 415-5880

OBJECTIVE: The objective of this work is to assess the condition (strength and operability) of a containment when significant degradation (corrosion of the steel liner or shell, loss of prestressing due to corrosion of the tendon system elements, and degraded bellows) has ocurred. The goal of this assessment is to be able to better understand the resulting containment safety margins for degraded conditions. Deterministic and risk-informed decision making methods will be considered.

REGULATORY USE: An understanding of the effect of aged-related degradation on containments is needed to maintain safe operation of the plant and to ensure that the current licensing basis is maintained under all loading conditons. The NRC staff will use the findings of this program to assist them in the evaluation of a licensee's assessment of degraded containment conditions.

WORK SCOPE: The scope of this work will be to perform an integrated assessment of containment degradation, i.e., considering the effects of: steel liner corrosion; loss of prestressing; and bellows degradation. Determinstic and risk-infromed methods will be considered under this program in determining the condition (strength and operability) of a degraded containment. The guidance provided in Regulatory Guide, 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant Specific Changes to the Licensing Basis," will be used in this study.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	450	170	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Dec,2000 through Sep,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

JOB CODE : Y6166

TITLE: COOPERATIVE GEOSCIENCE RESEARCH
Division of Engineering Technology
Program Manager: Pullani, Sada V. Phone: (301) 415-6843

OBJECTIVE: Perform research for improved definition of ground motion and seismic hazard in the central and eastern U.S. (CEUS). Subjects to be addressed include soil amplification in selected locations and spectral characterization of earthquakes.

REGULATORY USE: The NRC has spent considerable resources for defining seismic hazards in the CEUS. However, more detailed data from this project will be needed to derive better hazard estimates, particularly at locations distant from present plant sites. Results from this research will, therefore, be used for improved seismic hazard estimates at present and future nuclear plant sites.

WORK SCOPE: Initiate continuing series of projects to address seismic hazard issues in CEUS, resulting from some of the recently completed works. The scope includes seven tasks: 1. Catalog of locations and magnitude of historical earthquakes in the central US, 2. Evaluation of ground motion models for eastern and central North America, 3. Re-evaluation of ground motion prediction equations for eastern and central North America, 4. Resolving the uncertainty in site amplification modeling and its effects on site specific hazard estimation in the Mississippi embayment and adjacent areas, 5. Areal screening of liquifaction hazard, 6. Recurrence and uncertainty in the central and eastern US, and 7. Analysis and fault segmentation for use in evaluating fault-specific earthquake potential.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	227	150	

PROCUREMENT METHOD : Non-DOE Interagency Agreement.

THIS ACTION: Modify Scope

AGENCY: United States Geological Survey IAA NO: RES-00-001

FUNDING PERIOD: Jan,2003 through Dec,2003

PERIOD OF PERFORMANCE: Apr,2000 through Dec,2003

PROCUREMENT MILESTONES

Send Startup Package	5/26/2003
Send IA Letter to Agency	6/16/2003

JOB CODE : Y6233

TITLE: GV DOWNHOLE SEISMIC ARRAY OP/ANAL OF DATA
Division of Engineering Technology
Program Manager: Murphy, Andrew J. Phone: (301) 415-6011

OBJECTIVE: The objective of this project is to collect data on the propagation of seismic strong ground motion through a shallow soil column (30 to 50 meters). The propagation characteristics of this final portion of the travel path for seismic strong ground motions can sigificantly affect the amplitude and frequency of the ground motion. The role of the various parameters in the soil column is not well understood. The site, Garner Valley, being used for this project was selected as being representative of nuclear power plant sites in the eastern United States.

REGULATORY USE: This research is to provide information to reduce the uncertainties about the propagation of seismic strong ground motions through a shallow soil column. This information will aid the development of the technical basis for the revision of Reg. Guide 1.60 and to confirm the assumptions used in the revision. It will also be used in the development of addtional guidance on strong ground motion for design/modification of NPPs and other nuclear facilities.

WORK SCOPE: The contractor is to operate a multi-element array of downhole strong motion accelerographs in the seismically active Garner Valley, CA; to analyze and interpret any strong motion seismograms recorded by the array and similar seismograms recorded by cooperating projects; to promptly report any results to the NRC Program Manager: and to provide digital copies of any seismograms to the NRC and any of its cooperating partners via the NRC PM.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	398	150	

PROCUREMENT METHOD : Sole Source Commercial Contract.

THIS ACTION: Follow-on to Project W6412 Incrementally Fund

RFPA NUMBER: RES-00-038

CONTRACTOR: University of California at Santa Barbara CONTRACT NO: NRC-04-00-038

FUNDING PERIOD: Nov,2002 through Oct,2003

PERIOD OF PERFORMANCE: Apr,2000 through Mar,2004

PROCUREMENT MILESTONES

Send RFPA to DCPM	2/13/2003
Rcv Oblg. Doc DCPM	3/17/2003

JOB CODE : Y6272

TITLE: CHAR ELECTROMAGNETIC CONDITIONS AT NPP'S

Division of Engineering Technology
Program Manager: Antonescu, Christina E. Phone: (301) 415-6792

OBJECTIVE: The objective of this project is to provide electromagnetic data from nuclear power plant surveys in a commonly accesible form to the industry and to support avalyses that can more completely characterize the elctromagnetic conditions at nuclear power plants.

REGULATORY USE: Support NRR review of EMI/RFI as well as develop recommendations for modifications and enhancements of applicable standards and regulatory guides as necessary.

WORK SCOPE: The project is conceptualized to be a two-year confirmatory research effort to address industry's concern of reanalyzing the existing electromagnetic data from NPPs, characterization of electromagnetic transients in NPPs and possible revision of the technical basis for EMI operating envelopes. Specifically, the main tasks for FY2000 are to convert of existing electromagnetic data from histogram storage to data file format, to generate of NPP electromagnetic data sets and provide collaborative evaluation of the characteristic electromagnetic conditions at nuclear power plants(NPPs). Also, a workshop among nuclear power industry stakeholder will be held to facilitate determination of analysis approaches and to identify key technical focus areas that support the goal of reduced regulatory burden. The main work in FY 2001 consisted of providing recommendations of updating R.G. 1.180 on EMI/RFI test methods and recommendation on EMI/RFI effects in using wireless communication that operates in frequencies between 1 Ghz to 10Ghz. For FY 2002, research activities will provide for detailed analysis of existing electromagnetic operating envelopes, and technical support for finalyzing revision of RG 1.180 as warranted.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	315	204	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2000 through Nov,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	12/16/2002
Rec. Sign Form 173	1/15/2003

JOB CODE : Y6348

TITLE: PACKAGE PERFORMANCE STUDY
Division of Engineering Technology
Program Manager: Murphy, Andrew J. Phone: (301) 415-6011

OBJECTIVE: The objective of this study, entitled, "Update of Spent Fuel Shipping Container Response to Severe Hifhway and Railway Accidents," is to update the NRC's evaluation of the level of safety afforded by certified spent nuclear fuel (SNF) transportation packages under severe accident conditions for railway and highway transport.

REGULATORY USE: This study will provide the NRC with the technical basis to better quantify and communicate the level of protection of public health and safety and the environment during SNF transportation and to take appropriate action based on the results.

WORK SCOPE: The scope of work for Task 1 of Phase II will be to develop a life-cycle cost for the various options under consideration for potential full scale testing of a SNF transportation package. These options include: a used cask from DOE, a new commmercial cask, and a SNL designed and fabricated cask. (This section will be expanded after Task 1 is completed and decisions are made on how to proceed with the rest of Phase II.)

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,850	4,115	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Feb,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jan,2001 through Dec,2005

PROCUREMENT MILESTONES

Send SOW to Lab	12/30/2002
Rcv. DOE Proposal (189)	1/29/2003
Issue Form173 to DOE	2/13/2003
Rcv. Signed Form 173	3/17/2003

JOB CODE : Y6349

TITLE: HALDEN ENVIRONMENTALLY ASSISTED CRACKING
Division of Engineering Technology
Program Manager: Arndt, Steven A. Phone: (301) 415-5698

OBJECTIVE: Provide funding to the Halden Reactor Project (HRP) for collaborative research in the area of digital instrumentation and control (I&C).

REGULATORY USE: Data, methods, and technical bases obtained from HRP may be used by NRR to develop and support appropriate review guidance as it relates to digital I&C systems.

WORK SCOPE: Collaborative research at HRP will begin during FY2001 in the following areas: (1) Use of commercial off-the-shelf operating experience in safety assessments; (2) ranking of software engineering practices and criteria; and (3) testing digital relability assessment methods.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	350	220	

PROCUREMENT METHOD : Fund an International Agreement.

THIS ACTION: Modify Scope

AGENCY: Halden Institutt for Energiteknikk IA NO: RES-88-202

FUNDING PERIOD: Jan,2003 through Dec,2003

PERIOD OF PERFORMANCE: Nov,2000 through Dec,2005

PROCUREMENT MILESTONES

Send Startup Package	1/10/2003
Send Oblig Doc to OCFO	1/15/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6423

TITLE: DRY CASK PRA

Division of Engineering Technology
Program Manager: Shaukat, Syed K. Phone: (301) 415-6592

OBJECTIVE: This project is an effort to support probabilistic risk analysis requested by NMSS, Spent Fuel Project Office, for the handling and storage of spent nuclear fuel in dry casks. A pilot plant is selected that is using Holtec dry cask system of storage containing a multi-purpose canister inside a concrete overpack freely standing on a conrete pad out in the open at the nuclear plant facility. It intends to provide a framework for a general methodology applicable to other dry cask systems at other locations.

REGULATORY USE: This project will provide probabilistic risk analysis (PRA) insight for the review of applications regarding the dry cask storage systems of spent nuclear fuel at the plant site. This will assist the development of safety goals for dry cask storage.

WORK SCOPE: Examine several initiating events during handling, on-site transport, and on-site storage of the cask system to determine the magnitude of the event necessary to slide/tipover the cask system. Determine the loads/stresses imparted on the multi-purpose canister (MPC) for various initiating events. These loads will be used in subsequent fracture mechanics analyses to determine the probability of failure of the MPC.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	633	260	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2001 through Mar,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

JOB CODE : Y6475

TITLE: WIRELESS

Division of Engineering Technology
Program Manager: Antonescu, Christina E. Phone: (301) 415-6792

OBJECTIVE: The The objective of this project is to conduct confirmatory research on the impact of wireless communication technologies on safety-related instrumentation and control (I&C) systems in nuclear power plants. Wireless communication technologies have much to offer in the way of their application within nuclear power plants (e.g., mobile plant monitoring, real-time plant surveillance, and improved mobility/ flexibility for plant personnel) . However, there are issues that must be addressed regarding the implementation of these technologies to ensure plant safety.

REGULATORY USE: Support NRR review of expected wireless technology future applications. The end result of the project is the establishment of the technical basis for the development of guidelines for implementing wireless technology into plants.

WORK SCOPE: Research activities include monitoring of and participation in the industry forums related to the use of wireless technologies and investigation of wireless technology issues (narrowband vs spread spectrum operation, FDMA vs TDMA vs CDMA modulation, etc) to support assessment of their relevance for the nuclear power plant environment.

FUNDING ($1000):	Prior Year Obligations	FY03
	100	215

[redacted]

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Dec,2001 through Sep,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	12/16/2002
Rec. Sign Form 173	1/15/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6481

TITLE: SSHAC METHOD

Division of Engineering Technology
Program Manager: Murphy, Andrew J. Phone: (301) 415-6011

OBJECTIVE: The objective of the project is to perform a "10-year" update of the Probabilistic Seismic Hazard Assessment (PSHA) used in siting of nuclear power plants and other nuclear facilities. The "SSHAC" guidance is proposed as the basic guidance to be followed; this is described in NUREG/CR-6372, Vols 1 &2. The project will likely produce an update or revision of the hazard evaluation code and an update of the database of seismic source characteristic and the seismic attenuation model database.

REGULATORY USE: The planned regulatory product, an update of the PSHA guidance, will be incorporated into the regulatory guides supporting thte seismic siting criteria in 10 CFR Parts 72 & 100.

WORK SCOPE: The primary scope for the project will involve implementing the SSHAC guidance in NUREG/CR-6372. This will mean assembling and "training" a panel of seismicity experts and ground motion experts from whom expert opinions will be elicited to update the corresponding data bases. The basic hazard assessment code will also be updated. Before the SSHAC implementation begins, the use and applicability of the code and databases assembled by the US Geological Survey for its 2002 national seismic hazard map will be assessed.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	240	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: New Project

AGENCY: Undesignated. IAA NO: N/A

FUNDING PERIOD: Feb,2003 through Nov,2003

PERIOD OF PERFORMANCE: Feb,2003 through Dec,2006

PROCUREMENT MILESTONES

Send Startup Package	10/18/2002
Complete Draft IA	11/18/2002
Send IA Letter to Agency	12/03/2002
Receive ltr fm Agency	1/02/2003
Send Oblig Memo to OCFO	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6590

TITLE: REVIEW IEEE STDS FOR ENDORSEMENT

Division of Engineering Technology
Program Manager: Shaffer, Roman A. Phone: (301) 415-7606

OBJECTIVE: This research project has the following two objectives:

1. Revise RG 1.168 / Update IEEE 1012-1987 and IEEE 1028-1988 endorsed in RG 1.168 to IEEE 1012-1998 and IEEE 1028-1997, if necessary.
2. Revise RG 1.75 / Update IEEE 384-1974 endorsed in RG 1.75 to IEEE 384-1992.

REGULATORY USE: This project will revise Regulatory Guide 1.168 and Regulatory Guide 1.75, if this research reveals that the revisions to the regulatory guides are necessary. The revised regulatory guides will help the NRC in evaluating the digital instrumentation and control systems for plant updates and for new applications.

WORK SCOPE:

a. List the differences between (1) the version endorsed in the regulatoryguides and the updated version of IEEE standard 1012 and1028.

b. Determine whether the updates to the standard address the exceptions listed in the RGs.

c. Determine whether the update to the standard introduces new concerns to the NRC. If the update relaxes the requirements of the standard endorsed by RG, determine whether the relaxation is acceptable to the NRC. If the update adds new requirements, determine whether the new requirements are acceptable to the NRC.

d. Develop reports on the findings.

e. Determine a revision to RG 1.168 is necessary

f. Revise RG 1.168

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	70	30	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Univ. of Calif. - Lawrence Livermore National Laboratory

FUNDING PERIOD: Dec,2002 through Sep,2003

PERIOD OF PERFORMANCE: May,2002 through Sep,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

JOB CODE : Y6591

TITLE: SOFTWARE REL CODE MEASUREMENTS
Division of Engineering Technology
Program Manager: Arndt, Steven A. Phone: (301) 415-5698

OBJECTIVE: Develop techniques to credibly measure digital system reliability.

REGULATORY USE: Assist NRR in reviewing digital safety systems to provide a higher level of confidence in the reliability of digital systems.

WORK SCOPE: Work consists of:
1. Complete work on evaluating software reliability measurements which can be used to assess software reliability. 2. Utilize the results of the Software Reliability study reported in the University of Maryland report, "Software Engineering Measures for Predicting Software Reliability in Safety Critical Digital Systems" as folllows:
a. Obtain outside help in testing concept on a "real" project; b. develop a tie to a reliability model of the measurement technique; and c. provide results to NRR or use in reducing effort in reviews and improving regulatory efficiency this reducing regulatory burden.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	200	

PROCUREMENT METHOD : Fully Competitive Commercial Contract.

THIS ACTION: New Project Follow-on to Project Y6405

CONTRACTOR: Request for Proposals CONTRACT NO: RES-03-047

FUNDING PERIOD: Nov,2002 through Nov,2003

PERIOD OF PERFORMANCE: Nov,2002 through Nov,2004

PROCUREMENT MILESTONES

Send Startup Package	8/18/2002
Send RFPA to DCPM	8/19/2002
Issue Comp. Range Rpt.	9/12/2002
Issue Final Eval. Rpt.	10/28/2002
Award Contract	11/18/2002
RIMS Generated Funds Comm.	11/18/2002

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6596

TITLE: VULNERABILITY ASSESSMENT FOR NPPS
Division of Engineering Technology
Program Manager: Tegeler, Bret A. Phone: N/A

OBJECTIVE: To identify potential vulnerabilities of U.S. nuclear power plants to terrorist attacks and effective means to reduce these vulnerabilities. Phase I of the program, completed at the end of September 2002, focused primarily on developing BRL CAD models of several plants of interest and interfacing these models with the Visual Interactive Site Analysis Code (VISAC). The next phases, Phases 2 and 3, will refine the "basic" models to include critical plan equipment and enhance the threat library of the software. The enhanced threat library will include explosive hazards such as liquid hydrogen and liquid propane.

Technical support to the NRC is required for the following specific areas (but are not limited to): 1) the analysis of internal and external explosions; 2) the modeling of spatial impacts of attacks; and 3) characterizing damage effects from explosions involving volatile materials routinely stored at nuclear power plants (e.g., liquid hydrogen tanks). The program proposed herein will be conducted in two phases.

REGULATORY USE: In response to the September 11, 2001, terrorist attacks on the World Trade Center and the Pentagon, the NRC began to assess the threat of terrorism in each of the nuclear facilities certified by the Commission.

WORK SCOPE: This program will be conducted in two phases. Phase 2 - Amend the software code VISAC to incorporate critical equipment and associated fault trees for two plant specific studies. The plants of interest will be identified by the NRC project manager. Phase 3 - The software code, VISAC, will be modified by incorporating pressure and impulse algorithms for kerosene and liquid hydrogen explosions. The developed methodology shall be compared with available test data. In addition, algorithms for structural and component damage will be developed and compared to available test data.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	495	300	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION: Modify Scope

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Jul,2003 through Nov,2003

PERIOD OF PERFORMANCE: Nov,2001 through Apr,2004

PROCUREMENT MILESTONES

Rcv. DOE Proposal (189)	
Send SOW to Lab	
Issue Form173 to DOE	7/22/2003
Rcv. Signed Form 173	8/18/2003

JOB CODE : Y6712

TITLE: SAFETY SYSTEM ISOLATION STUDY
Division of Engineering Technology
Program Manager: Shaffer, Roman A. Phone: (301) 415-7606

OBJECTIVE: The primary objective of this research project is to study the digital systems generically qualified for safety applications (i.e., Triconex TRICON, Siemens TELEPERM, and Westinghouse COMMON Q) to determine how effectively these sysetms are isolated from cyber attacks.

REGULATORY USE: If specific vulnerabilities are identified, Contractor shall propose regulatory changes to address them. Depending on the identified potential vulnerability (or vulnerabilities), changes to I&C-related regulations, e.g., 10CFR50.55a(h), or to physical security-related regulations, e.g., 10CFR73.55, could be proposed. All identified potential vulnerabilities as well as corresponding proposed rule changes, as appropriate, shall be documented in a final report to the NRC Project Manager.

WORK SCOPE: TASK 1: Review of Regulations and Regulatory Guidance. Contractor shall review current NRC regulatory requirements and regulatory guides to determine if they are sufficient to ensure these systems are not threatened by cyber terrorism.
TASK 2: Review of External Agency and Industry Guidance. Contractor shall review external agency and industry guidance related to cyber terrorism to determine if additional NRC guidance or regulatory changes are required.
TASK 3: Review of Digital Safety Systems. Contractor shall review the digital systems (TRICON, TELEPERM, and COMMON Q) for potential vulnerabilities resulting from inadequate isolation.

DELIVERABLES: Draft and Final reports (NUREG-series).

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	75	125	

PROCUREMENT METHOD : DOE Work Order for an Urgent Requirement.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2002 through Nov,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6718

TITLE: SOIL-STRUCTURE INTERACTION FOR BURIED STRUCTURES

Division of Engineering Technology
Program Manager: Graves, Herman Phone: (301) 415-5880

OBJECTIVE: The objective of this research is to investigate the applicability of existing seismic SSI computer codes
to deeply embedded or buried structures and to recommend any necessary modifications to the computer codes. For two of the new reactor designs submitted to the NRC for preliminary review, the entire reactor building and a significant portion of the steam generator building will be partially or completely embededd below grade. Based on a review of research by foreign research and development organizations and regulators gaps where additional research is needed will be noted.

REGULATORY USE: The end product of this work will be technical guidance in NUREG'S or contractor's reports and updates of Regulatory Guides and Standard Review Plan sections, as necessary. In addition, a possible outcome of the work will be that seismic SSI analysis techniques may lead to modified computer codes that may be utilized by NRC staff for the independent review of new reactor submittals.

WORK SCOPE: The scope of the work is to review current NRC seismic analysis guidelines to determine if the guidelines adequately address the SSI analyses requirements for buried nuclear power plant structures. The work will also involve identifying and collecting earthquake down-hole data that will be useful in developing benchmarks for seismic SSI models.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	280	220	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Sep,2002 through Sep,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	3/17/2003
Rec. Sign Form 173	4/16/2003

JOB CODE : Y6729

TITLE: CLASSIFICATION OF DIGITAL SYSTEM VULNERABILITIES
Division of Engineering Technology
Program Manager: Shaffer, Roman A. Phone: (301) 415-7606

OBJECTIVE: The primary objective of this research project is to establish the technical bases for review and inspection of digital systems at nuclear facilities for adequate protection against cyber attack.

REGULATORY USE: Theoretical understanding of security-related vulnerabilities will be provided as well as tools potentially useful to both NRC design reviewers and inspectors (Resident and Regional). The project deliverables include a taxonomy of digital system security vulnerabilities, a database of known vulnerabilities, review and inspection checklists, and perhaps even software-based assessment tools. Guidance on how and when to use these tools will be provided as well.

WORK SCOPE: TASK 1: Taxonomy Development. Identifies state of the art in computer vulnerability taxonomies in order to combine them into a single classification scheme applicable to digital systems found at nuclear facilities.
TASK 2: Taxonomy Validation. Validates the new classification scheme on established and well-recognized computer vulnerability databases (e.g., CERT, SANS) according to defined criteria.
TASK 3: Analysis of Vulnerabilities and Exploits. Addresses the technical details of digital system vulnerabilities and their exploits.
TASK 4: Security Assessment Tools and Techniques. Identifies software tools for analyzing digital systems' vulnerabilities to cyber attack.
TASK 5: Review and Inspection Guidance. Combines the output from the previous tasks into design review and inspection procedures (including software-based security assessment tools) having strong technical bases.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	50	189	

PROCUREMENT METHOD : DOE Work Order for an Urgent Requirement.

THIS ACTION: Incrementally Fund

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Aug,2003

PERIOD OF PERFORMANCE: Aug,2002 through Aug,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

JOB CODE : Y6733

TITLE: PROTOCOL ROBUSTNESS ANALYSES
Division of Engineering Technology
Program Manager: Shaffer, Roman A. Phone: (301) 415-7606

OBJECTIVE: The primary objective of this project is to identify and investigate data communication protocols for their potential vulnerability to cyber attack.

REGULATORY USE: This research project is expected to provide valuable data to NRC reviewers and inspectors, which could be useful during future rulemaking. Because the line between IT and process control systems is becoming less clear, data indicating scope of vulnerability of common Internet protocols and Fieldbus protocols may provide a more complete picture of the nuclear industry's exposure to cyber attack. Such data will enable the NRC to take a realistic and effective regulatory position on cyber security of digital systems at nuclear-powered electricity generating stations.

WORK SCOPE: TASK 1: Protocol Identification. Contractor shall identify data communication protocols having potential application within the nuclear industry. This task specifies criteria for selection.
TASK 2: Plan/Method Outline. Contractor shall formulate a method of analysis to apply to the protocol(s) selected during TASK 1.
TASK 3: Protocol Analysis and Tools Development. Contractor shall analyze the protocol(s) selected in TASK 1 for vulnerabilities in accordance with the method developed in TASK 2.
TASK 4: Reports and Toolkit Delivery. Contractor shall provide a NUREG-series report on the results fo the vulnerability analyses of the selected protocol(s). Contractor shall also provide a copy of the software tool (toolkit).

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	100	220	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Aug,2003

PERIOD OF PERFORMANCE: Sep,2002 through Aug,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

JOB CODE : Y6734

TITLE: SECURITY TOOL VULNERABILITY CASE STUDY

Division of Engineering Technology
Program Manager: Shaffer, Roman A. Phone: (301) 415-7606

OBJECTIVE: The primary objective of this project is to evaluate a digital system security tool (either COTS or open source) for its effectiveness in protecting against cyber attack. The security tool chosen for this project will be selected, ideally, from a list of tools known to be (or expected to be) in use at nuclear-powered electricity generating stations.

REGULATORY USE: The process (including test criteria) used for evaluating the selected tool may be leveraged into a standardized testing process for a certain class of digital system security tool (e.g., IDS or firewall). If such a scheme is feasible, it may lead to industry guidance on effective protection measures for digital systems (perhaps in the form of a Regulatory Guide and/or Inspection Procedures).

WORK SCOPE: TASK: Tool Assessment. Contractor shall identify a widely implemented digital system security tool (e.g., firewall, IDS) within the nuclear industry. Contractor shall provide a plan for evaluating the tool subject to NRC Project Manager input. Contractor shall evaluate the security tool in accordance with the plan. Project deliverable is a NUREG-series report discussing the plan, the testing methodology, and the testing results.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	100	111	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Sep,2002 through Sep,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

JOB CODE : Y6757

TITLE: CONTAINMENT CAPACITY STUDIES
Division of Engineering Technology
Program Manager: Costello, James F. Phone: (301) 415-6009

OBJECTIVE: Develop confirmatory analyses of the structural response and failure modes for the wide variety of U. S. containment designs under extreme loadings. Both severe accident loads, including temperature effects, and severe environmental loads, including large earthquakes, should be considered.

REGULATORY USE: Regulatory decisions on issues related to failure margins in plants are based on estimates of containment capacity. More realistic estimates of actual failure modes are necessary for developing risk-informed approaches to decision making on, among other things, remaining lifetime for degraded concrete structures.

WORK SCOPE: This is a follow on effort to utilize the results of NRC investment in major testing programs. The two major activities will be:
(1) Utilize the results of the concrete containment model tests to to assess the likely failure modes of existing U. S. plants.
(2) Utilize contacts developed, with foreign organizations during the Model Test Round Robin calculations, to get the benefit of experiences in estimating capacities for their plant designs.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	299	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Mar,2003 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2003 through Nov,2005

PROCUREMENT MILESTONES

Send SOW to Lab	10/03/2002
Rcv. DOE Proposal (189)	12/17/2002
Issue Form173 to DOE	1/16/2003
Rec. Signed Form 173	2/17/2003

JOB CODE : Y6796

TITLE: IAEA COORDINATED RES PROJECT ON SEISMIC GROUND MOTION

Division of Engineering Technology
Program Manager: Murphy, Andrew J. Phone: (301) 415-6011

OBJECTIVE: Assist Member States in the evaluation of techniques for re-evaluation of the seismic hazard to nuclear facilities, the evaluation of the vulnerability of the facilities, and the implementation of appropriate upgrades and/or safety enhancements, as needed. This coordinated research project (CRP) focusses on the assessment of the vulnerability of structures. The specific objective is for nuclear engineers to adapt and use the best available engineering practices appropriate to asses the effects of near-field earthquakes, for the evaluation of the seismic vulnerabilities of nuclear facilities. The attention of the participants is drawn to the fact that, due to the available experimental data, the NFEs considered in this CRP are low-to-moderate magnitude earthquakes.

REGULATORY USE: This work is a follow-on activity to Job Code W6691, "Displacement Based Criteria, " which examined the potential use of displacement based design rules for nuclear facilities. This project will further examine this concept and transmit these to the international regulatory community via the CRP.

NRC will share with the international community the results of its investigations and evaluation of displacement-based seismic design issues, learn from the international community how it is handling the issue of large displacements from moderate magnitude earthquakes at short distance, conduct analyses of small scale models subjected to large displacement on a small shake table, and to continue to evaluate the analytical methods needed to conduct displacement-based seismic design of nuclear facilities.

WORK SCOPE: Participate in the activities of the IAEA CRP on Seismic Ground Motion. These activities include: group meetings, providing and explaining to the international community the results of its investigations and evaluations of displacement-based seismic design issues and methods, assimilating the focus, data, approaches and analysis methods of the international community to the issues of near-field earthquakes, and evaluating and summarizing the information discussed by the members of the CRP for the NRC through the Monthly Letter Status Reports and topical reports as appropriate and approved by the Project Manager.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	100	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Jul,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jul,2003 through Feb,2005

PROCUREMENT MILESTONES

Send SOW to Lab	4/30/2003
Rcv. DOE Proposal (189)	5/19/2003
Issue Form173 to DOE	7/11/2003
Rec. Signed Form 173	7/18/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6797

TITLE: EVAL OF USGS 2002 SEISMIC HAZARDS ASSESSMENTS

Division of Engineering Technology
Program Manager: Murphy, Andrew J. Phone: (301) 415-6011

OBJECTIVE: The objective of this project is to obtain data and analyses from the USGS using its 2002 Seismic Hazard Data and Code at central and eastern U.S. NPP sites. These data and analyses will be used by the NRC staff to evaluate the applicability of the 2002 USGS data base and code as a suitable tool for the ten-year update of the NRC's seismic siting guidance, Reg. Guide 1.165

REGULATORY USE: The planned regulatory product of this program, SSHAC Method, is an update of the Probabilistic Seismic Hazard Assessment guidance; and it is planned to be incorporated into the regulatory guides supporting the seismic siting criteria in 10 CFR Parts 72 & 100.

WORK SCOPE: Develop estimates of the seismic hazard at NPP site in the central and eastern U.S., using the 2002 USGS seismic hazard data base and analysis code at a seies of ground motion frequencies and re-occurrence intervals.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	250	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: New Project

AGENCY: United States Geological Survey IAA NO: RES-03-004

FUNDING PERIOD: Mar,2003 through Dec,2004

PERIOD OF PERFORMANCE: Mar,2003 through Dec,2003

PROCUREMENT MILESTONES

Send Startup Package	11/15/2002
Complete Draft IA	12/16/2002
Send IA Letter to Agency	12/31/2002
Receive ltr fm Agency	1/30/2003
Send Oblig Memo to OCFO	3/17/2003

JOB CODE : Y6833

TITLE: VULNERABILITY ASSESS-STRUCTURAL RESPONSE
Division of Engineering Technology
Program Manager: Shaukat, Syed K. Phone: (301) 415-6592

OBJECTIVE: To identify potential vulnerabilities of U.S. nuclear power plants (NPPs) to terrorist attacks and identify effective means to reduce these vulnerabilities. An initial scoping assessment (Phase I) covering all U. S. NPPs was performed at the Sandia National Laboratories (SNL) using readily available information. In the current effort (Phase II), being performed at the SNL and the Brookhaven National Laboratory (BNL), state-of-the-art analytical tools and data will be developed, validated, and demonstrated. The tools will be used to perform analyses, as necessary to support the following project objectives: 1) characterize the generic vulnerabilities of NPPs to aircraft attacks (BNL and SNL); 2) identify potentially effective and efficient mitigation strategies (SNL); and 3) develop and deploy tools for identifying and characterizing facility-specific vulnerabilities (BNL and SNL).

REGULATORY USE: In response to the September 11, 2001, terrorist attacks on the World Trade Center and the Pentagon, the NRC began to assess the threat of terrorism in each of the nuclear facilities certified by the Commission.

WORK SCOPE: This project complements ongoing work being performed by SNL. Tasks include: perform analyses to evaluate the potential for damage to large structures at the point-of-impact, and the vibratory response of the buildings in areas that may be below grade or far from the impct location; develop simplified physical response tools for use in screening analyses; support stakeholder interactions; and preparation of a final report.

FUNDING ($1000):	Prior Year Obligations	FY03
	0	400

[redacted]

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Aug,2003 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2003 through Mar,2004

PROCUREMENT MILESTONES

Rcv. DOE Proposal (189)	
Send SOW to Lab	
Issue Form173 to DOE	7/23/2003
Rec. Signed Form 173	8/15/2003

Nuclear Regulatory Commission
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Advance Procurement Plan for FY 2003

JOB CODE : Y6911

TITLE: QA SNF TRANSPORTATION CASK ACQ

Division of Engineering Technology
Program Manager: Murphy, Andrew J. Phone: (301) 415-6011

OBJECTIVE: Support the NRC's Package Performance Study (PPS) research program in the acquisition of a rail cask and a truck cask for full-scale impact and thermal testing under extreme accident conditions. The contractor shall be responsible for developing and implementing a quality assurance plan similar to the DOE plan docketed as 71-0786. The contractor shall be acting as the owner's (NRC) agent for all quality assurance functions during procurement of the casks. The contractor shall assist the NRC staff in preparation of the procurement documents to obtain the casks. The contractor shall resolve design control and other technicla issues during fabrication of the casks, coordinating with NRC as necessary. The contractor shall provide electronic copies of all quality assurance records providing documentary evidence of activities affecting the quality of the casks, including, as a minimum: design, procurement, manufacturing, and installation records; supplier evaluations; nonconformance reports; results of inspections, tests, and audits; failure analysis; as-built drawings and specifications; qualification of personnel, procedures, and equipment; calibration procedures; trainin records; and corrective actions reports.

REGULATORY USE: The NRC is currently engaged in the PPS, a major research program to investigate the response or capacity of spent nuclear fuel under extreme accident conditions.

WORK SCOPE: The NRC staff-proposed draft preliminary plans (NUREG-1768) for the physical testing of actual casks were available for public comment, and the public comment period ended May 30, 2003. Key elements of the test plans are the impact testing and thermal testing of an actual rail cask and actual truck cask. The test specimens will be cask designs that have been certified by the NRC and are in the inventory of casks likely to be used to transport spent nuclear fuel to either the proposed Private Fuel Storage site or the potential Yucca Mountain repository. The casks used in the PPS are to have been procured and manufactured by an independent contractor according to the NRC QA requirements as described in 10 CFR Part 71. NRC seeks to put in place a contractor to develop and implement a WA plan to cover the owner's responsibilities for acquisition of the casks. The contractor will assist the NRC in preparation of the cask procurement agreement an shall perform the QA and technical functions of the owner during acquisition of the casks.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	150	

PROCUREMENT METHOD : Fully Competitive Commercial Contract.

THIS ACTION: New Project

CONTRACTOR: To Be Determined CONTRACT NO: RES-03-067

FUNDING PERIOD: Aug,2003 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2003 through Aug,2008

PROCUREMENT MILESTONES

Issue Comp. Range Rpt.	
Issue Final Eval. Rpt.	
Send Startup Package	
Send RFPA to DCPM	6/30/2003
Award Contract	8/18/2003

Monday, July 21, 2003

Nuclear Regulatory Commission

Project Approval Status Report For FY 2003

Projects Selected For:

Division: Division of Risk Analysis & Applications

Branch: Operating Experience Risk Analysis Branch

Job Code	Title	PM Name	Contractor
A9134	SEQUENCE CODING SEARCH SYSTEM (SCSS)	Brady	ORNL
G6810	MANAGEMENT OF PRECURSORS STUDY	Harper	NAS
J8258	INTL COMMON CAUSE EXCHANGE PROJECT	Rasmuson	OECD
J8263	REACTOR OVERSIGHT PROCESS SUPPORT	Wolf	INEL
W6355	SPAR MODEL DEVELOPMENT: LOW POWER/SHUTDOWN	O'Reilly	INEL
W6467	SPAR MODEL DEVELOPMENT: LEVEL 1, REV. 3 MODELS	O'Reilly	INEL
Y6153	SPAR MODEL DEVELOPMENT: LEVEL 2/LERF	O'Reilly	BNL
Y6214	INTEGRATED DATA CODING AND ANALYSIS METHODS	Wolf	INEL
Y6215	OPER EVENTS FOR ACC SEQ PRECURSOR PGM	Harper	EQE
Y6370	DEVELOPMENT OF RISK-BASED PERFORMANCE INDICATORS	Wolf	ISL INC
Y6468	RX OPERATING EXPERIENCE DATA FOR RISK APPL.	Wolf	INEL
Y6546	INDUSTRY TRENDS PROGRAM	Wolf	INEL
Y6553	SDP FRONT-END INTERFACE FOR SPAR MODELS	O'Reilly	INEL
Y6626	ACCESS TO INPO'S EPIX SYSTEM	Brady	INPO
Y6636	SUPPORT FOR INDUSTRY TRENDS	Wolf	ISL INC

Nuclear Regulatory Commission

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Advance Procurement Plan for FY 2003

JOB CODE : A9134

TITLE: SEQUENCE CODING SEARCH SYSTEM (SCSS)

Division of Risk Analysis & Applications
Program Manager: Brady, Bennett M. Phone: (301) 415-6363

OBJECTIVE: The ORNL is assisting the NRC/RES in the maintenance and operation of the Sequence Coding and Search System (SCSS). This program involves a system for reducing the descriptive text contained in Licensee Event Reports (LERs) to coded sequences that are both computer readable and computer searchable. The system provides a structured format for detailed coding of LER information that is utilized to support the NRC's analysis of industry trends in addition to establishing a data source for measuring industry performance.

REGULATORY USE: COMSECY-95-022 directed the continuation of SCSS for new LERs. FY2002-2003 Operating Plan 1.A.1GAD specifies to continue to operate and maintain the SCSS database to provide the necessary data for RES studies and provide data for other NRC offices and the regions. This systems supports staff for their daily routine needs for retrieving information from LERs. Established programs currently supported with information directly from SCSS includes: Accident Sequence Precursor Program (ASP), Common Cause Failure database, System Studies and Component Studies providing support for risk analyses.

WORK SCOPE: Process LERs received by the agency into the SCSS database. Review LERs and establish a coded matrix of sequenced information for input into the SCSS database. Continue to maintain a functional website as the SCSS platform to support agency and industry access to LER information. Support staff needs by performing searches of the information contained in SCSS.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	2,245	435	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jul,1980 through Apr,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : G6810

TITLE: MANAGEMENT OF PRECURSORS STUDY

Division of Risk Analysis & Applications
Program Manager: Harper, Marcel R. Phone: (301) 415-6344

OBJECTIVE: The grant will document and promote industrial and scientific approaches for detecting, analyzing, and benefitting from kowledge of accident precursors.

REGULATORY USE: The NRC will use the report and the proceedings of the workshop to compare the NRC Accident Sequence Precursor methods and approaches to that of industry and other government agencies. This information may provide new insights that can be used in regulatory applications such as risk analyses and the reactor oversight process significance determination process.

WORK SCOPE: As part of the project, a two-day workshop will be held on July 17 and 18, 2003 in Washington, DC, to examine precursor methods and approaches utilized in various industries and to highlight cross-industry applications of precursor methodologies. A report that includes the proceedings of the workshop will be issued at the end of the grant.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	25	

PROCUREMENT METHOD: Non-Educational Grant.

THIS ACTION: New Project

RFPA NUMBER: RES-03-066

GRANTEE: National Academy of Sciences GRANT NO: NRC-04-03-066

FUNDING PERIOD: Jun,2003 through Oct,2003

PERIOD OF PERFORMANCE: Jun,2003 through Oct,2003

PROCUREMENT MILESTONES

Rcv. Grant Appl. from DCPM	2/20/2003
Complete Tech. Review	4/07/2003
OGC REVIEW	4/17/2003
Send RFPA To DCPM	5/19/2003
Award Grant	6/18/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : J8258

TITLE: INTL COMMON CAUSE EXCHANGE PROJECT

Division of Risk Analysis & Applications
Program Manager: Rasmuson, Dale Phone: (301) 415-7571

OBJECTIVE: The purpose of the project is to expand the common-cause failure (CCF) event data available to the NRC and utilities through the exchange of CCF data among the NEA participating countries.

The objectives of the International Common-Cause Failure Data Exchange (ICDE) Project are (1) to foster the exchange of CCF data, (2) to generate qualitative insights on root causes of CCF events to be used to derive ways for preventing CCF events or for mitigating their consequences, and (3) to make available quantitative data for CCF events in the estimation of the efficiency of defenses against CCF events and for the assessment of CCF events in PRAs.

REGULATORY USE: The NRC will use this data to compare CCF insights from US plants with insights from the other participating countries. This information may provide new insights that can be used in planning inspections, etc.

WORK SCOPE: Participate in International Common-Cause Failure Data Exchange Project by: submitting data to the ICDE Clearing House, submitting CCF insights reports to the ICDE, and annual status report to ICDE.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	52	15	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION: Modify Scope

AGENCY: OECD/NEA IA NO: RES-98-300

FUNDING PERIOD: Apr,2003 through Mar,2004

PERIOD OF PERFORMANCE: May,1998 through Mar,2005

PROCUREMENT MILESTONES

Send Startup Package	4/07/2003
Send Oblig Doc to OCFO	4/15/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : J8263

TITLE: REACTOR OVERSIGHT PROCESS SUPPORT

Division of Risk Analysis & Applications
Program Manager: Wolf, Thomas R. Phone: (301) 415-7576

OBJECTIVE: To assist in the development, demonstration, and implementation of enhance performance indicators that can provide objective measures for use in assessing reactor operational performance in the context of public risk.

REGULATORY USE: Enhanced performance indicators are designed to be incorporated into the reactor oversight process (NUREG-1649) and the industry trends program (SECY-01-0111). Their use will help ensure that the NRC mission to protect the public is met through the use of a combination of performance indicators and risk-informed inspection activities.

WORK SCOPE: The objective of this effort for FY-03 is the continuation of the development of enhanced performance indicators. The effort involves the mitigating system performance index (MSPI) pilot program; feedback from stakeholders and appropriate MSPI modifications; enhancements to the state-of-the-art models, analyses, and data; revision of plant-specific thresholds based on new or updated models; development of an integrated indicator to assess the risk-signficance on the overall plant performance; and public meetings and workshops.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,723	389	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Nov,1998 through Nov,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

JOB CODE : W6355

TITLE: SPAR MODEL DEVELOPMENT: LOW POWER/SHUTDOWN

Division of Risk Analysis & Applications
Program Manager: O'Reilly, Patrick D. Phone: (301) 415-7570

OBJECTIVE: To develop logic models for analyzing low power/shutdown internal events from previously completed templates that will provide staff analysts the capability to estimate the relative risk of events and/or conditions that occur at licensed commercial nuclear power plants during low power/shutdown operations.

REGULATORY USE: These low power/shutdown analysis tools will be used with the SAPHIRE/GEM PRA software by various organizations (NRR, RES, regional offices) within the agency for estimating the risk associated with shutdown/low power events/conditions in activities such as: the reactor oversight process, the ASP Program, the resolution of generic issues, the review of utility-licensee submittals regarding operating license amendments, and the development of risk-based performance indicators (RBPIs).

WORK SCOPE: In FY 2001-02, the project developed specifications, prototype templates, and associated guidelines for developing other LP/SD models. Starting with FY 2002, the project is using the PWR LP/SD template to develop models for the lead plant in each of eight plant classes (two, for Surry and Grand Gulf, had previously been completed) along with guidance on how to develop LP/SD models for other plants in the same plant class from the LP/SD model for the lead plant. In another current task, the project is updating the HRA methodology used in the SPAR models to add uncertainty analysis capability, tailoring the method for specific application to LP/SD operations, and improving the documentation appropriately to conform to the NUREG format.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	896	314	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Aug,1994 through Feb,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : W6467

TITLE: SPAR MODEL DEVELOPMENT: LEVEL 1, REV. 3 MODELS

Division of Risk Analysis & Applications
Program Manager: O'Reilly, Patrick D. Phone: (301) 415-7570

OBJECTIVE: To continue improvement of the Level 1 standardized plant analysis risk (SPAR) models through particular modifications to each of the plant-specific models in order to provide a more detailed set of logic models for use in regulatory activities by staff analysts to estimate the relative risk significance of events and/or conditions (including inspection findings) that occur at licensed operating commercial nuclear power plants.

REGULATORY USE: These models will be used by staff analysts in various organizations (NRR,RES, Regional Offices) to perform their regulatory activities, such as: the significance determination process (SDP) of the reactor oversight process, the Accident Sequence Precursor (ASP) program, review/assessment of proposed license amendments, resolution of generic issues, and development of risk-based performance indicators (RBPIs). In order to perform their evaluations, the staff require a realistic set of standardized plant-specific models available for use with the SAPHIRE suite of PRA codes.

WORK SCOPE: A Revision 3 version of the Level 1 SPAR models is being produced to make the models more reflective of the as-built, as-operated plant by incorporating an expanded set of initiating events, a standard set of support systems (e.g., a.c. power, d.c. power, component cooling water, essential service water), test and maintenance unavailability, and improved methodologies for human reliability analysis, common cause failure analysis, and uncertainty analysis. The work scope includes an onsite QA review by INEEL analysts in conjunction with the regional office SRAs in order to ensure that the models reflect the actual plant configuration and operation.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	4,968	891	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,1995 through Sep,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

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JOB CODE : Y6153

TITLE: SPAR MODEL DEVELOPMENT: LEVEL 2/LERF

Division of Risk Analysis & Applications
Program Manager: O'Reilly, Patrick D. Phone: (301) 415-7570

OBJECTIVE: To develop Level 2/Large Early Release Frequency (LERF) models that will provide staff analysts the capability to estimate the frequency and the probability of a radiological release (to which a large early release is a contributor).

REGULATORY USE: This LERF/Level 2 analysis tools will be used by staff analysts (NRR, RES, regional offices) to perform their regulatory activities, such as: the significance determination process (Phase 3 analysis) of the reactor oversight process, the ASP Program, review/assessment of proposed amendments to operating licenses, resolution of generic issues, and development of risk-based performance indicators.

WORK SCOPE: The strategy for development of LERF/Level 2 models consists of three phases: (1) determining the usefulness of currently available Level2 /LERF models, (2) considering the results obtained in Phase 1, preparing a detailed program plan for developing Level 2/ LERF models that meet the needs of staff users, and (3) implementing the program plan after it has been approved by the management of the user organizations.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	220	430	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2001 through Sep,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6214

TITLE: INTEGRATED DATA CODING AND ANALYSIS METHODS
Division of Risk Analysis & Applications
Program Manager: Wolf, Thomas R. Phone: (301) 415-7576

OBJECTIVE: To develop an integrated system for data gathering, data coding, data analysis tools, and display methods to streamline the process required to produce updated system, component and special study reliability and availability information, including industry trends. The project includes development of a web-based means for conveying the results internally and to the public.

REGULATORY USE: The information can be used by various organizations (NRR, regions, RES) in activities such as: development of enhanced performance indicators; provide updated information and data for the NRC industry trends and reactor oversight programs; enhance inspections of risk-important systems; support staff technical reviews of proposed license amendments, including risk-informed applications. The information will also be available to the public which is part of the effort to increase public confidence in the work of the Agency.

WORK SCOPE: The FY-03 effort concentrates on completion of the development and implementation of a system which integrates all INEEL data collection, coding, and analyses activities required to support OERAB activities.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,773	5	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Nov,1999 through Nov,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6215

TITLE: OPER EVENTS FOR ACC SEQ PRECURSOR PGM

Division of Risk Analysis & Applications
Program Manager: Harper, Marcel R. Phone: (301) 415-6344

OBJECTIVE: This project will assess operating experience and document those potential core damage operating events or plant conditions that significantly impact risk for feedback to the NRC regulatory process. This project produces an Accident Sequence Precursor (ASP) report for each analysis of a precursor.

REGULATORY USE: Established by the NRC in 1979 in response to the Risk Assessment Review Group report, the primary objective of the Accident Sequence Precursor (ASP) Program is to systematically evaluate U. S. nuclear plant operating experience to identify, document, and rank those operating events that were most significant in terms of the potential for inadequate core cooling and core damage (precursors). The program is used to monitor the agency's performance against the following Strategic Plan goals for maintaining safety: "No more than one event per year which is a significant precursor of a nuclear reactor accident," and "No statistically significant adverse industry trends in safety performance." In SECY-97-076, "PRA Implementation Plan," the ASP Program was explicitly identified as a key ingredient in the NRC's risk-informed regulatory framework. An integral part of the NRC's improved reactor oversight process, is the significance determination process (SDP), which is described in SECY-99-007A. The methods developed in ASP analyses will be an important contributor to the Phase 3 of SDP.

WORK SCOPE: The ASP Program systematically screens, reviews, and analyzes operational events. It identifies and documents accident sequence precursors. Each precursor analysis receives a peer review by the affected licensee and the NRC staff. Each precursor analysis is issued for the public in a report.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,441	797	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-00-041

CONTRACTOR: EQE Engineering, Inc. CONTRACT NO: NRC-04-00-041

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Sep,2000 through Sep,2003

PROCUREMENT MILESTONES

Send RFPA to DCPM	1/16/2003
Rcv Oblg. Doc DCPM	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6370

TITLE: DEVELOPMENT OF RISK-BASED PERFORMANCE INDICATORS

Division of Risk Analysis & Applications
Program Manager: Wolf, Thomas R. Phone: (301) 415-7576

OBJECTIVE: To assist in the development, demonstration, and implementation of enhanced performance indicators that can provide objective measures for use in assessing reactor operational performance in the context of public risk.

REGULATORY USE: Enhanced performance indicators are being designed and developed such that they may be incorporated into the reactor oversight process (NUREG-1649). Their use will help ensure that the NRC mission of protecting the public safety is met through the use of a combination of performance indicators and risk-informed inspection activities.

WORK SCOPE: For FY-03, in conjunction with the Idaho National Engineering and Environmental Laboratory, the work continues the development of enhanced performance indicators. The main focus in FY-03 will be the industry trial use of the mitigating system performance index (MSPI) developed in FY-02. This effort will include modifications resulting from feedback during the trial period, modifications and enhancements as new state-of-the-art models are developed and new data are received, and support of public meetings and workshops.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	582	195	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: Follow-on to Project Y6211 Incrementally Fund

RFPA NUMBER: RES-01-052

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-01-052

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2001 through Nov,2004

PROCUREMENT MILESTONES

Send RFPA to DCPM	1/16/2003
Rcv Oblg. Doc DCPM	2/17/2003

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6468

TITLE: RX OPERATING EXPERIENCE DATA FOR RISK APPL.
Division of Risk Analysis & Applications
Program Manager: Wolf, Thomas R. Phone: (301) 415-7576

OBJECTIVE: To collect, code and maintain operational data for reactor systems and components, initiating events, common-cause failures and fire events for use in various NRC regulatory activities.

REGULATORY USE: This effort supports a variety of NRC applications including the Industry Trends Program, risk-informed event analyses, plant inspections based on the latest risk-important operating experience, and determinations of the effectiveness of regulatory or industry initiatives based on the latest risk-important operating experience.

WORK SCOPE: Utilize methods and procedures developed under Job Code Y6214 to continue the collection and codification of reactor operational data for use in various risk-informed data evaluation efforts.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	373	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Apr,2003 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2003 through Nov,2005

PROCUREMENT MILESTONES

Send SOW to Lab	10/09/2002
Rcv. DOE Proposal (189)	12/17/2002
Issue Form173 to DOE	1/16/2003
Rec. Signed Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6546

TITLE: INDUSTRY TRENDS PROGRAM
Division of Risk Analysis & Applications
Program Manager: Wolf, Thomas R. Phone: (301) 415-7576

OBJECTIVE: 1.) To produce plant-specific and industry-wide estimates, summary tables, graphs, and charts from reactor operational data to support the Industry Tends Program and various OERAB and NRC data analysis activities. 2.) To maintain and update the OERAB web pages with the results of these analyses.

REGULATORY USE: The effort supports: 1) Industry Trends Program, 2) annual RES "maintaining safety" report, 3) enhancing inspection resources based on the latest risk important operating experience, 4) comparing licensee's risk-informed applications with various regulatory guides, 5) assisting in determining the effectiveness of regulatory or industry initiatives based on the latest risk important operating experience, and 6) demonstrating to the public the agency's ability to analyze operating experience independent of licensee-sponsored risk assessments.

WORK SCOPE: A centralized operating experience data evaluation process which produces updated plant-specific and industry performance tables, graphs and trend charts and updated web pages.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	467	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project Follow-on to Project Y6214

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Apr,2003 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2003 through Nov,2005

PROCUREMENT MILESTONES

Send SOW to Lab	10/09/2002
Rcv. DOE Proposal (189)	12/17/2002
Issue Form173 to DOE	1/16/2003
Rec. Signed Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6553

TITLE: SDP FRONT-END INTERFACE FOR SPAR MODELS

Division of Risk Analysis & Applications
Program Manager: O'Reilly, Patrick D. Phone: (301) 415-7570

OBJECTIVE: The purpose of this project is to develop a user-friendly front end processor which will serve as an interface with the Revision 3 SPAR models and will enable inspectors to use the SPAR models to perform Phase 2 analyses in the SDP.

REGULATORY USE: The primary users of this front end processor are envisioned to be the agency's resident inspectors at the plant sites. They should be able to use this interface in the Phase 2 analyses that they perform as part of the SDP.

WORK SCOPE: The scope of this project consists of the following tasks: (1) Define the need and use for the interface, (2) Develop specifications for the interface, (3) Review the interface specifications with the intended users and obtain their buyin, (4) Prepare a detailed program plan and resource requirement estimates for developing a prototype interface, (5) Execute plant and develop a prototype interface, (6) Perform beta-testing and evaluation of the prototype interface with key users, (7) Modify the interface to address review/evaluation comments and produce final interface, (8) Conduct a workshop to train users on the use of the interface, and (9) Provide teachnical support for interface users.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	50	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Jul,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jul,2003 through Nov,2004

PROCUREMENT MILESTONES

Send SOW to Lab	3/03/2003
Rcv. DOE Proposal (189)	5/19/2003
Issue Form173 to DOE	6/18/2003
Rec. Signed Form 173	7/18/2003

JOB CODE : Y6626

TITLE: ACCESS TO INPO'S EPIX SYSTEM
Division of Risk Analysis & Applications
Program Manager: Brady, Bennett M. Phone: (301) 415-6363

OBJECTIVE: Under this project, the Institute of Nuclear Power Operations (INP0) will provide access to their Equipment Performance and Information Exchange (EPIX) System to NRC staff and related support services.

REGULATORY USE: The EPIX System contains engineering data and failure information on key components in systems within the scope of the Maintenance Rule for all operating U.S. nuclear power plants. These data will be used by NRC staff in analyzing and monitoring U.S. nuclear power plant equipment performance. As part of the agreement to accept the voluntary industry approach to providing reliability data in lieu of a proposed reliability data rule, EPIX will contain reliability data. These reliability data and failure information will be used in a system developed by NRC staff, the NRC Reliability and Availability Data System (RADS), to produce reliability parameter estimates for NRC risk-informed applications such as the Reactor Oversight Process, mitigating system performance indices, inspections focused on the most risk significant equipment, reviewing licensee applications for risk-informed initiatives, generic issues resolution, system and component reliability studies, and Standardized Plant Analysis Risk (SPAR) models.

WORK SCOPE: Provide up to 100 access codes to NRC staff and contractors as requested by the NRC EPIX Coordinator. Provide a complete set of EPIX guidance manuals to the NRC EPIX Coordinator as requested. EPIX is designed so that usage training is not required. If training is desired, INPO shall provide EPIX training once per calendar year upon request. Include an individual designated by the EPIX Coordinator to serve on the EPIX Ad Hoc Users Group as a member of the feedback group. Provide NRC with the same component engineering and failure data retrieval and report generation capability for the EPIX and NPRDS modules as is provided to INPO member organizations.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	243	253	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: Incrementally Fund

CONTRACTOR: Institute of Nuclear Power Operation CONTRACT NO: NRC-04-02-067

FUNDING PERIOD: May,2003 through Apr,2004

PERIOD OF PERFORMANCE: May,2002 through May,2004

PROCUREMENT MILESTONES

Send RFPA to DCPM	3/17/2003
Rcv Oblg. Doc DCPM	4/16/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6636

TITLE: SUPPORT FOR INDUSTRY TRENDS
Division of Risk Analysis & Applications
Program Manager: Wolf, Thomas R. Phone: (301) 415-7576

OBJECTIVE: To assist in the development, demonstration and implementation of methods to determine and display the latest plant-specific and industry trends in risk-important operational performance.

REGULATORY USE: This effort supports a variety of NRC applications incluidng the Industry Trends Program, risk-informed event analyses, plant inspections based on the latest risk-important operating experience, and determinations of the effectiveness of regulatory or industry initiatives based on the the latest risk-important operating experience.

WORK SCOPE: Support development of a systematic method to analyze and display risk-important plant-specific and industry operating trends.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	124	84	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-01-052

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-01-052

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2001 through Nov,2004

PROCUREMENT MILESTONES

Send RFPA to DCPM	1/16/2003
Rcv Oblg. Doc DCPM	2/17/2003

Monday, July 21, 2003

Nuclear Regulatory Commission

Project Approval Status Report For FY 2003

Projects Selected For:

Division: Division of Risk Analysis & Applications

Branch: Probabilistic Risk Analysis Branch

Job Code	Title	PM Name	Contractor
K6007	PROBABILISTIC ASSESSMENT AND APPLICATIONS	Woods	U MD
W6144	TECHNICAL SUPPORT IN RISK ASSESSMENT	Lancaster	INEL
W6224	RISK-INFORMING PART 50	Lane	BNL
W6904	LOW POWER AND SHUTDOWN RISK STUDY - LEVEL 1	O'Neal	SNL
W6970	SUPT TO DEVELOP CONSENSUS PRA STANDARDS	Lancaster	SNL
W6994	REVIEW APPLICATION AND REFINEMENT OF ATHENA	Lois	SNL
Y6037	FIRE RISK ASSESSMENT	Woods	SNL
Y6103	LOW POWER AND SHUTDOWN RISK STUDY - LEVEL 2	O'Neal	BNL
Y6123	RETROSPECTIVE RA OF HUMAN RELIABILITY IN OPERATING EVENTS	Lois	INEL
Y6332	DIGITAL SYSTEMS RISK	Lancaster	BNL
Y6335	RISK-INFORMED INITIATIVES FOR NUCLEAR MATERIALS	Chow	BNL
Y6371	RISK ASSOCIATED WITH CABLE AGING	Buslik	BNL
Y6394	MAINTAIN & SUPT SAPHIRE CODE & LIBRARY OF PRA	O'Neal	INEL
Y6430	PTS RISK ASSESSMENT	Woods	SNL
Y6486	SA INITIATED STEAM GENERATOR TUBE RUPTURE SEQUENCES	Woods	SNL
Y6487	ADV RX REGULATORY FRAMEWORK DEVELOPMENT	Lancaster	BNL
Y6489	PRA FOR ACR-700	Ridgely	ORNL
Y6502	PRA FOR DRY CASK STORAGE- PEER REVIEW	Ryder	SNL
Y6612	RELIABILITY OF A SCI	Ryder	LLNL
Y6619	ADV RX PRA DEVELOPMENT	Ridgely	SNL
Y6623	VULNERABILITY ASSESSMENT	Thornsbury	SNL
Y6688	FIRE MODEL BENCHMARKING AND VALIDATION	Dey	NIST
Y6823	LINK JCATS WITH INTEGRATION MODEL	Kuritzky	SNL
Y6832	HRA FOR BY-PRODUCT MATERIAL	Lois	BNL

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Job Code : K6007

Advance Procurement Plan for FY 2003

Job Code : K6007 Title : PROBABILISTIC ASSESSMENT AND APPLICATIONS

Division of Risk Analysis & Applications
Program Manager: Woods, Hugh Phone: (301) 415-6622

OBJECTIVE: The NRC is participating in a cooperative agreement with the University of Maryland's Center for Technology Risk Studies (CTRS). The CTRS is involved in assessing the performance of technological systems, exploring the ways in which systems can fail and evaluating the risk implications of such failures. This cooperative agreement will provide NRC access to the software tools and analytical techniques under development at the Center. NRC willl also be able to benefit, in particular, from research being done on uncertainty analysis and deterministic-probabilistic areas.

REGULATORY USE: This is a cooperative agreement and the research will provide analysis tools for the application of risk assessment technology to regulatory processes. The tools will enhance NRC's and the industry's collective ability to scientifically regulate complex technologies in a quantitative, risk informed manner.

WORK SCOPE: Work has been funded in the areas of: (1) Integrated Model and Parameter Uncertainty; (2) Integrated Deterministic-Probabilistic Analysis; (3) Software Reliability; (4) Thermal-Hydraulic Uncertainty Evaluation and Propagation; 5) High Resolution Experimental Measurement of Turbulent Mixing Within Complex Geometries; 6) AP1000 LBLOCA Uncertainty Analysis; 7) Improved Methods for Performing Importance Analysis; 8) Co-organizing PRAB Colloquium; 9) Integrated Uncertainty Framework and Applications Research; and 10) Causal Modeling Research.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,443	391	

PROCUREMENT METHOD: Cooperative Agreement (Grant) (Task Ordering Agreement)

RFPA NUMBER: RES-98-056

GRANTEE: University of Maryland GRANT NO: NRC-04-98-056

PERIOD OF PERFORMANCE: Aug,1998 through Aug,2004

Task Orders Not Defined for This Project

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : W6144

TITLE: TECHNICAL SUPPORT IN RISK ASSESSMENT
Division of Risk Analysis & Applications
Program Manager: Lancaster, Leslie Phone: (301) 415-6199

OBJECTIVE: Provide technical support in the area of risk assessment to the PRAB staff in the form of reviews, analyses, and on-call technical assistance. Support the model uncertainty conference.

REGULATORY USE: The types of projects accomplished in this FIN are varied. Each of these carries out the mission of doing PRA.

WORK SCOPE: Examples of technical assistance include: (1) HRA support in low power and shutdown operations; (2) a data base review of spring actuated relief valves.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	922	89	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION:

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Oct,2003

PERIOD OF PERFORMANCE: Sep,1993 through Oct,2003

JOB CODE : W6224

TITLE: RISK-INFORMING PART 50
Division of Risk Analysis & Applications
Program Manager: Lane, John C. Phone: (301) 415-6442

OBJECTIVE: Perform technical work to be used as a basis for proposing Commission directed risk-informed changes to 10CFR50. In performing this work, appropriate modifications will be developed and justified.

REGULATORY USE: Incorporate risk-informed attributes into 10 CFR Part 50 regulations. Initial activities are focused on 10CFR50.44 and 10CFR50.46.

WORK SCOPE: Work on this project includes:
(1) Develop recommendations on changes to regulations in Part 50 to make it more risk-informed,
(2) Provide assistance to NRR rulemaking as they develop Commission-approved changes to the regulations, and
(3) Meet with other NRC staff, including NRR, ACRS and stakeholders to discuss the work and solicit feedback.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,346	200	

PROCUREMENT METHOD : DOE Work Order for an Urgent Requirement.

THIS ACTION:

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Jul,1999 through Dec,2003

JOB CODE : W6904

TITLE: LOW POWER AND SHUTDOWN RISK STUDY - LEVEL 1
Division of Risk Analysis & Applications
Program Manager: O'Neal, Daniel Phone: (301) 415-4156

OBJECTIVE: In a letter to Commissioner Jackson, dated April 18, 1997, the ACRS wanted to "...draw attention to the critical need for developing an understanding of risk posed by low-power and shutdown operations (LPSO) at nuclear power plants. This need is apparent as a result of: (1) repeated events during these modes of power plant operations, (2) changes being made in plant operations in response to economic forces, and (3) the ongoing NRC initiative to develop risk-informed, performance-based regulation." The industry noted the need to consider risk during LPSO and has been actively developing risk monitors and assessing risk during LPSO. In addition, RG 1.174 requires consideration of all modes of operation when developing risk-informed programs. This contract responds to ACRS concerns, Commission guidance, and the PRA implementation plan activities by developing technical capabiliities to conduct benchmark risk analysis in support of ongoing risk-informed programs, to provide timely regulatory responses to industry initiatives and licensee submittals. This contract also supports international activities, through COOPRA and CSNI, to obtain international insights, lessons learned, activities and experiences of LPSOs.

REGULATORY USE: Enable the staff to provide industry with timely responses as it implements RG 1.174 and related risk-informed regulatory guides and activities that require risk consideration during all modes of reactor operation. Provide the staff the tools and knowledge base to respond to issues raised during LPSO. Provide audit and independent regulatory evaluations of industry initiatives and submittals. To assess operating reactor events and industry initiatives that propose rewriting of 10 CFR Part 50 to incorporate risk insights. To respond to Congressional inquiries and directives to actively pursue risk-informed regulatory initiatives.

WORK SCOPE: Develop capabilities to assess LPSO for a representative range of plant types, all phases of LPSO, accidents initiated by internal fires and other external events, human performance, source terms, radionuclide dispersal, and on-site populations that will affect the predictions of accident consequences, uncertainties to the depth similar to that done for the risk benchmark for power operations, etc. Interact with industry and international communities to obtain technical information and data on LPSO. Develop staff the capabilities to provide timely review and technical comments on industry initiatives and submittals.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	632	95	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION:

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Feb,1999 through Nov,2003

JOB CODE : W6970

TITLE: SUPT TO DEVELOP CONSENSUS PRA STANDARDS
Division of Risk Analysis & Applications
Program Manager: Lancaster, Leslie Phone: (301) 415-6199

OBJECTIVE: During the last several years both the NRC and the nuclear industry have recognized that PRA has evolved to the point where it can be used increasingly as a tool in regulatory decision making. The objective of this program is to support the staff in the development of consensus PRA standards. The intent of the standards is to support the NRC regulatory guides and standard review plan for decision making in risk-informed, performance-based regulation.

Included will be assistance provided to the staff in regards to the development of regulatory guides which will endorse the consensus industry standards.

REGULATORY USE: The staff's risk-informed regulatory initiatives require a firm set of standards for the underlying PRA methods. This effort is intended to provide the long-term set of such standards through a cooperative effort between NRC, ASME, ANS and others. Also, it will result in a set of regulatory guides which endorse the consensus industry standards.

WORK SCOPE: Task 1. Internal Events (not including fire) Level 1 PRA for full power
Task 2. External Events for full power
Task 3. Internal Events (not including fire) Level 1 PRA and external events for other power operations
Task 4. Internal events (not including fire) Level 1/2 for full power operation-currently suspended
Task 5. Comment evaluation and disposition (for ASME PRA standard document)
Task 6. Development of data handbook
Task 7. Follow-On Activities

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,255	110	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jan,1998 through Nov,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	1/01/2003
Issue Form173 to DOE	1/16/2003
Rcv. Signed Form 173	2/17/2003

JOB CODE : W6994

TITLE: REVIEW APPLICATION AND REFINEMENT OF ATHENA
Division of Risk Analysis & Applications
Program Manager: Lois, Erasmia Phone: (301) 415-6560

OBJECTIVE: The primary objectives of this program are as follows:

1. to conduct a peer review of the ATHEANA human reliability analysis method
2. to apply the ATHEANA method in a variety of risk assessments and event evaluations
3. to revise NUREG-1624 to document the peer review effort and lessons learned from applications of ATHEANA
4. to apply ATHEANA in the assessment of fire risk
5. to assess the feasibility of applying software V&V techniques to ATHEANA
6. to assess the feasibility of developing an expert system for ATHEANA
7. to support NRC participation in U.S. & international activities associated with HRA techniques, data, and insights
8. to incorporate management influences in the ATHEANA human reliability analysis model

REGULATORY USE: The tasks in this Job Code support the application of PRA/HRA methods and technology in the regulatory process.

WORK SCOPE: Consistent with objectives listed above.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	2,735	350	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION:

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Mar,1998 through Dec,2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6037

TITLE: FIRE RISK ASSESSMENT

Division of Risk Analysis & Applications
Program Manager: Woods, Hugh Phone: (301) 415-6622

OBJECTIVE: The objective of this project is to improve the NRC staff's ability to thoroughly understand and accurately evaluate nuclear power plant (NPP) fire risk through the use of improved fire risk analysis (FRA) techniques. These improved FRA techniques will become part of the PRA technology whose increased use in all regulatory matters has been directed through the Commission's stated PRA policy (Federal Register Notice 60 FR 42622, August 16, 1995) which states in part, "The use of PRA technology should be increased in all regulatory matters to the extent supported by the state-of-the-art in PRA methods and data... ."

REGULATORY USE: Provide improved FRA methods for use by both the nuclear industry and the NRC staff in assessing the risk due to fires at nuclear power plants. These methods will be in support of the Commission's policy statement referenced in the "Objective" section of this entry.

WORK SCOPE: There are sixteen (16) major tasks in this project:
1) Tools for Circuit Failure Mode and Likelihood Analysis
2) Tools for Fire Detection and Suppression Analysis
3) IEEE-383 Rated Cable Self-Ignited Fire Frequency Analysis: Feasibility Study
4) Fire Modeling Toolbox: Input Data and Assessment
5) Experience from Major Fires
6) Support NRC Participation in U.S. and International Activities
7) Administrative Support and Management Oversight
8) Cable Failure Mode Likelihood Studies
9) Fire Risk Requantification Studies
10) Fire Protection Rulemaking Support
11) Fire Protection for NPPs
12) Fire Significance Determination Process Support
13) Support NMSS Needs
14) Fire Risk Assessment Tools Precursor Analysis
15) Support Development of ANS Fire PRA Standard
16) Conduct Scoping Study of Fire Risk in Advanced NPP Design

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	2,425	800	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jun,1998 through Nov,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	1/01/2003
Issue Form173 to DOE	1/16/2003
Rcv. Signed Form 173	2/17/2003

JOB CODE : Y6103

TITLE: LOW POWER AND SHUTDOWN RISK STUDY - LEVEL 2
Division of Risk Analysis & Applications
Program Manager: O'Neal, Daniel Phone: (301) 415-4156

OBJECTIVE: To assist the NRC in identifying the significance of low power/shutdown risk and incorporating it in risk-informed decisionmaking.

REGULATORY USE: Potential update to current risk-informed regulation, such as Reg. Guide 1.174 and DG-1122.

WORK SCOPE: To provide an understanding of the risk associated with LPSD operations sufficient to support decision-making for risk-informed regulation. Development of this understanding should include identification of a method sufficient to characterize LPSD risk, as well as the identification of the associated standards for performing the methodology and for establishing the regulatory guidance.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	280	78	

PROCUREMENT METHOD : DOE Work Order for an Urgent Requirement.

THIS ACTION:

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Feb,1999 through Nov,2003

JOB CODE : Y6123

TITLE: RETROSPECTIVE RA OF HUMAN RELIABILITY IN OPERATING EVENTS

Division of Risk Analysis & Applications
Program Manager: Lois, Erasmia Phone: (301) 415-6560

OBJECTIVE: To collect in a structured manner information on human performance during operational events in commercial nuclear power plants and other complex technologies

REGULATORY USE: To support validation of human reliability models used in risk-informed regulatory activities

WORK SCOPE: Search reactor operational event reports and similar reports for other complex technologies; assess important human performance aspects contributing to event; document event and aspects in structured data base

FUNDING ($1000):	Prior Year Obligations	FY03
	721	350

[redacted]

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,1999 through Nov,2003

PROCUREMENT MILESTONES

Send SOW to Lab	11/14/2002
Rcv. DOE Proposal (189)	12/26/2002
Issue Form173 to DOE	1/16/2003
Rcv. Signed Form 173	2/17/2003

JOB CODE : Y6332

TITLE: DIGITAL SYSTEMS RISK
Division of Risk Analysis & Applications
Program Manager: Lancaster, Leslie Phone: (301) 415-6199

OBJECTIVE: Investigate digital I&C system analysis methods for incorporation with PRA:
- produce guidance for the review of PRA-based evidence for digital systems,
- investigate strengths and weaknesses of current digital systems analysis methods, and
- generate suggestions for improving the integration of the methods with PRA.

REGULATORY USE: - Provide guidance for the review of digital systems in PRA
- Provide a technical basis for agency views on important issues when digital systems are included in PRA

WORK SCOPE: Expansion of state-of-the-art in PRA to include digital I&C systems.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	175	108	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2002 through Dec,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/15/2002
Send SOW to Lab	11/01/2002
Rcv. DOE Proposal (189)	12/02/2002
Rcv. Signed Form 173	1/16/2003

JOB CODE : Y6335

TITLE: RISK-INFORMED INITIATIVES FOR NUCLEAR MATERIALS
Division of Risk Analysis & Applications
Program Manager: Chow, Edward T. Phone: (301) 415-6571

OBJECTIVE: Support NMSS in developing draft safety goals/guidance for their applications for nuclear materials and waste applications.

REGULATORY USE: Support NMSS in prioritzing the NMSS licensing activities using risk information.

WORK SCOPE: (1) develop draft risk guidelines for nuclear materials and waste applications, (2) assist NMSS in evaluating the results obtained from risk informing materials and waste activities, and (3) develop recommendations to finalize and implement the draft risk guidelines.

FUNDING ($1000):	Prior Year Obligations	FY03
	300	575

[redacted]

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Mar,2002 through Dec,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	1/01/2003
Issue Form173 to DOE	1/16/2003
Rcv. Signed Form 173	2/17/2003

JOB CODE : Y6371

TITLE: RISK ASSOCIATED WITH CABLE AGING
Division of Risk Analysis & Applications
Program Manager: Buslik, Arthur J. Phone: (301) 415-6184

OBJECTIVE: The objective of this project is to estimate the risk associated with the aging of systems, components, and structures, with special emphasis on the risk associated with cable aging. The methodology to be used will involve reliability physics models, and, in this sense, may be viewed as a follow-on effort to the work described in NUREG/CR-5632, "Incorporating Aging Effects into Probabilistic Risk Assessment--A Feasibility Study Utilizing Reliability Physics Models".

REGULATORY USE: The results will be useful in assessing the contribution of aging effects, especially those of cables inside containment, to overall nuclear plant risk and will likely be used in regulatory decision making concerning aging nuclear power plants.

WORK SCOPE: The project will involve assessing the failure probabilities of systems, structures, and components as a function of their age, and incorporating these time dependent failure probabilities into probabilistic risk assessment models. The emphasis, at least in the early stages, will be in assessing the failure probabilities of cables inside containment during the harsh environment after a loss of coolant accident.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	200	144	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Oct,2003

PERIOD OF PERFORMANCE: Mar,2002 through Oct,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6394

TITLE: MAINTAIN & SUPT SAPHIRE CODE & LIBRARY OF PRA
Division of Risk Analysis & Applications
Program Manager: O'Neal, Daniel Phone: (301) 415-4156

OBJECTIVE:
The objective of this work is to: (a) maintain the SAPHIRE computer code by testing and correcting it as necessary, (b) maintain the SAPHIRE library of probabilistic risk assessment (PRA) databases, (c) provide user support for both the code and the databases, (d) documentation, and (e) implement code updates and new capabilities.

REGULATORY USE:
This project is supporting the maintenance and user support of the Systems Analysis Program for Hands-on Integrated Reliability Evaluations (SAPHIRE) computer code, developed for performing probabilistic risk assessments (PRAs) using a personal computer (PC).

SAPHIRE has been developed at the Idaho National Engineering and Environmental Laboratories (INEEL) under the Job Code Number (JCN): L1429. Several SAPHIRE versions have been released, the latest being the Windows/NT Version 7.

The NRC has developed and maintains the SAPHIRE computer code for performing PRAs. SAPHIRE offers state-of-the-art capability for assessing the risk associated with core damage frequency, as well as the risk from containment performance and radioactive releases. SAPHIRE supports NRC's risk-informed activities, which include the SPAR model development plan, the significance determination process, risk-informing Part 50, vulnerability assessment, advanced reactors, operational experience, generic issues and regulatory backfit.

WORK SCOPE: The workscope covers continuing maintenance, user support, development, and testing to insure that SAPHIRE is a state-of-the-art code. The project also covers PRA database development and maintenance, continuing SAPHIRE code updates and new capabilities, and documentation.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	405	305	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Dec,2000 through Dec,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	1/27/2003
Issue Form173 to DOE	2/17/2003
Rcv. Signed Form 173	3/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6430

TITLE: PTS RISK ASSESSMENT

Division of Risk Analysis & Applications
Program Manager: Woods, Hugh Phone: (301) 415-6622

OBJECTIVE: The objective of this project is to determine PTS "risk" due to operation of all domestic pressurized water reactors (PWRs) as a function of plant age and to support the development of acceptable metric(s) to characterize that risk and the maximum acceptable quantitative value of that (those) metric(s) (e.g., 5x10E-6 through-wall cracks per reactor year). Prior research has identified four nuclear power plants (Oconee, Beaver Valley, Calvert Cliffs, and Palisades) to be examined and extrapolated as representatives of the fleet of domestic PWRs.

REGULATORY USE: This will enable the NRC to decide upon, and then promulgate, possible new limits on plant operation (e.g., a new screening criterion for pressure vessel embrittlement, such as RTPTS = 270 degrees F).

WORK SCOPE: Scope is limited to the assessment of PTS risk on US PWRs.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	913	635	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2001 through Nov,2003

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	1/01/2003
Issue Form173 to DOE	1/16/2003
Rcv. Signed Form 173	2/17/2003

JOB CODE : Y6486

TITLE: SA INITIATED STEAM GENERATOR TUBE RUPTURE SEQUENCES

Division of Risk Analysis & Applications
Program Manager: Woods, Hugh Phone: (301) 415-6622

OBJECTIVE: Scope
Identify and quantify frequency of severe accident sequences that result in high/dry situations which challenge the steam generator tubes (i.e., that result in high temperature and pressure in the primary system, and low pressure, dry conditions in the secondary system)

Goals
-Develop method to identify, model, and quantify these sequences
-Demonstrate the method on an example plant
-Document the method in a report which can be used to support development of guidance for future risk-informed licensee submittals

REGULATORY USE: Response to NRR User Need on severe accident behavior of SG tubes.

WORK SCOPE: Severe accident challenges to the steam generator tubes and RCS pressure boundary.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	250	50	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Jun,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jun,2002 through Nov,2004

PROCUREMENT MILESTONES

Send SOW to Lab	4/01/2003
Rcv. DOE Proposal (189)	5/01/2003
Issue Form173 to DOE	5/16/2003
Rcv. Signed Form 173	6/16/2003

JOB CODE : Y6487

TITLE: ADV RX REGULATORY FRAMEWORK DEVELOPMENT
Division of Risk Analysis & Applications
Program Manager: Lancaster, Leslie Phone: (301) 415-6199

OBJECTIVE: The objective of this project is to develop a risk-informed, performance-based, regulatory framework for advanced reactors starting with the basic NRC objectives and principles (i.e., to protect the health and safety of the public, Safety goals, defense-in-depth, and the cornerstones). The products would be technology-neutral regulations and the development of reactor design-specific Regulatory Guides and Standard Review Plan sections.

REGULATORY USE: The proposed framework could be used for advanced reactor licensing in place of the current 10 CFR 50 and 10 CFR 52 regulations.

WORK SCOPE: 1. Develop technology-neutral framework.
2. Develop technology-neutral regulations.
3. Develop guidance and criteria to apply the technology-neutral framework on a reactor-specific basis.
4. Apply the guidance and criteria to create reactor-specific Regulatory Guides.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	300	250	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2002 through Nov,2003

PROCUREMENT MILESTONES

Send SOW to Lab	11/01/2002
Rcv. DOE Proposal (189)	12/02/2002
Issue Form173 to DOE	12/17/2002
Rcv. Signed Form 173	1/16/2003

JOB CODE : Y6489

TITLE: PRA FOR ACR-700
Division of Risk Analysis & Applications
Program Manager: Ridgely, John N. Phone: (301) 415-6555

OBJECTIVE: The objective is to (1) provide technical support for NRR's review of ACR-700 PRA related documents and (2) model the PRA for the ACR-700 starting with the information generated during the review of the CANDU 3 and supplementing with ACR-700 specific information as it becomes available and as needed. This work will include identification of initiating events and systems that are "important to safety" and performance of plant assessments.

REGULATORY USE: The results of this work will be used to assist NRR in the pre-application and design certification reviews of the ACR-700 advanced reactor design.

WORK SCOPE: This work includes:
1) review of selected ACR-700 PRA related documents,
2) upgrading the previous CANDU 3 PRA to current operational status,
3) revise the CANDU 3 model to reflect the ACR-700 design,
4) identify initiating events,
5) classification of systems as to their relative importance from a probabilistic perspective, and
6) perform PRAs for the ACR-700.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	200	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Apr,2003 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2003 through Dec,2006

PROCUREMENT MILESTONES

Send SOW to Lab	10/31/2002
Rcv. DOE Proposal (189)	1/14/2003
Issue Form173 to DOE	2/13/2003
Rec. Signed Form 173	3/17/2003

JOB CODE : Y6502

TITLE: PRA FOR DRY CASK STORAGE- PEER REVIEW
Division of Risk Analysis & Applications
Program Manager: Ryder, Christopher P. Phone: (301) 415-6102

OBJECTIVE: The objective of this program is to perform a peer review of a PRA being performed by the NRC staff with support from contractors. The review provides assurance that all aspects of the PRA are adequately performed and documented.

REGULATORY USE: Dry cask storage is being used by utilities to store spent nuclear fuel that has been cooled in the spent fuel pool. A risk analysis of a cask at a site was requested by NMSS. RES developed a program to analyze and assess the risk from loading a cask, transporting the cask on site, and storing the cask on-site. Risk estimates can be made for use in considering options to risk-inform 10 CFR 72 regulatory requirements, considering options for developing safety goals, enhancing public confidence, increasing regulatory effectiveness, reducing regulatory burdens, and assessing data on the performance of the cask.

WORK SCOPE: The contractor staff is to review all technical aspects of the PRA, such as load analyses, failure analyses, source term analyses, consequence analyses, and risk analyses. The contractor is also to review the documentation of the PRA. The contractor is to provide written comments on the NRC staff's report.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	140	75	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Mar,2002 through Dec,2003

PROCUREMENT MILESTONES

Send SOW to Lab	1/30/2003
Rcv. DOE Proposal (189)	3/03/2003
Issue Form173 to DOE	3/18/2003
Rcv. Signed Form 173	4/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6612

TITLE: RELIABILITY OF A SCI

Division of Risk Analysis & Applications
Program Manager: Ryder, Christopher P. Phone: (301) 415-6102

OBJECTIVE: The contractor is to identify the potential release paths from the secondary containment of a BWR plant and assess the likelihood of a radioactive release through these paths to the outside environment stemming from a drop of a dry cask containing spent nuclear fuel.

REGULATORY USE: Dry cask storage is being used by utilities to store spent nuclear fuel that has been cooled in the spent fuel pool. A risk analysis of a cask at a BWR plant was requested by NMSS. RES developed a program to analyze and assess risk from loading the cask, transporting the cask on site, and storing a cask on-site. The reliability of secondary containment to isolate is assessed and used in a PRA being done by the NRC staff with support from other contractors. Risk estimates can be made for use in considering options to risk-inform 10 CFR Part 72 regulatory requirements, considering options for developing safety goals, enhancing public confidence, increasing regulatory effectiveness, reducing regulatory burdens, and assessing data on the performance of the cask.

WORK SCOPE: Identify potential release paths from the secondary containment. Develop a reliability model of secondary containment isolation. Quantify the reliability. Document the model and the finding as a part of NRC's report on the risk of dry cask storage.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	30	15	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Univ. of Calif. - Lawrence Livermore National Laboratory

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Jan,2002 through Sep,2006

PROCUREMENT MILESTONES

Issue Form173 to DOE	10/01/2002
Rec. Sign Form 173	10/16/2002

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6619

TITLE: ADV RX PRA DEVELOPMENT
Division of Risk Analysis & Applications
Program Manager: Ridgely, John N. Phone: (301) 415-6555

OBJECTIVE: The objectives of the advanced reactor PRA work is to develop: (1) the necessary data for advanced reactor PRAs, (2) an understanding of the uncertainties, (3) the methods necessary to understand the PRA aspects of advanced reactor designs, (4) the expertise to evaluate advanced reactor PRAs, and (5) identification of additional research needed.

REGULATORY USE: This work will assist NRR in reviewing PRAs submitted on plants with advanced reactor designs as part of the license application review process.

WORK SCOPE: As part of the PRA development for advanced reactors, work is needed for data collection and analysis, modeling of passive systems, modeling of digital instrumentation and control systems, evaluation of alternative risk metrics, evaluation of external events and other operational states (e.g., shutdown), creating dynamic modeling of PRA codes with thermal/hydraulic and consequence codes, and creation of advance reactor specific PRAs.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	184	240	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2002 through Dec,2007

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6623

TITLE: VULNERABILITY ASSESSMENT

Division of Risk Analysis & Applications
Program Manager: Thornsbury, Eric A. Phone: (301) 415-5924

OBJECTIVE: (1) Characterize the generic vulnerabilities of nuclear power plants to terrorist attacks. (a) characterize potential for damage to structures, systems, and components, and (b) characterize potential offsite radiological consequences.
(2) Identify potentially effective and efficient mitigation strategies. (a) identify potentially effective mitigation strategies, (b) determine under what conditions these strategies may be effective, (c) support decisions related to regulatory requirements and licensing actions, and (d) support NRC interactions with other agencies.
(3) Develop and deploy tools for identifying and charaterizing facility-specific vulnerabilities. (a) develop, validate, and demonstrate tools, and (b) support technology transfer to approved stakeholders.

REGULATORY USE: By January 2002, the NRC had completed an initial assessment of nuclear power plant vulnerabilities to aircraft attack. Insights gained have influenced regulatory decisions and have been shared with other Federal agencies, as appropriate. In FY2003 detailed analyses on aircraft attacks is expected to be completed, and an assessment of nuclear power plant vulnerabilities to other terrorist attacks will be initiated. If warranted by the ongoing analyses, the NRC will consider enhancements to security for affected licenses to continue to ensure the protection of the public health and safety.

WORK SCOPE: In the months since the September 11, 2001, attacks, the NRC has been evaluating the effects of a deliberate aircraft impact and the resulting fire on the structural integrity of the reactor containment building and other reactor support facilities. Variables considered in the analyses include aircraft size and speed, as well as the amount of jet fuel on board the airplane. Work in this area is continuing with emphasis on resolving the uncertainties in our earlier work, and on addressing key aspects, such as fire and potential radiological consequences, in more detail. The majority of this effort is expected to be completed in FY2003. The initial efforts on testing to validate the computational methods are just getting underway and will continue for about three years. In FY2003, an assessment of nuclear power plant vulnerabilities to other terrorist attacks will be initiated.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	8,345	5,237	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION: Incrementally Fund

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2002 through Nov,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

JOB CODE : Y6688

TITLE: FIRE MODEL BENCHMARKING AND VALIDATION
Division of Risk Analysis & Applications
Program Manager: Dey, Monideep K. Phone: (301) 415-6443

OBJECTIVE: To benchmark computer codes used (or potentially used) by NRC staff and contractors against fire experiments performed by NIST.

REGULATORY USE: There is now underway a considerable amount of work at NRC to improve the efficiency, effectiveness, and realism, of fire requirements and regulatory oversight. Benchmarking is necessary to ensure that the models used by the staff are sufficiently accurate and realistic.

WORK SCOPE: Define and perform experiments simulating fires in nuclear facilities.

Apply computer models to simulate these fires.

Compare experimental results and model predictions; assess accuracy and modify models, as necessary.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	180	300	

PROCUREMENT METHOD : Non-DOE Interagency Agreement.

THIS ACTION: Incrementally Fund

AGENCY: National Institute of Science and Technology IAA NO: RES-02-002

FUNDING PERIOD: Feb,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jun,2002 through Sep,2004

PROCUREMENT MILESTONES

Send Startup Package	1/01/2003
Send IA Letter to Agency	1/16/2003
Send Oblig Memo to OCFO	2/17/2003

JOB CODE : Y6823

TITLE: LINK JCATS WITH INTEGRATION MODEL
Division of Risk Analysis & Applications
Program Manager: Kuritzky, Alan Phone: (301) 415-6255

OBJECTIVE: To integrate land assault simulation models with plant risk models and demonstrate the capability for performing more realistic vulnerability assessments

REGULATORY USE: To provide more realistic and efficient tools to NSIR staff involved in planning and implementing force-on-force exercises for nuclear power plants.

WORK SCOPE: 1. Develop JCATS model for pilot plant.
2. Adapt conditional risk models (developed for other threats) to run with JCATS.
3. Perform demonstration assessments.

FUNDING ($1000):	Prior Year Obligations	FY03
	0	150

[redacted]

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Aug,2003 through Aug,2004

PERIOD OF PERFORMANCE: Aug,2003 through Aug,2004

PROCUREMENT MILESTONES

Send SOW to Lab	4/02/2003
Rcv. DOE Proposal (189)	6/16/2003
Issue Form173 to DOE	7/16/2003
Rec. Signed Form 173	8/15/2003

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6832

TITLE: HRA FOR BY-PRODUCT MATERIAL
Division of Risk Analysis & Applications
Program Manager: Lois, Erasmia Phone: (301) 415-6560

OBJECTIVE: The objectives of this project are to develop:
1. An understanding of what potentially, risk-significant human actions should be addressed by NMSS.
2. An understanding of NMSS user needs regarding HRA capabilities, including HRA methods, HRA-informed tools, or other HRA needs.
3. An evaluation of existing HRA methods and tools with respect to their applicability and usefulness for NMSS byproduct material applications (as required by NMSS user needs).
4. Recommendations specific to each NMSS by-product material application (or group of applications) for: a) direct use of, b) needed modification of, or c) needed development of HRA methods or HRA-based tools, in order to support NMSS user needs.

REGULATORY USE: The tasks in this activity support the application of PRA/HRA methods and technology in the regulatory process.

WORK SCOPE: Consistent with the objectives listed above, the following four tasks will be performed:

1. Identification of potentially risk - significant human actions.
2. Identification level of detail required for NMSS byproduct material users.
3. Grouping of similar byproduct material applications.
4. Identification of NMSS byproduct material HRA capability needs.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	100	

PROCUREMENT METHOD : DOE Work Order.

THIS ACTION: New Project

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: May,2003 through Nov,2003

PERIOD OF PERFORMANCE: May,2003 through Nov,2003

Monday, July 21, 2003

Nuclear Regulatory Commission

Project Approval Status Report For FY 2003

Projects Selected For:

Division: Division of Sys. Anal. & Regul. Effectiveness

Branch: Safety Margins & System Analysis Branch

Job Code	Title	PM Name	Contracto
K6987	ANALYTICAL SUPPORT FOR SERENA PROGRAM	Basu	UC-SB
W6479	DEVELOPMENT OF CRITICALITY SAFETY DATA FOR LICENSING REVIEW	Lee	ORNL
W6698	PUMA INTEGRAL TEST FACILITY	Wang	PURDUE
W6749	THERMAL HYDRAULIC RESEARCH	Han	PURDUE
W6832	CABRI WATER LOOP	Meyer	IPSN
Y6195	DRY CASK STORAGE LICENSE FOR HIGH BURNUP FUEL	Scott	ANL
Y6300	USER SUPPORT FOR CONSOLIDATED TRAC CODE	Odar	LANL
Y6312	MASCA PROGRAM	Behbahani	OECD
Y6313	OECD-MCCI PROGRAM	Basu	ANL
Y6320	NEWT LATTICE CODE	Lee	ORNL
Y6321	BENCHMARK, MOX FUEL RELEASE, ST EXPERIMENTS	Lee	SNL
Y6367	HIGH BURNUP CLADDING PERFORMANCE	Scott	ANL
Y6377	MELCOR CODE DEVELOPMENT AND ASSESSMENT	Behbahani	SNL
Y6392	MAIN., APPL. ASSESS., & DEVEL NRC COMPUTER CODES	Rubin	ISL INC
Y6403	REACTOR CORE ANALYSIS	Scott	BNL
Y6428	EVALUATION OF SGTR PERFORMANCE	Rubin	ISL INC
Y6503	AP 1000 ANALYSIS	Rubin	ISL INC
Y6504	SG-FISSION PRODUCT RETENTION	Lee	PSI
Y6506	HALDEN FUEL EXPERIMENTS	Meyer	HALDEN
Y6507	APEX EXPERIMENTAL VALIDATION	Rhee	OREG ST
Y6511	CSARP MEETING	Basu	SNL
Y6512	TESTS OF SA IN OXIDIZING MEDIUM	Basu	ANL
Y6517	HIGH BURNUP SOURCE TERM FOR STORAGE	Lee	ORNL

Monday, July 21, 2003

Nuclear Regulatory Commission

Project Approval Status Report For FY 2003

Projects Selected For:

Division: Division of Sys. Anal. & Regul. Effectiveness

Branch: Safety Margins & System Analysis Branch

Job Code	Title	PM Name	Contracto
Y6525	TRAC-M CODE MAINTENANCE	Rubin	ISL INC
Y6526	ADMINISTER CAMP MEETING	Rubin	ISL INC
Y6571	SETH PROGRAM - TEST FACILITIES	Boyd	OECD
Y6580	FUEL CODE APPLICATIONS FOR HIGH BURNUP	Scott	PNL
Y6583	A/R DEV OF TRAC-M CODE - A/R PORTION OF Y6300	Odar	LANL
Y6586	FUEL CODE ASSESSMENT FOR MOX	Scott	PNL
Y6587	REACTOR ANALYSIS FOR HIGH-BURNUP FUEL	Scott	BNL
Y6589	THERMAL-HYDRAULIC RESEARCH	Han	PURDUE
Y6598	RELAP5 ANALYSES FOR PTS	Rubin	ISL INC
Y6607	SUPPORT ARTIST TEST (SUPTS Y6802 TASK 5)	Behbahani	SNL
Y6660	ADV RX - E.G., PBMR, IRIS - T/H EVALUATION	Rubin	ISL INC
Y6661	UPDATE DATABASE FOR NEUTRONICS CODE	Lee	ORNL
Y6662	AP-1000 CONFIRMATORY T/H ANALYSIS	Rubin	ISL INC
Y6664	CONTAINMENT ANALYSIS & EXP. FOR AP1000	Notafrancesco	SNL
Y6666	ADVD NUMERICAL METHODS IN TRAC-M	Odar	NAVSEA
Y6667	SNAP IMPLEMENTATION	Gingrich	APTI
Y6668	CONTAINMENT ANALYSIS SUPT (SUPTS Y6802 TASK 8)	Notafrancesco	SNL
Y6671	ROD BUNDLE - PHASE 2	Rhee	PENN ST
Y6673	TRAC-M DEV ASSESS - SM LOCA PROCESSES	Rubin	ISL INC
Y6685	UPGRADE NEUTRON CODE-NUC FUEL COMP/SFTY ASS	Lee	ORNL
Y6690	ANAL SUPPORT FOR OECD-MCCI PROG	Basu	ANL
Y6696	AP-1000 SEVERE ACCIDENT PHENOMENA EVAL	Lee	ENERGY
Y6716	PIRT FOR TRISO COATED FUEL PARTS	Odar	INEL
Y6717	PIRT FOR TRISO COATED FUEL PARTICLES	Odar	ORNL
Y6721	AGT W/IBRAE-RAS ON NUC SAFETY ANALYSIS CODES	Behbahani	RAS
Y6723	INTL AGMT ON FUEL BEHAVIOR AND MATL SCIENCE RES	Scott	RRC
Y6769	PUMA TEST FACILITY	Wang	PURDUE
Y6771	TO #3: MOX NEUTRONICS	Lee	PURDUE
Y6772	AP-1000 EXPERIMENTAL CONFIRMATORY RESEARCH	Rhee	RFP
Y6795	APEX AP 1000 TEST PROGRAM	Rhee	OREG ST
Y6801	AR/SA CODE DEVELOPMENT	Lee	SNL
Y6802	MELCOR SA CODE DEVELOP & ASSESSMENT	Behbahani	SNL
Y6804	ESBWR CONTAINMENT SUPPORT	Notafrancesco	SNL
Y6806	REVIEW OF GE SCALING REPORT	Staudenmeier	ISL INC
Y6812	ACR 700 INPUT MODEL DEVELOPMENT	Rubin	ISL INC
Y6813	ACR 700 PHENOMENOLOGY/SUPPORTING EXPERIMENTS	Bessette	BNL
Y6830	TRAC-M DEVEL ASSESS - ROSA-IV TESTS	Murray	ASTM
Y6831	METHODS DEVELOPMENT FOR ACR-700	Bessette	UNDES
Y6881	SA PHENOMENA EVAL FOR ADV RX	Lee	ENERGY

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : K6987

TITLE: ANALYTICAL SUPPORT FOR SERENA PROGRAM
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Basu, Sudhamay Phone: (301) 415-6774

OBJECTIVE: The objective of this activity is to participate in cooperative research that is being carried out at the Center for Risk Studies and Safety (CRSS) at the University of California Sanata Barbara. The Center maintains experimental and analytical readiness in the broader areas of safety assessment, risk management, severe accidents, and thermal-hydraulics.

REGULATORY USE: The activities carried out by CRSS will enable NRC to respond to emerging or existing safety issues for operating reactors as well as ALWR. Examples include retention of molten core material in the rector vessel following a severe accident, pressurized thermal shock, fuel-structure interactions, etc.

WORK SCOPE: This is a cooperative agreement with tasks specified as needs arise.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	925	100	

PROCUREMENT METHOD: Cooperative Agreement (Grant).

THIS ACTION:

RFPA NUMBER: RES-98-051

GRANTEE: University of California at Santa Barbara GRANT NO: NRC 04-98-051

FUNDING PERIOD: Nov,1999 through Mar,2001

PERIOD OF PERFORMANCE: Mar,1998 through Aug,2003

Office of Nuclear Regulatory Research

Job Code : W6479

Advance Procurement Plan for FY 2003

Job Code : W6479

Title : DEVELOPMENT OF CRITICALITY SAFETY DATA FOR LICENSING REVIEW

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: The importance of establishing a technical basis for use in licensing review of criticality safety for systems with fissile material is increasing as licensees work to optimize facilities and storage/transportation packages at the same time that access to experimental data is decreasing. The purpose of this project is to help assure that adequate data and guidance are in place for use in review of criticality safety evaluations.

REGULATORY USE: A specific issue is the review of requests to increase enrichment at commercial uranium fuel fabrication and enrichment plants. There is a particular lack of benchmark data between 5 and 10 percent enriched uranium. Accurate cross section data is also a critical component of criticality analysis. The AMPX code update will enable independent processing of the most current Evaluated Nuclear Data File (ENDF) to a format for use by criticality safety codes. In addition a technical basis is required to utilize burnup credit in transportation for criticality safety analysis. Going to high-burnup spent fuel also requires the ability to predict source terms for licensing review.

WORK SCOPE: Develop a generalized procedure to determine the range of applicability of Nuclear Criticality Safety analytical codes. This procedure should determine the extent to which analytical methods can be acceptably applied in terms of fissile system parameterization (enrichment, concentration, moderation, geometry, compostion, etc.).
Upgrade the AMPX code system for processing Version 6 format of ENDF for use in criticality safety codes. In addition, develop guidance 1) for use of burnup credit in spent fuel storage and transportation licensing review and 2) for predicting radionuclides inventory and decay heat for high-burnup fuel.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	6,212	175	

PROCUREMENT METHOD: DOE Work Order (Task Ordering Agreement).

LABORATORY: Oak Ridge National Laboratory

PERIOD OF PERFORMANCE: Sep,1995 through Jun,2004

Task Orders Not Defined for This Project

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : W6698

TITLE: PUMA INTEGRAL TEST FACILITY
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Wang, Weidong Phone: (301) 415-6279

OBJECTIVE: Provide a broad spectrum of relevant data in which containment thermal-hydraulics is coupled with reactor coolant system thermal-hydraulics and provide important data for code assessment and model development of the NRC consolidated code. The data will also improve understanding of complex phenomena and processes expected in a BWR plant during an accident or transient. Specifically, two-phase stability will be studied.

REGULATORY USE: PUMA data will be used to support the development and assessment of the NRC consolidated code for thermal-hydraulics and neutronics. The consolidated code and PUMA data will be used by NRR staff to analyze regulatory issues and confirm their review of those issues.

WORK SCOPE: Purdue University conducts, analyzes, and reports results of NRC-approved tests conducted at the PUMA test facility. The contractor also maintains the facility and instrumentation in operating condition. Tests have been performed to investigate a large-break loss-of-coolant accident (LOCA), two small-break LOCAs, single-phase and two-phase natural circulation in the reactor pressure vessel and isolation condensers, and steam condensation in the suppression pool with or without the presence of noncondensibles and noncondensible gas distribution in the containment, the impact of vacuum breaker leakage or failure on containment behavior. LOCA data was compared with similar tests obtained in the PANDA and GIRAFFE test facilities to assess the quarter-height vs. full-height scaling issue. Separate effects tests were performed to provide low-pressure data for single-phase and two-phase critical mass flow rates. Currently, the facility will be run to generate two-phase instabilities with power feedback and the data will be compared to predictions made by the TRAC-M code.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,177	50	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: Modify Scope

RFPA NUMBER: RES-98-045

CONTRACTOR: Purdue University CONTRACT NO: NRC-04-98-045

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jul,1998 through Mar,2003

PROCUREMENT MILESTONES

Send Startup Package	1/08/2003
Send RFPA to DCPM	1/22/2003
Receive Proposal	2/14/2003
Complete Prop. Eval.	2/21/2003
Issue Modification	3/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

Job Code : W6749

Job Code : W6749 Title : THERMAL HYDRAULIC RESEARCH

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Han, James T. Phone: (301) 415-6773

OBJECTIVE: The objective of this contract is to perform research and small-scale fundamental experiments in the areas of: modern code architecture and languages, advanced numerical methods including implicit integration and higher-order differencing techniques, new two-phase flow modeling techniques including interphase area transport and three field methods, support for the development of accurate and consistent constitutive models and correlations, development of a new graphical user interface, and model development for computational fluid dynamics.

REGULATORY USE: RELAP5, TRAC-P, TRAC-B and RAMONA are four separate thermal-hydraulic codes used to support licensing. This contract will assist in consolidating the functionality of these codes into a single thermal-hydraulic code, called TRAC-M, that will be easier for NRC to upgrade and maintain. Research activities under this contract will also develop models that will be incorporated into the consolidated code to rectify the identified deficiencies of the current codes.

WORK SCOPE: This is a task-ordering contract that will be used in NRC's attempt to consolidate the functionality of the RELAP-5, TRAC-P, TRAC-B and the RAMONA thermal-hydraulic codes into a single code called TRAC-M that will be easier to upgrade and maintain. Task orders will be issued on an as-needed basis.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	7,718	82	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement)

CONTRACTOR: Purdue University CONTRACT NO: NRC-04-97-046

PERIOD OF PERFORMANCE: Jul,1997 through Jun,2002

Task Order # : 1 Interfacial Area Transport Oper Amt. = $0

Work Period	Deliverable
Sep, 1997 thru Dec, 2002	Data taken at facility for Databank, 2 group formulation source/sink terms developed. Deliverable date is June 2002.

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 2 Modularization of TRAC-P Oper Amt. = $0

Work Period	Deliverable
Sep, 1997 thru Nov, 2002	Continue to modularize TRAC-M, enable external component, improve the run time via parallelization

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 3 Develop Assessment Numerical Techniques — Oper Amt. = $0

Work Period	Deliverable
Sep, 1997 thru Nov, 1999	Set of numerical techniques in code, final letter report

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 4 Phase Separation in Tees — Oper Amt. = $0

Work Period	Deliverable
Sep, 1997 thru Nov, 2002	Correlation for phase separation in tees based on data taken at facility, data for NRC Databank

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 5 Subcooled Boiling at Low Pressure — Oper Amt. = $0

Work Period	Deliverable
Jan, 1998 thru Nov, 2002 Future T.O.	correlation for data taken at facility, data for NRC databank

THIS ACTION
Incrementally Fund

Procurement Milestones	Dates
N/A	N/A

Task Order # : 6 SNAP Runtime & Output Visualization Development — Oper Amt. = $0

Work Period	Deliverable
Jan, 1998 thru Mar, 2003 Future T.O.	GUI code with full RELAP5 capability, translation to TRAC-M

THIS ACTION
Incrementally Fund

Procurement Milestones	Dates
N/A	N/A

Task Order # : 7 SNAP Nodalization Knowledge-Based Expert Systems Oper Amt. = $0

Work Period	Deliverable
Jan, 1998 thru Mar, 2000 Future T.O.	Knowledge Based Expert System for automatic nodalization scheme

Procurement Milestones	Dates
N/A	N/A

Task Order # : 8 Improvements to PARCS Oper Amt. = $0

Work Period	Deliverable
Jun, 1998 thru Jan, 2002	Improvements developed incorporated into PARCS, tested and documented

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 9 BWR Model Development and Assessment Oper Amt. = $0

Work Period	Deliverable
Aug, 1999 thru Jan, 2002	a final report

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 10 OECD/NRC Benchmark for a BWR Turbine Trip Transient Oper Amt. = $0

Work Period	Deliverable
May, 2000 thru Dec, 2002 Future T.O.	development of benchmark specifications, compilation of code calculations, and a final report

THIS ACTION
Incrementally Fund

Procurement Milestones	Dates
N/A	N/A

Task Order # : 11 Multi-Phase CFD Enhancements to Nuc Rx Safety Anal Oper Amt. = $0

Work Period	Deliverable
Apr, 2001 thru Jun, 2002	a report on code selection basis,code validation requirements, and code improvements

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 12 MELCOR ASSESSMENT AGAINST SCDAP/RELAP5 Oper Amt. = $0

Work Period	Deliverable
Apr, 2001 thru Dec, 2002	a final report

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 13 Automated Code Assessment Program Oper Amt. = $0

Work Period	Deliverable
N/A Future T.O.	enhancement of numerical techniques

Procurement Milestones	Dates
N/A	N/A

Task Order # : 14 Two-Phase CFD Enhancements for NPHASE Code Oper Amt. = $0

Work Period	Deliverable
Feb, 2002 thru Nov, 2002	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 17 Peach Bottom Turbine Tub Analysis Oper Amt. = $0

Work Period	Deliverable
Feb, 2002 thru Aug, 2002	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : W6832

TITLE: CABRI WATER LOOP
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Meyer, Ralph O. Phone: (301) 415-6789

OBJECTIVE: To obtain test reactor data from the French Cabri reactor, under reactivity accident conditions, that are needed to revise regulatory criteria for new fuel types and burnup ranges.

REGULATORY USE: Current fuel-related licensing criteria in Regulatory Guide 1.77 are inadequate at higher burnups and have not been examined for new cladding alloys. This project will provide information that will be used to develop modified licensing criteria that are valid out to at least 65 GWd/t for Zircaloy, ZIRLO, and M5 cladding. The information will also be used to improve computer codes that are used to perform studies of fuel rod response to postulated accidents.

WORK SCOPE: Perform tests in the Cabri reactor, analyze test reactor results, perform related laboratory and hot-cell tests and utilize analytical codes to interpret test results. See W6497 for prior sodium loop experiments.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,331	552	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION: Incrementally Fund

AGENCY: Institute de Protection et de Surete Nucleaire IA NO: RES-95-750

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: May,1998 through Jan,2006

PROCUREMENT MILESTONES

Send Startup Package	2/03/2003
Send Oblig Doc to OCFO	2/17/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6195

TITLE: DRY CASK STORAGE LICENSE FOR HIGH BURNUP FUEL
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Scott, Harold H. Phone: (301) 415-6771

OBJECTIVE: Using experimental investigation, theoretical analyses, and knowledge of Zircaloy metallurgy and ceramic science, provide technical bases for developing the criteria for dry-cask storage of spent high burnup fuel.

REGULATORY USE: NRC will use the products to determine the efficacy of ISG-11 for high burnup spent fuel storage, and for determining rod behavior (failure) during transport accidents.

WORK SCOPE: Examine the effect of high burnup operation on spent fuel cladding behavior under dry storage conditions. The scope includes hot-cell creep experiments, mechanical properties testing, fuel and cladding characterization work, isotopic analysis, and post-irradiation examinations (PIE). This job code forms a task (Task 8) under job code Y6367.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,443	810	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Feb,2000 through Jun,2005

PROCUREMENT MILESTONES

Send SOW to Lab	12/13/2002
Rcv. DOE Proposal (189)	1/20/2003
Issue Form173 to DOE	2/07/2003
Rcv. Signed Form 173	2/17/2003

Job Code : Y6300

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6300

TITLE: USER SUPPORT FOR CONSOLIDATED TRAC CODE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Odar, Fuat Phone: (301) 415-6500

OBJECTIVE: The consolidated TRAC code has been released to the NRC staff and will be released to the CAMP members in November 2000. The objectives of this Job Code is 1) to provide support for development of the Graphical User Support (GUI) for the TRAC users, 2) to develop Phenomena, Ranking and Identification Tables (PIRT) for reasearch areas in high burn up fuel, burn up fuel credit, and source term, 3) to modify TRAC Code to include RELAP5 capabilities for CAMP and NRC users, 4) to provide training and user support to the NRC staff in analyzing reactor system transients, 5) to provide support to NRC staff in developing input decks, 6) to provide user friendly features in the TRAC code when needed and 7) to correct errors in the TRAC code when they are found.

REGULATORY USE: NRC staff will perform plant transient analyses to meet regulatory requirements as risk informed regulations and PRAs are developed.

WORK SCOPE: 1) Provide support to NRC staff in Pressurized Thermal Shock analysis and development of the Oconee input deck and 2) Complete high burnup PIRT reports

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	799	108	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION: Incrementally Fund

LABORATORY: Los Alamos National Laboratory

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Jul,2000 through Sep,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	8/18/2003
Rec. Sign Form 173	9/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6312

TITLE: MASCA PROGRAM

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Behbahani, Ali Phone: (301) 415-6768

OBJECTIVE: Investigate the influence of chemical behavior on heat transfer in stratified molten ceramic pools, and to investigate fission product (FP) behavior in a molten pool and in particular partitioning of FP between layers in case of stratification and between phases during melting and solidification. In addition, expand material properties data base and develop computer models describing relevant phenomena related to the molten pool formation and its effect on the lower head of RPV.

REGULATORY USE: Understanding RPV failure mechanisms and the timing of the vessel failure during the late phase of the severe accident as a result of corrum melt-lower head vessel interactions will be highly beneficial to the severe management strategies under consideration for LWRs. The result of this work, along with Job code Y6058, will be used to assess melt retention in the lower head, and possible failue mode and time of failure of the RPV lower head.

WORK SCOPE: Build experimental test set ups to measure thermophysical properties and heat flux distribution to the simulated lower head as a result of chemical interaction and fission product partitioning. In addition, develop models to predict heat flux distribution on the lower head.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	204	30	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION: Incrementally Fund

AGENCY: OECD/NEA IA NO: RES-01-200

FUNDING PERIOD: Jan,2003 through Sep,2003

PERIOD OF PERFORMANCE: Dec,2000 through Sep,2006

PROCUREMENT MILESTONES

Send Startup Package	2/10/2003
Send Oblig Doc to OCFO	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6313

TITLE: OECD-MCCI PROGRAM
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Basu, Sudhamay Phone: (301) 415-6774

OBJECTIVE: Investigate through separate effects tests different cooling mechanisms for cooling ex-vessel core debris by an overlying water pool so as to enable development of coolability models for reactor applications and to determine a path of resolution of the ex-vessel debris coolability issue.

REGULATORY USE: Ex-vessel debris coolability is one of the remaining severe accident issues having implications for severe accident management. In order for NRC to determine the efficacy of SAM strategies developed by the industry, it is important that we have an adequate data base of various possible cooling mechanisms so that a coolability model can be developed for reactor applications.

WORK SCOPE: Perform small-scale separate effect tests using prototypic core debris to invetigate coolability by: (1) melt eruption, (2) water ingression, and (3) mechanical crust breach. Once data base is generated through these experiments, develop coolability models capturing the various cooling mechanisms. Using models, perform calculations in reactor scale to determine if ex-vessel core debris at this scale would be coolable. Verify the models and integral calculations by performing a large-scale experiment.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	200	350	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jan,2002 through Dec,2006

PROCUREMENT MILESTONES

Issue Form173 to DOE	5/16/2003
Rec. Sign Form 173	6/16/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6320

TITLE: NEWT LATTICE CODE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: To develop NEWT as part of the SCALE code to include the capability to generate lattice physics cross-sections to be used in neutronics for the analysis of UOX/MOX fuel.

REGULATORY USE: When NEWT development is completed and documented, NEWT will be used in generating lattice cross-sections input to neutronics code used for safely analysis of MOX cores.

WORK SCOPE: (1) Develop and document NEWT as a stand alone code suitable for MOX analysis.
(2) Benchmark NEWT and assess its capability vs. comparable codes (e.g., WIMS8).
(3) Develop interface between SCALE and NEWT.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	370	550	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2001 through Dec,2006

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6321

TITLE: BENCHMARK, MOX FUEL RELEASE, ST EXPERIMENTS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: The purpose is to use experimental data on fission product release for MOX to benchmark fuel release models used in severe accidents codes. Benchmarked severe accident codes are used to perform analyses for MOX and non-MOX cores to obtain radionuclide inventories to estimate the release to the environment for risk-important accidents. These releases will be used to perform offsite consequences.

REGULATORY USE: To support MOX core licensing.

WORK SCOPE: (1) Benchmark fuel release models against experiments (as they become avaliable) from VERCORS (France), VEGA (Japan), MAGRAGUS (France) as well as other appropriate data.
(2) Perform plant analysis using radionuclide inventories for a core containing one-third MOX fuel and for a core containing no MOX fuel to estimate the release to the environment for risk-important accidents.
(3) Perfrom consequence analysis.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	247	150	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Dec,2001 through Dec,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

Job Code : Y6367

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6367

TITLE: HIGH BURNUP CLADDING PERFORMANCE

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Scott, Harold H. Phone: (301) 415-6771

OBJECTIVE: Using experimental investigations, theoretical analyses, and current knowledge base of Zircaloy metallurgy, provide technical bases for determining applicability of the existing fuel damage criteria to high burnup fuel operation, determining safety margins for high burnup operation, evaluating existing criteria for dry-cask storage license renewal, and for developing criteria for dry storage of high burnup spent fuel.

REGULATORY USE: Fuel damage criteria are stated in 10 CFR 50.46, SRP 4.2, GDC 10, and in several other Reg. Guides. NRC will use the products of this research program to verify the efficacy of the existing criteria for high burnup operations to 62 GWd/t, and to determine safety margins for such cases. NRC will also use the products to modify fuel codes for use in performing licensing audits for high burnup fuel. Moreover, NRC will use the products as a technical basis to support any modifications of existing fuel damage criteria, if warranted. Finally, NRC will use the products to determine the efficacy of ISG-11 for high burnup spent fuel storage.

WORK SCOPE: Examine the effects of high burnup operation on cladding behavior with laboratory tests in a hot cell and with supporting analyses. The hot-cell experimental program will include: (1) integral LOCA testing (ballooning, burst, oxidation, and quenching), (2) oxidation kinetics experiments on a range of Zr alloys, (3) post-quench ductility testing, (4) mechanical properties testing (axial tensile, biaxial tube burst, structural bending, impact resistance, etc.), (5) creep experiments, and (6) miscellaneous post-irradiation examinations (PIE). The experimental program is supported by computer modeling and other related analytical activities.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	4,151	2,364	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Nov,2000 through Jun,2005

PROCUREMENT MILESTONES

Send SOW to Lab	11/01/2002
Rcv. DOE Proposal (189)	12/02/2002
Issue Form173 to DOE	12/17/2002
Rcv. Signed Form 173	1/16/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6377

TITLE: MELCOR CODE DEVELOPMENT AND ASSESSMENT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Behbahani, Ali Phone: (301) 415-6768

OBJECTIVE: To develop, assess, and maintain the system level MELCOR code that will provide the NRC with the capability to model key accident phenomena in nuclear power plants in adequate detail.

REGULATORY USE: With the capability to model plant accidents and transients for both primary system and containmemt for operating LWRs as well as ALWRs, the code will be used to assist the NRC in addressing risk informed safety and to provide the NRC with technical basis for formulating appropriate regulatory guidelines. Additionally, the code will be used to perform audit calculations for operating plants and will provide necessary inputs to propabilistic risk analysis.

WORK SCOPE: The scope of work under this job code include: (1) development of improved models for primary system and containment thermal-hydraulics and for fission product release and transport; (2) modernization of the code for ease of use; (3) assessment of the code against experimental data base as well as plant analysis; (4) NRC technical assistance and code user support; and (5) maintenance and quality assurance of the code.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	2,436	273	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Nov,2000 through Sep,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Office of Nuclear Regulatory Research

Job Code : Y6392

Advance Procurement Plan for FY 2003

Job Code : Y6392 Title : MAIN., APPL. ASSESS., & DEVEL NRC COMPUTER CODES

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: 1. Complete consolidation of RELAP5 capabilities into the TRAC-M code. 2. Provide configuration control, correction of code errors, code improvements, developmental assessment, documentation updates, and user support to the NRC, its contractors, and members of CAMP and the domestic Users Support Group for RELAP5/MOD3 and related codes. 3. Perform technical studies for advanced reactor designs as well as other issues as directed by the NRC.

REGULATORY USE: RELAP5/MOD3 and related codes are used to perform analyses of transients in operating reactors, analyses to support resolution of generic issues, evaluation of emergency procedures and accident management strategies, confirmation of licensee's analyses, testing of fidelity of NRC simulators, and training exercises for NRC staff. It is anticipated that RELAP5 and TRAC-M will also be used to support analyses of AP1000.

WORK SCOPE: 1. Complete consolidation of RELAP5 capabilites into the TRAC-M code. 2. Maintain configuration control, and a tape or CD library of code versions. 3. Distribute code versions to NRC-approved users in a form compatible with the user's computer system. 4. Provide telephone assistance during regular business hours. 5. Maintain a file of user trouble reports and user change requests for each code. 6. Meet with the NRC project officer bi-monthly. 7. Provide input for the NRC T-H code website semi-annually. 8. Provide a training workshop yearly. 9. Coordinate with, and provide support to, TRAC-M consolidation. 10. Provide members with user support required by CAMP agreements. 11. Participate in and make presentations at CAMP semi-annual meetings. 12. On a cost recovery basis, provide CAMP members with support not covered by bi-lateral international agreements. 13. Prepare annual summary reports of Independent Assessments performed by CAMP participants. 14. Maintain cognizance of national and international developments in TH codes/experiements.

Task Order Work

1. Perform engineering analyses of user-reported errors and document those analyses. 2. Make code improvements and improvements in user convenience features. 3. Make code improvements that take advantage of advances in computer capabilities and new experimental and assessment results. 4. Maintain and improve the auto-DA process for developmentally assessing the code. 5. Perform developmental assessment of new versions of the code. 6. Test new code versions by independent organizations. 7. Maintain and update code manuals. 8. Perform technical studies. 9. Develop input models of advanced reactor designs or operating reactors.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,088	303	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement)

RFPA NUMBER: NRC-02-054

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

PERIOD OF PERFORMANCE: Dec,2001 through Dec,2005

Task Order # : 2 RADTRAD Enhancements and Improvements Oper Amt. = $125

Work Period	Deliverable
Feb, 2002 thru Jun, 2003	NUREG on updated versions of RADTRAD.

THIS ACTION
New Task Order

Procurement Milestones	Dates
Send RFPA to DCPM	12/02/2002
Rcv. Oblg. Doc DCPM	1/16/2003

Task Order # : 7 TRAC-M Assessment of PWR Steam and Feedwater Line Breaks — Oper Amt. = $125

Work Period	Deliverable
Sep, 2002 thru Mar, 2003	Technical report.

THIS ACTION
New Task Order

Procurement Milestones	Dates
Send RFPA to DCPM	12/02/2002
Rcv. Oblg. Doc DCPM	1/16/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6403

TITLE: REACTOR CORE ANALYSIS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Scott, Harold H. Phone: (301) 415-6771

OBJECTIVE: The objectives of this project are: assist the NRC Office of Research in developing and using the TRITON and PARCS computer codes and input models, and review information on reactor core response to mixed-oxide fuel loadings.

REGULATORY USE: The staff will be developing certain capabilities in order to effectively review MOX core license applications. The Office of Nuclear Regulatory Research (RES) is responsible for developing the necessary data and tools to support the Office of Nuclear Reactor Regulation review of MOX fuels to ensure that the requirements in 10 CFR 50.46, Appendix A to 10 CFR Part 50, and Appendix K to 10 CFR Part 50 are met. RES will use the deliverables in its role of advising whether regulatory criteria and guidelines developed for UO2 fuel are adequate for MOX fuel.

WORK SCOPE: This project is primarily for MOX work.
Assess PARCS code outputs with results from French data for a core with MOX assemblies.
Compare TRAC-PARCS code outputs with DCS case and with MOX standard problem case.
Use PARCS to look at intra-assembly flux shapes.
Perform an RIA calculation in FY04.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	290	152	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2001 through Nov,2004

PROCUREMENT MILESTONES

Send SOW to Lab	6/14/2003
Issue Form173 to DOE	6/15/2003
Rcv. Signed Form 173	6/16/2003
Rcv. DOE Proposal (189)	7/29/2003

JOB CODE : Y6428

TITLE: EVALUATION OF SGTR PERFORMANCE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: To systematically address the uncertainty in the prediction of thermal hydraulic conditions used for assesssment of steam generator tube failure probabilities.

REGULATORY USE: To build upon the analysis and understanding of severe accident thermal hydraulic conditions developed in support fo NUREG-1570 "Risk Assessment of Severe Accident-Induced Steam Generator Tube Rupture," and more recent analysis performed in support of the Callaway electrosleeve review.

WORK SCOPE: To address tube to tube variations, the contractor shall: 1. Complete a SCDAP/RELAP5 baseline calculation for the Zion plant; 2. Address the effects of varying sequences to include (a) a SCDAP/RELAP5 calculation for SG depressurization in a non-pressurizer loop, (b) two SCDAP/RELAP5 calculations with variations in reactor coolant pump seal leakage, and (c) two SCDAP/RELAP5 calculations to address the effects of SG tube leakage on bulk RCS and SG responses; 3. Investigate potential conservatism in the SCDAP/RELAP5 analysis for SG tube integrity; 4. Complete up to sixteen SCDAP/RELAP5 calculations for sampled SG inlet plenum/heat transfer points to develop a probabilistically weighted picture of SG tube temperatures; 5. Re-examine 1/7th scale test data and methods of predicting peak SG tube temperatures; 6. Perform two SCDAP/RELAP5 sensitivity calculations using the Zion plan with variation in double-sided oxidation scenarios; 7. Investigate and resolve unphysical, numerically driven flows in the reactor vessel that cause water level to drop unrealistically below the core; 8. Investigate and resolve the occurrence of unphysical loop seal clearing; 9. Add radiation heat transfer modeling from vapor-to-vapor and vapor-to-wall in RELAP/SCDAP; 10. Provide presentations for peer reviews; and 11. Provide a draft NUREG/CR documenting all work.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	304	408	

PROCUREMENT METHOD: Commercial Small Purchase.

THIS ACTION: Incrementally Fund

CONTRACTOR: Information Systems Laboratories, Inc. REQUISITION NO: DR-01-0289

FUNDING PERIOD: Jul,2002 through Mar,2003

PERIOD OF PERFORMANCE: Jul,2001 through Jun,2003

PROCUREMENT MILESTONES

Send RFPA to DCPM	12/16/2002
Rcv Oblg. Doc DCPM	1/15/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

Job Code : Y6503

Job Code : Y6503 Title : AP 1000 ANALYSIS

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: Develop TRAC-M input models for large break and small break LOCA analysis of AP1000.

REGULATORY USE: The TRAC-M code will be used to perform audit calculations of the AP1000 to support and confirm regulatory decisions on AP1000 Design Certification.

WORK SCOPE: Starting with the AP1000 RELAP input deck, improved input models for TRAC-M will be developed in order to perform large break and small break LOCA calculations. The input deck will be improved by incorporating the most recent design information made available to the staff. TRAC-M will be used to simulate double-ended cold leg guillotine greaks at several break flow discharge coefficients. A double-ended guillotine break of the direct vessel injection (DVI) line will also be simulated to assess small break performance. In addition, a calculation using a coupled version of TRAC-M and CONTAIN will be performed.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	272	278	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement)

RFPA NUMBER: RES-02-054

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

PERIOD OF PERFORMANCE: May,2002 through May,2003

Task Order # : 4 AP1000 ANALYSIS Oper Amt. = $100

Work Period	Deliverable
May, 2002 thru Dec, 2003	Technical reports.

THIS ACTION
New Task Order

Procurement Milestones	Dates
Send RFPA to DCPM	12/02/2002
Rcv. Oblg. Doc DCPM	1/16/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6504

TITLE: SG-FISSION PRODUCT RETENTION
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: To provide technical review of planning and conducting experiments under the AeRosol Trapping In a STeam generator (ARTIST) Project at the Paul Scherrer Institut (Switzerland). Provide in-kind contribution to the ARTIST Project.

REGULATORY USE: Evaluation of risk from steam generator tube rupture accidents.
Steam Generator DPO Action Plan 3.3 (develop better model of the natural mitigation of radionuclide release that could occur in the secondary side of the SGs.

WORK SCOPE: (1) Participate in the review of the ARTIST experiments.
(2) Provide in-kind analysis as agreed upon under the NRC-PSI bi-lateral agreement.
(3) Provide technical assistance to NRC in montoring the progress of the Project.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	160	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION: New Project

AGENCY: Paul Scherrer Institute (PSI) IA NO: RES-03-100

FUNDING PERIOD: Mar,2003 through Dec,2003

PERIOD OF PERFORMANCE: Apr,2003 through Apr,2008

PROCUREMENT MILESTONES

Send Signed Int'l. Agmt	2/10/2003
Send Oblig Memo to OCFO	2/24/2003
OCFO Enter Trans FFS	3/17/2003

JOB CODE : Y6506

TITLE: HALDEN FUEL EXPERIMENTS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Meyer, Ralph O. Phone: (301) 415-6789

OBJECTIVE: To obtain test reactor data, for a range of operational and transient conditions, that are needed for code development and licensing reviews of new fuel types and burnup ranges.

REGULATORY USE: Halden Project data are used by NRR to review applicants' safety analyses, and the data are used for development and validation of the NRC FRAPCON and FRAPTRAN computer codes, which are in turn used to audit applicant claims and to perform special studies.

WORK SCOPE: See three-year Halden Project plan and SECY-03-0023 (issued 02/03). The fuel program is part of the larger Halden project. The funds from this JCN may be merged with others for implementation. see W6673 for prior years effort.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	353	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION: New Project

AGENCY: Halden Institutt for Energiteknikk IA NO: RES-88-202

FUNDING PERIOD: Jan,2003 through Dec,2003

PERIOD OF PERFORMANCE: Jan,2003 through Dec,2005

PROCUREMENT MILESTONES

Send Signed Int'l. Agmt	12/11/2002
Send Oblig Memo to OCFO	12/25/2002
OCFO Enter Trans FFS	1/15/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6507

TITLE: APEX EXPERIMENTAL VALIDATION
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rhee, Gene S. Phone: (301) 415-6489

OBJECTIVE: This program is conducted to obtain data needed for reviewing the AP1000 reactor design. The test data obtained from this program are used to understand the AP1000 reactor behavior as well as to assess the computer code TRAC-M.

REGULATORY USE: The results of the review of the AP1000 reactor behavior will be utilized in making licensing decisions. In addition, the TRAC-M code will be used for confirmatory analyses following the assessment against the AP1000-scaled test data.

WORK SCOPE: 1. Eleven tests will be conducted for selected design-basis and beyond design-basis accident scenarios over a two year period from January 2003 through December 2004.
2. A test report will be prepared after completion of all tests.
3. All test data will be submitted to the NRC Data Bank.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	300	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: New Project Follow-on to Project W6699

RFPA NUMBER: RES-03-049

CONTRACTOR: Oregon State University CONTRACT NO: NRC-04-03-049

FUNDING PERIOD: Jan,2003 through Dec,2003

PERIOD OF PERFORMANCE: Mar,2003 through Mar,2005

PROCUREMENT MILESTONES

Send Startup Package	9/30/2002
Send RFPA to DCPM	10/11/2002
Complete Evaluation	12/13/2002
RIMS Generated Funds Comm.	1/10/2003
Award Contract	1/15/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6511

TITLE: CSARP MEETING
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Basu, Sudhamay Phone: (301) 415-6774

OBJECTIVE: Provide technical support in the organization of the Cooperative Severe Accident Research Program (CSARP) annual technical meeting.

REGULATORY USE: The Cooperative Severe Accident Research Program (CSARP) provides a forum for exchange of technical information on severe acccident research carried out internationally. The CSARP member countries or Partners subscribe to this program with the expressed intention of sharing their research progress in resolving severe accident issues.

WORK SCOPE: Provide required technical and logistics support in organizing and conducting the Cooparative Severe Accident Research Program (CSARP) Annual Technical Meeting in May 2002. This job code is a task under job code Y6377.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	40	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project Follow-on to Project Y6377

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Jan,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jan,2003 through Nov,2005

PROCUREMENT MILESTONES

Send SOW to Lab	10/02/2002
Rcv. DOE Proposal (189)	11/18/2002
Issue Form173 to DOE	12/18/2002
Rec. Signed Form 173	1/17/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6512

TITLE: TESTS OF SA IN OXIDIZING MEDIUM
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Basu, Sudhamay Phone: (301) 415-6774

OBJECTIVE: To study fuel behavior under oxidizing conditions.

REGULATORY USE: Fuel behavior under air-ingress conditions for spent fuel pool or for certain reactor condition.

WORK SCOPE: (1) Perform experimental measurements of fuel behavior under postulated oxidizing conditions.
(2) Develop correlations for use in NRC severe accident code.
(3) Provide technical support to NRC as required

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	300	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Apr,2003 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2003 through Apr,2004

PROCUREMENT MILESTONES

Send Signed Int'l. Agmt	3/11/2003
Send Oblig Memo to OCFO	3/25/2003
OCFO Enter Trans FFS	4/15/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6517

TITLE: HIGH BURNUP SOURCE TERM FOR STORAGE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: Obtain data to expand NRC's technical knowledge of the storage of high burnup fuel to support ISFSI facility licensing and cask certification, particularly for criticality considerations.

REGULATORY USE: SFPO needs measurement, characterization, and comparison of the source terms to be used in licensing basis evaluations. This area complements the RES work underway at Oak Ridge National Laboratory on high burnup nuclide inventories, which was requested in the user-need memorandum dated March 27, 1998. Further, the Reactor Systems Branch (SRXB) of the Office of Nuclear Reactor Regulation has also expressed an interest in obtaining this data to benchmark some of its computer code calculations.

WORK SCOPE: to be developed
This JCN funds part of Task 8 under Y6367

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	275	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: May,2003 through Nov,2003

PERIOD OF PERFORMANCE: May,2003 through Dec,2005

PROCUREMENT MILESTONES

Send SOW to Lab	9/02/2002
Rcv. DOE Proposal (189)	11/18/2002
Issue Form173 to DOE	12/18/2002
Rec. Signed Form 173	1/17/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6525

TITLE: TRAC-M CODE MAINTENANCE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: Provide code configuration control, correction of code errors, code improvements, developmental assessment, documentation updates, and user support to NRC, its contractors and members of CAMP.

REGULATORY USE: The TRAC-M code will be used to perform audit calculations of both operating and advanced LWRs to formulate and defend regulatory decisions.

WORK SCOPE: Maintain TRAC-M. Develop new code versions or updates that include modeling changes and improved user convenience. Provide assistance and diagnosis of user problems, correction of coding "bugs", engineering analyses, code changes, and updating of code documentation.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	360	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: New Project

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Dec,2001 through Dec,2005

PROCUREMENT MILESTONES

Send Startup Package	7/29/2002
Send RFPA to DCPM	8/28/2002
Complete Evaluation	11/26/2002
Award Contract	12/17/2002
RIMS Generated Funds Comm.	12/17/2002

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6526

TITLE: ADMINISTER CAMP MEETING
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: Provide code configuration control, correction of code errors, code improvements, developmental assessment, documentation updates, and user support to members of CAMP for the RELAP5/MOD3 and related codes. Provide support for CAMP activities.

REGULATORY USE: None.

WORK SCOPE: Provide support for CAMP that shall include participating in CAMP meetings twice a year.

Provide members with user support required by the CAMP agreements, e. g., provide the latest version of the codes and documentation, answer user questions and concerns, and distribute the quarterly newsletter.

Participate in and make presentations at CAMP semi-annual meetings, and prepare CAMP and Technical Program Committee (TPC) meeting minutes.

On a cost recovery basis, provide CAMP members with support not specifically covered by bi-lateral international agreements, e. g., special projects, training in addition to regular workshops, etc.

Prepare annual summary reports of Independent Assessments performed by CAMP participants, when directed by NRC.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	50	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: New Project

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Dec,2002 through Sep,2003

PROCUREMENT MILESTONES

Send Startup Package	7/29/2002
Send RFPA to DCPM	8/28/2002
Complete Evaluation	11/26/2002
Award Contract	12/17/2002
RIMS Generated Funds Comm.	12/17/2002

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6571

TITLE: SETH PROGRAM - TEST FACILITIES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Boyd, Christopher Phone: (301) 415-0244

OBJECTIVE: The objective of this program is to run boron mixing experiments in the PKL facility in Germany to generate data that will be used to assess system analysis codes for these phenomena. Beginning in calendar year 2002, the PANDA facility in Switzerland will be used to run containment mixing experiments that will generate data for assessment of containment codes and CFD codes. This program is the SETH program and is an international collaborative effort.

REGULATORY USE: The formation of dilute (unborated) slugs in a system and containment mixing phenomena has not been thoroughly modeled and the database is limited. Codes and modeling techniques must be assessed to ensure that the community can accurately predict these phenomena so that the safety impact of scenarios that generate these phenomena can be evaluated.

WORK SCOPE: In the PKL facility, boron dilution and slug transport data will be obtained. In the PANDA facility, containment mixing data will be obtained. Both data sets will help us to assess our capability to model these phenomena.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	250	326	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION: Incrementally Fund

AGENCY: OECD/NEA IA NO: RES-02-245

FUNDING PERIOD: Dec,2001 through Jan,2003

PERIOD OF PERFORMANCE: Oct,2001 through Jun,2005

PROCUREMENT MILESTONES

Send Startup Package	12/10/2002
Send Oblig Doc to OCFO	12/16/2002

JOB CODE : Y6580

TITLE: FUEL CODE APPLICATIONS FOR HIGH BURNUP
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Scott, Harold H. Phone: (301) 415-6771

OBJECTIVE: FRAPCON & FRAPTRAN development and assessment for high-burnup applications (non-MOX). Fuel behavior (computerized) models will be used to analyze light water reactor fuel rod behavior from beginning-of-life to high burnup. Specific objectives include: 1) collect, review, and critique available data and information regarding burnup impacts on fuel rod thermal-mechanical properties and characteristics; 2) evaluate the need for updating specific models; 3) perform and document approved model changes; and 4) update the transient models to account for high burnup effects for LOCA and RIA type transients.

REGULATORY USE: Computer codes similar to FRAPCON are used by the industry to assess fuel behavior in relation to specified acceptable fuel design limits (SAFDLs) during normal operation. Insofar as SAFDLs do not need regulatory attention, those codes would not need regulatory attention. However, those codes are also used to provide initial conditions for accident analysis, which do need to be reviewed by NRC for adequacy. Therefore, research is needed to support steady-state code improvements for analysis of extended fuel burnup. Since new cladding alloys like ZIRLO and M5 have been introduced specifically to achieve extended burnups, the cladding models need to be developed and assessed for those alloys as a function of burnup and associated variables.

WORK SCOPE: A companion NRC project at Argonne National Laboratory (ANL) will be making measurements to update and improve cladding mechanical property models. PNNL staff will assess the inclusion of these models into MATPRO for FRAPCON-3 and FRAPTRAN. Work with the RRC on making FRAPTRAN/BALON2 predictions of the cladding ballooning that is expected in ANL and HALDEN LOCA tests, and work with the VTT to use GENFLO in calculating BWR power oscillation behavior.
Maintain and upgrade MATPRO. Improve stress and strain convergence in FRAPTRAN. Improve FRAPCON for use in making predictions under dry storage conditions.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	402	393	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Oct,2001 through Nov,2004

PROCUREMENT MILESTONES

Send SOW to Lab	10/18/2002
Rcv. DOE Proposal (189)	11/15/2002
Issue Form173 to DOE	11/27/2002
Rcv. Signed Form 173	12/16/2002

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6583

TITLE: A/R DEV OF TRAC-M CODE - A/R PORTION OF Y6300
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Odar, Fuat Phone: (301) 415-6500

OBJECTIVE: The objective of this project is to modify the TRAC-M code to predict the course and consequences of postulated accidents and transients in advanced (new) reactors.

REGULATORY USE: It is anticipated that utilities or power companies will submit a new advanced reactor design, ESBWR, to the NRC for licensing. NRC will need capability to audit calculations of postulated accidents and transients performed by the vendors. The modified TRAC-M code will provide the capability to the NRC to perform audit calculations.

WORK SCOPE: The TRAC-M code will be modified to include new ESBWR fuel design so that system transients and accidents, which are postulated to occur, can be predicted. This will permit NRC to audit vendor calculations with the new design. In addition, as a continuation of the effort started last year, some graphite properties and balance of plant components for gas cooled reactors will be developed and implemented in the TRAC-M code. Code improvements and correction of errors will be continued as new capabilities are added and tested.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	705	605	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Los Alamos National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Feb,2002 through Nov,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Job Code : Y6586

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6586

TITLE: FUEL CODE ASSESSMENT FOR MOX

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Scott, Harold H. Phone: (301) 415-6771

OBJECTIVE: Improve FRAPCON and FRAPTRAN for use in calculating behavior of MOX rods

REGULATORY USE: It is expected that MOX fuel will be used in two operating reactors within the next 10 years. A scoping assessment is needed to identify where, if any, current licensing tools and data bases are deficient in their capability to model and evaluate the safety implications of MOX fuel.

WORK SCOPE: Verify radial power profiles calculated for MOX.
Perform calculations and provide plots for MOX cases to be specified by NRC.
Perform assessment and prepare formal documentation.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	42	98	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jan,2002 through Nov,2004

PROCUREMENT MILESTONES

Send SOW to Lab	11/15/2002
Rcv. DOE Proposal (189)	12/20/2002
Issue Form173 to DOE	1/08/2003
Rcv. Signed Form 173	1/16/2003

JOB CODE : Y6587

TITLE: REACTOR ANALYSIS FOR HIGH-BURNUP FUEL
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Scott, Harold H. Phone: (301) 415-6771

OBJECTIVE: Use PARCS or other computational tools to calculate core behavior for transients and accidents involving rapid reactivity changes.

REGULATORY USE: GSIs will continue to arise from licensing, plant design or operational issues, and NRC must have a capability to respond appropriately to these issues in a timely and realistic manner.

WORK SCOPE: non-MOX work
1. Use TRAC-PARCS to get results for asymmetric deboration for a SBLOCA case. (Generic Safety Issue 185 - Control of Recriticality following SBLOCAs in PWRs).
2. Perform additional analysis of REAs to compare rod worth vs pellet enthalpy.
3. Coordinate NRC work with the Russian and French work using 3D T-H-neutronic codes.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	50	130	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Mar,2002 through Dec,2003

PROCUREMENT MILESTONES

Send SOW to Lab	11/07/2002
Rcv. DOE Proposal (189)	12/11/2002
Issue Form173 to DOE	12/19/2002
Rcv. Signed Form 173	1/16/2003

Office of Nuclear Regulatory Research

Job Code : Y6589

Advance Procurement Plan for FY 2003

Job Code : Y6589 Title : THERMAL-HYDRAULIC RESEARCH

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Han, James T. Phone: (301) 415-6773

OBJECTIVE: The objective of this contract is to perform analytical and small-scale experimental work to support TRAC-M consolidation and to address other issues on reactor kinetics, mixed oxide (MOX) fuel, computational fluid dynamics (CFD), and severe accidents.

REGULATORY USE: This contract provides support to the TRAC-M thermal-hydraulic system code, the PARCS reactor kinetics code (as a module in TRAC-M), the MELCOR severe accident code, and a CFD code. All these codes have been used to support the NRC regulatory decisions.

WORK SCOPE: This contract wlll provide analytical or experimental results in the areas of (1) advanced numerical methods in TRAC-M, (2) PARCS maintenance, (3) MOX neutronics, (4) interfacial area transport, (5) phase separation in tees, (6) post-CHF heat transfer and hydrodynamics, (7) separate-effects experiments for model development, (8) two-phase CFD enhancements, and (9) MELCOR assessment and applications.

Analytical skills are needed to perform all these tasks. In addition, experimental skills (e.g., design, construction, and operation of a test facility) are needed for Tasks (4) through (7).

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	704	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement).

THIS ACTION: New Project Follow-on to Project W6749

RFPA NUMBER: RES-03-048

CONTRACTOR: Purdue University CONTRACT NO: NRC-04-03-048

PERIOD OF PERFORMANCE: May,2003 through May,2006

PROCUREMENT MILESTONES

Title	Date
Send Startup Package	05/14/2002
Send RFPA to DCPM	06/13/2002
Issue Comp. Range Rpt.	11/11/2002
Issue Final Eval. Rpt.	12/26/2002
Award Contract	01/16/2003
RIMS Generated Funds Comm.	01/16/2003

Task Order # : 1 Melcor Assessment and Application Oper Amt. = $0

Work Period	Deliverable
N/A	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

Task Order # : 2 Two-Phase CFD Enhancements — Oper Amt. = $0

Work Period	Deliverable
N/A	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 3 MOX Neutronics — Oper Amt. = $0

Work Period	Deliverable
N/A	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 4 Interfacial Area Transport — Oper Amt. = $0

Work Period	Deliverable
N/A	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 5 Separate Effects Experiments for Model Development — Oper Amt. = $0

Work Period	Deliverable
N/A	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Office of Nuclear Regulatory Research

Job Code : Y6598

Advance Procurement Plan for FY 2003

Job Code : Y6598 Title : RELAP5 ANALYSES FOR PTS

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: Prior work was done to update and develop input decks for four plants: Oconee-1, Beaver Valley-1, Palisades, and Calvert Cliffs-1 and to analyze a large number of transients. It is necessary to carry this work to completion.

REGULATORY USE: PTS rule, 10 CFR 50.61.

WORK SCOPE: Complete additional PTS transients for all four plants as defined by the NRC Project Officer. Write NUREG/CRs to document all results. All RELAP5 files that should be retained as defined by the NRC Project Officer will be archived on the NRC data bank.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	515	402	

PROCUREMENT METHOD: Sole Source Commercial Contract (Task Ordering Agreement)

RFPA NUMBER: RES-02-054

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

PERIOD OF PERFORMANCE: Dec,2001 through Dec,2004

PROCUREMENT MILESTONES

Title	Date
Send Startup Package	11/01/2002
Send RFPA to DCPM	11/18/2002
Receive Proposal	12/18/2002
Complete Prop. Eval.	01/02/2003
Issue Modification	01/17/2003

Task Order # : 1 PTS Analysis Oper Amt. = $250

Work Period	Deliverable
Dec, 2001 thru Nov, 2003	NUREG/CR.

THIS ACTION
New Task Order

Procurement Milestones	Dates
Send RFPA to DCPM	12/02/2002
Rcv. Oblg. Doc DCPM	1/16/2003

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

Job Code : Y6607 Title : SUPPORT ARTIST TEST (SUPTS Y6802 TASK 5)

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Behbahani, Ali Phone: (301) 415-6768

OBJECTIVE: Analytical program to support ARTIST program at PSI. This experimental program deals with the study of the aerosol removal on the secondary side of a "dry" steam generator and aerosol removal within a flooded side of a steam generator. This work is done under Job code Y6377.

REGULATORY USE: See JCN 6377

WORK SCOPE: See JCN Y6377

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	50	50	

PROCUREMENT METHOD: DOE Work Order (Task Ordering Agreement).

LABORATORY: Sandia National Laboratories

PERIOD OF PERFORMANCE: May,2003 through Jun,2007

PROCUREMENT MILESTONES

Title	Date
Issue Form173 to DOE	01/16/2003
Rec. Sign Form 173	02/17/2003

Task Order # : 5 Support Artist Test (Supts Y6802 - Task 5) Oper Amt. = $0

Work Period	Deliverable
May, 2003 thru Jun, 2007	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Office of Nuclear Regulatory Research

Job Code : Y6660

Advance Procurement Plan for FY 2003

Job Code : Y6660 Title : ADV RX - E.G., PBMR, IRIS - T/H EVALUATION

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: "ESBWR UPGRADES TO TRAC-M" [Task Order #8 to ISL contract NRC-04-02-054]

The objectives are 1) to provide input processing capability in TRAC-B format to simulate new fuel designs applicable to ESBWR, 2) to provide capability for the TRAC-M code to calculate Minimum Critical Power Ratio, and 3) to provide the necessary documentation.

REGULATORY USE: The upgraded TRAC-M code will be used to perform audit calculations of ESBWR design.

WORK SCOPE: see "Objectives"

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	175	37	

PROCUREMENT METHOD: Sole Source Commercial Contract (Task Ordering Agreement)

RFPA NUMBER: RES-02-054

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

PERIOD OF PERFORMANCE: Sep,2002 through Jul,2003

Task Order # : 8 ESBWR UPGRADES FOR TRAC-M Oper Amt. = $37

Work Period	Deliverable
Sep, 2002 thru Jul, 2003	TER

THIS ACTION
New Task Order

Procurement Milestones	Dates
Send RFPA to DCPM	3/03/2003
Rcv. Oblg. Doc DCPM	4/17/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6661

TITLE: UPDATE DATABASE FOR NEUTRONICS CODE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: To develop and assess neutronics code for advanced reactors.

REGULATORY USE: Identification and understaning potential physics issues related to safety, developing regulatory criteria, and establishing analysis technology needed to perform licensing review.

WORK SCOPE: (1) Investigate physics issues related to advanced reactors
(2) Preparatin and testing of ENDF/B-6 data libraries
(3) Develop resonance treatment for TRISO-type fuel
(4) Develop burnup-dependent lattice physics for TRISO-type fuel
(5) Develop decay heat for HTGR reactors
(6) Perform benchmark for analytical tools developed

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	448	125	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Sep,2002 through Nov,2006

PROCUREMENT MILESTONES

Issue Form173 to DOE	2/13/2003
Rec. Sign Form 173	3/17/2003

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

Job Code : Y6662 Title : AP-1000 CONFIRMATORY T/H ANALYSIS

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: Determine large and small break LOCA sensitivities for AP1000 using TRAC-M.

REGULATORY USE: The TRAC-M code will be used to perform audit calculations of the AP1000 to support and confirm regulatory decisions on AP1000 Design Certification.

WORK SCOPE: A comprehensive series of large and small break LOCAs will be simulated using TRAC-M in order to explore performance of the AP1000 to a wide range of accident scenarios. These calculations will identify major sensitivities to modeling assumptions and plant initial and boundary conditions.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	22	

PROCUREMENT METHOD: Sole Source Commercial Contract (Task Ordering Agreement).

THIS ACTION: New Project

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

PERIOD OF PERFORMANCE: Dec,2001 through Dec,2004

PROCUREMENT MILESTONES

Title	Date
Send Startup Package	06/27/2002
Send RFPA to DCPM	07/29/2002
Complete Evaluation	10/28/2002
Award Contract	11/18/2002
RIMS Generated Funds Comm.	11/18/2002

Task Order # : 4 AP-1000 ANALYSIS Oper Amt. = $0

Work Period	Deliverable
May, 2002 thru Feb, 2003	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6664

TITLE: CONTAINMENT ANALYSIS & EXP. FOR AP1000
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Notafrancesco, Allen Phone: (301) 415-6499

OBJECTIVE: Objectives are (1) to identify important containment phenomena (2) to determine model adequacy (3) to investigate uncertainties

REGULATORY USE: To confirm adequate margins.

WORK SCOPE: see "objectives"

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	31	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Jan,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jan,2003 through Nov,2003

PROCUREMENT MILESTONES

Issue Comp. Range Rpt.	
Issue Final Eval. Rpt.	
Send RFPA to DCPM	
Send Startup Package	
RIMS Generated Funds Comm.	1/07/2003
Award Contract	2/17/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6666

TITLE: ADVD NUMERICAL METHODS IN TRAC-M
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Odar, Fuat Phone: (301) 415-6500

OBJECTIVE: The objective of this project is to modify the TRAC-M code using advanced numerical methods so that the accuracy of the predictions of the code will increase.

REGULATORY USE: The TRAC-M code is being used by NRC to predict system transients and accidents. Advanced numerical methods provide more accurate predictions. The use of these methods will define margins more accurately and regulatory conservatisms may be reduced.

WORK SCOPE: Develop droplet field numerics and explore/implement higher order numerics in the TRAC-M code. Explore the parallel processing with new computer systems and improve/implement parallel processing in the TRAC-M code.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	227	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: New Project

AGENCY: Naval Sea Systems Command, Department of the Navy IAA NO: RES-03-002

FUNDING PERIOD: Jan,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jan,2003 through Dec,2005

PROCUREMENT MILESTONES

Send Startup Package	8/27/2002
Send RFPA to DCPM	9/26/2002
Complete Evaluation	12/25/2002
Award Contract	1/15/2003
RIMS Generated Funds Comm.	1/15/2003

JOB CODE : Y6667

TITLE: SNAP IMPLEMENTATION
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Gingrich, Chester Phone: (301) 415-6780

OBJECTIVE: The objective is to maintain and modify the SNAP (Symbolic Nuclear Analysis Package) code in a manner consistent with the current TRAC-M, RELAP5 and CONTAIN codes design.

REGULATORY USE: The US NRC has thermal hydraulic system transient, severe accident and containment system codes such as TRAC-M, RELAP5, MELCOR, PARCS and CONTAIN. A graphical user interface system is necessary for user friendly and effective use of these codes. The SNAP code is a graphical user interface system designed to support these codes. The graphical user interface increases the efficiency of the staff who are performing audit calculations to check the vendor submittals.

WORK SCOPE: Modify and maintain the ModelEditor as required to support ongoing TRAC-M development efforts.Develop input assistants to provide RELAP5 - TRAC-M conversion of model components. Provide ability to import TRAC-M ASCII full plant and restart files. Provide CONTAIN and MELCOR support to the ModelEditor. Develop MELCOR and PARCS plugins to provide runtime and post-processing capability. Maintain TRAC-M TPR and and develop 3D plotting capability.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	311	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: New Project

CONTRACTOR: Applied Programming Technology, Inc. CONTRACT NO: NRC-04-03-057

FUNDING PERIOD: Feb,2003 through Dec,2003

PERIOD OF PERFORMANCE: Apr,2003 through Apr,2004

PROCUREMENT MILESTONES

Send Startup Package	6/14/2002
Send RFPA to DCPM	7/15/2002
Issue Comp. Range Rpt.	12/12/2002
Issue Final Eval. Rpt.	1/27/2003
Award Contract	2/17/2003
RIMS Generated Funds Comm.	2/17/2003

Office of Nuclear Regulatory Research

Job Code : Y6668

Advance Procurement Plan for FY 2003

Job Code : Y6668

Title : CONTAINMENT ANALYSIS SUPT (SUPTS Y6802 TASK 8)

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Notafrancesco, Allen Phone: (301) 415-6499

OBJECTIVE: The objectives of this effort are:
(1) to review new or industry containment related models, approaches, and methodologies;
(2) to perform limited containment related studies for issue resolution;
(3) to provide expert technical assistance (e.g., review reports, attend meetings, etc.).

REGULATORY USE: This program will provide needed technical expertise in the area of containment analysis, including licensing support.

WORK SCOPE: See "objectives"

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	75	

PROCUREMENT METHOD: DOE Work Order (Task Ordering Agreement).

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

PERIOD OF PERFORMANCE: May,2003 through Nov,2007

PROCUREMENT MILESTONES

Title	Date
Issue Comp. Range Rpt.	
Issue Final Eval. Rpt.	
Send RFPA to DCPM	
Send Startup Package	
RIMS Generated Funds Comm.	01/07/2003
Award Contract	02/17/2003

Task Order # : 8 Containment Analysis Supt (Supts Y6802 Task 8) Oper Amt. = $0

Work Period	Deliverable
May, 2003 thru Nov, 2007	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6671

TITLE: ROD BUNDLE - PHASE 2
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rhee, Gene S. Phone: (301) 415-6489

OBJECTIVE: To generate experimental data to allow a mechanistic reflood model to be developed for the NRC consolidated TRAC-M code. The data to be obtained covers the overall process of reflooding from the bottom as well as separate data on some basic components of the reflood process such as steam-water interfacial drag and steam cooling with and without water droplet injections.

REGULATORY USE: An improved reflood model will reduce the uncertainty in making licensing decisions and would allow some of the conservatism in the current ECCS model to be utilized in the form of increased power output or higher peaking factor.

WORK SCOPE: 1. Prepare detailed test specifications.
2. Conduct tests on reflood, steam-water interfacial drag, and steam cooling with and without water droplet injections.
3. Qualify the data and prepare a quick look report after each test.
4. Prepare a test report after each test series.
5. Submit all test data to the NRC Data Bank.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	300	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: New Project Follow-on to Project W6855

RFPA NUMBER: RES-03-059

CONTRACTOR: Pennsylvania State University CONTRACT NO: NRC-04-03-059

FUNDING PERIOD: Jan,2003 through Dec,2003

PERIOD OF PERFORMANCE: Mar,2003 through Mar,2004

PROCUREMENT MILESTONES

Send Startup Package	9/30/2002
Send RFPA to DCPM	10/10/2002
Complete Evaluation	11/22/2002
RIMS Generated Funds Comm.	1/13/2003
Award Contract	1/15/2003

Office of Nuclear Regulatory Research

Job Code : Y6673

Advance Procurement Plan for FY 2003

Job Code : Y6673 Title : TRAC-M DEV ASSESS - SM LOCA PROCESSES

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: Use TRAC-M to simulate separate effects tests and demonstrate acceptable agreement with predecessor codes.

REGULATORY USE: The TRAC-M code will be used to perform audit calculations of both operating and advanced LWRs to formulate and defend regulatory decisions.

WORK SCOPE: Develop or modify pre-existing input decks and simulate separate and integral effects tests using TRAC-M based on the TRAC-M Code Consolidation DA Plan. Results of the simulations will be compared to results for the same test simulated with RELAP, TRAC-P, or TRAC-B as needed in order todemonstrate that TRAC-M produces equivalent calculations.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	110	599	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement)

RFPA NUMBER: RES-02-054

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

PERIOD OF PERFORMANCE: Sep,2002 through Apr,2003

PROCUREMENT MILESTONES

Title	Date
Send RFPA to DCPM	12/16/2002
Rcv Oblg. Doc DCPM	01/15/2003

Task Order # : 6 TRAC-M Code Consolidation Developmental Assess. Oper Amt. = $0

Work Period	Deliverable
Sep, 2002 thru Apr, 2003	

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Job Code : Y6685

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6685

TITLE: UPGRADE NEUTRON CODE-NUC FUEL COMP/SFTY ASS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: Upgrade data base for ORIGEN source term code

REGULATORY USE: Enhance code utilization for high burnup fuel and for MOX fuel (fuel fabrication, SNF transportation and storage)

WORK SCOPE: (1) Obtain MALIBU experimental data on UOX (PWR and BWR) and MOX fuel
(2) Upgrade data base for ORIGEN code.
(3) Perform analysis to ascertain improvements made.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	370	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: May,2003 through Nov,2003

PERIOD OF PERFORMANCE: May,2003 through Sep,2006

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	2/17/2003
Issue Form173 to DOE	3/19/2003
Rec. Signed Form 173	4/18/2003

JOB CODE : Y6690

TITLE: ANAL SUPPORT FOR OECD-MCCI PROG
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Basu, Sudhamay Phone: (301) 415-6774

OBJECTIVE: Perform pretest calculations to guide the selection of the MCCI test matrix, experimental conditions and quantities. Perform post-test analysis of experimental data from separate effect experiments and develop models and correlations for incorporation into NRC's severe accident codes.

REGULATORY USE: Develop quantitative models of core-concrete interactions for use in severe accident calculations to address safety issues including new plant licensing.

WORK SCOPE: Perform pretest MCCI calculations using the CORCON module (CAV package) of the MELCOR severe accident analysis computer code. Perform post-test analysis of experimental data obtained from separate efect experiments. Develop dryout heat flux and melt entrainment correlations. Also develop crust freezing models. Perform post-test analysis of 2D MCCI experimental data.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	50	50	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION: Incrementally Fund

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: May,2002 through Apr,2006

PROCUREMENT MILESTONES

Issue Form173 to DOE	11/15/2002
Rec. Sign Form 173	12/16/2002

JOB CODE : Y6696

TITLE: AP-1000 SEVERE ACCIDENT PHENOMENA EVAL
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: To address severe accident technical issues related to AP1000 design certification

REGULATORY USE: AP-1000 design certification

WORK SCOPE: (1) Develop MELCOR deck for AP1000
(2) Perfrom MELCOR analysis to address severe accident pehnomena for AP1000
(3) Evaluate the applicability of AP600 technical studies for AP1000

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	150	169	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: Incrementally Fund

CONTRACTOR: Energy Research, Inc. CONTRACT NO: NRC-04-02-075

FUNDING PERIOD: Mar,2003 through Dec,2003

PERIOD OF PERFORMANCE: Aug,2002 through Sep,2004

PROCUREMENT MILESTONES

Send RFPA to DCPM	2/13/2003
Rcv Oblg. Doc DCPM	3/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6716

TITLE: PIRT FOR TRISO COATED FUEL PARTS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Odar, Fuat Phone: (301) 415-6500

OBJECTIVE: The objective of this work is to provide structured information with importance ranking 1) of the phenomena occurring during anticipated operational transients and postulated accidents affecting TRISO coated fuel particle performance in gas cooled reactors, and 2) of the processes used in manufacturing of TRISO coated fuel particles. This information will help NRC to design experimental and analytical research programs.

REGULATORY USE: The information will help NRC establish regulatory limits and/or controls in operating and licensing of gas cooled reactors.

WORK SCOPE: Participate in "Phenomena Identification and Ranking Table" (PIRT) meetings and provide input to the PIRT report on TRISO coated Fuel Particles.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	40	40	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Idaho National Engineering & Environmental Laboratory

FUNDING PERIOD: Oct,2002 through Oct,2003

PERIOD OF PERFORMANCE: Sep,2002 through Oct,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	6/16/2003
Rec. Sign Form 173	7/16/2003

JOB CODE : Y6717

TITLE: PIRT FOR TRISO COATED FUEL PARTICLES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Odar, Fuat Phone: (301) 415-6500

OBJECTIVE: The objective of this work is to provide structured information with importance ranking 1) of the phenomena occurring during anticipated operational transients and postulated accidents affecting performance of TRISO coated fuel particles in gas cooled reactors. This information will help NRC design the experimental and analytical research programs.

REGULATORY USE: The results of "Phenomena Identification and Ranking Table" (PIRT) for TRISO coated fuel particles will help NRC establish regulatory limits and/or controls in operating and licensing of gas cooled reactors.

WORK SCOPE: Paricipate in the PIRT meetings and provide input to the PIRT report.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	36	51	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Oct,2003

PERIOD OF PERFORMANCE: Sep,2002 through Oct,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	8/18/2003
Rec. Sign Form 173	9/17/2003

JOB CODE : Y6721

TITLE: AGT W/IBRAE-RAS ON NUC SAFETY ANALYSIS CODES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Behbahani, Ali Phone: (301) 415-6768

OBJECTIVE: The objective of this work is to modernize the MELCOR code by converting it to FORTRAN-95 (see Y6377)

REGULATORY USE: With the capability to model plant accidents and transients for both primary system and containment for operating LWRs as well as ALWRs, the code will be used to address risk-informed safety issues and to provide the NRC with the technical basis for formulating appropriate regulatory guidelines. Additionally the code will be used to audit camculations for operating plants and will provide necessary input to probabilistic risk analysis.

WORK SCOPE: Assist IBRAE-RAS in the modernization of MELCOR.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	180	508	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION: Incrementally Fund

AGENCY: Russian Academy of Sciences IA NO: RES-02-250

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Jul,2002 through Jul,2007

PROCUREMENT MILESTONES

Send Startup Package	12/10/2002
Send Oblig Doc to OCFO	12/16/2002

JOB CODE : Y6723

TITLE: INTL AGMT ON FUEL BEHAVIOR AND MATL SCIENCE RES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Scott, Harold H. Phone: (301) 415-6771

OBJECTIVE: Obtain cladding test measurements and computer code work from Kurchatov (RRC) and RIAR to augment efforts at ANL, BNL and PNNL. The work is leveraged by support from IRSN (France) and Russian organizations.

REGULATORY USE:
The results of this work to date have led to code improvements, expanded data bases and confirmatory research information. This work has also helped the Russians become familiar with USNRC analytical tools, safety issues, and Western approaches to safety. It is our intent to continue these programs in 2003 at a level comparable to that in 2002.

WORK SCOPE: FRAPTRAN work and oxidation & embrittlement tests on E110. Continue assessment of earlier Russian data for conditions of loss-of-coolant accidents. Perform ring-compression tests and axial tensile tests of oxidized specimens of irradiated and unirradiated E110 cladding to determine the zero-ductility conditions for analysis of loss-of-coolant accidents. Transfer all Russian special modeling that was incorporated in USNRC 's FRAP-T6 fuel rod transient code and MATPRO materials property library to USNRC's new FRAPTRAN code and updated MATPRO library. 3-D Reactor Physics calculations will be made for MOX core loadings. Sensitivity studies will be completed on boron-dilution accidents to examine major uncertainties.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	150	150	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION: Modify Scope

AGENCY: Russian Research Center IA NO: RES-02-300

FUNDING PERIOD: Jan,2003 through Jan,2004

PERIOD OF PERFORMANCE: Aug,2002 through Aug,2007

PROCUREMENT MILESTONES

Send Startup Package	5/12/2003
Send Oblig Doc to OCFO	5/19/2003

JOB CODE : Y6769

TITLE: PUMA TEST FACILITY
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Wang, Weidong Phone: (301) 415-6279

OBJECTIVE: Provide a broad spectrum of relevant data in which containment thermal-hydraulics is coupled with reactor coolant system thermal-hydraulics and provide important data for code assessment and model development of the NRC consolidated code. The data will also improve understanding of complex phenomena and processes expected in a BWR plant during an accident or transient.

REGULATORY USE: PUMA data will be used to support the development and assessment of the NRC consolidated code for thermal-hydraulics and neutronics. The consolidated code and PUMA data will be used by NRR staff to analyze regulatory issues and confirm their review of those issues.

WORK SCOPE: Purdue University conducts, analyzes, and reports results of NRC-approved tests conducted at the PUMA test facility. The contractor also maintains the facility and instrumentation in operating condition. Tests have been performed to investigate a large-break loss-of-coolant accident (LOCA), two small-break LOCAs, single-phase and two-phase natural circulation in the reactor pressure vessel and isolation condensers, and steam condensation in the suppression pool with or without the presence of noncondensibles and noncondensible gas distribution in the containment, the impact of vacuum breaker leakage or failure on containment behavior. LOCA data was compared with similar tests obtained in the PANDA and GIRAFFE test facilities to assess the quarter-height vs. full-height scaling issue. Separate effects tests were performed to provide low-pressure data for single-phase and two-phase critical mass flow rates. Currently, the facility will be run to generate two-phase instabilities with power feedback and integral tests. The data will be compared to predictions made by the TRAC-M code.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	685	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: New Project

RFPA NUMBER: RES-03-055

CONTRACTOR: Purdue University CONTRACT NO: NRC-04-03-055

FUNDING PERIOD: Jan,2003 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2003 through Apr,2004

PROCUREMENT MILESTONES

Send Startup Package	10/07/2002
Send RFPA to DCPM	10/21/2002
Complete Evaluation	12/31/2002
Award Contract	1/15/2003
RIMS Generated Funds Comm.	1/15/2003

Office of Nuclear Regulatory Research

Job Code : Y6771

Advance Procurement Plan for FY 2003

Job Code : Y6771 Title : TO #3: MOX NEUTRONICS

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: The 3-D neutronics package, PARCS, will be enhanced tomodel MOX fuel issues and will be able to run in parallel with TRAC-M to reduce runtime.

REGULATORY USE: By making the code run faster, more detailed calculations can be run to support regulatory decisions without being hindered by turnaround time. Higher number of energy groups (4), pin by pin discretization, and a higher order angular dependence (P3) are necessary to calculate the spatial distribution of flux in each of the groups without homogenization limiting the accuracy so that power levels can be properly determined for MOX cores.

WORK SCOPE: Development activities: assessment, higher energy groups, pin by pin discretization and P3 are to be completed.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	124	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement).

THIS ACTION: New Project Follow-on to Project Y6336

CONTRACTOR: Purdue University CONTRACT NO: NRC-04-03-048

PERIOD OF PERFORMANCE: Jan,2003 through Dec,2004

PROCUREMENT MILESTONES

Title	Date
Send Startup Package	05/14/2002
Send RFPA to DCPM	06/13/2002
Issue Comp. Range Rpt.	11/11/2002
Issue Final Eval. Rpt.	12/26/2002
Award Contract	01/16/2003
RIMS Generated Funds Comm.	01/16/2003

Task Order # : 2 MOX Neutronics Oper Amt. = $150

Work Period	Deliverable
N/A	TBD
Concurrent T.O.	

Procurement Milestones	Dates
Send Startup Package	12/18/2002
Send RFPA to DCPM	12/25/2002
Receive Proposal	1/01/2003
Complete Prop. Eval.	1/08/2003
Issue Modification	1/15/2003

Office of Nuclear Regulatory Research

Job Code : Y6772

Advance Procurement Plan for FY 2003

Job Code : Y6772 Title : AP-1000 EXPERIMENTAL CONFIRMATORY RESEARCH

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rhee, Gene S. Phone: (301) 415-6489

OBJECTIVE: To develop data base and thermal hydraulic models for entrainment and de-entrainment in upper plenums.

REGULATORY USE: The models developed from this project will be implemented in the TRAC-M code and used to support licensing decisions.

WORK SCOPE: 1. Modify the ATLATS facility, which is currently used to investigate phase separation at tee junctions, to measure entrainment and carryover from the upper plenum of the vessel.

2. Conduct a series of experiments to measure entrainment as a function of upper plenum water level, system pressure, core steam velocity, and upper plenum internals.

3. Simulated upper plenum internals will be used in some tests while not in others to isolate the effects of cross-flow de-entrainment

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	200	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement).

THIS ACTION: New Project Follow-on to Project Y6663

CONTRACTOR: Request for Proposals CONTRACT NO: RES-03-048

PERIOD OF PERFORMANCE: Mar,2003 through Feb,2004

PROCUREMENT MILESTONES

Title	Date
Send Startup Package	07/12/2002
Send RFPA to DCPM	08/12/2002
Issue Comp. Range Rpt.	01/09/2003
Issue Final Eval. Rpt.	02/24/2003
Award Contract	03/17/2003
RIMS Generated Funds Comm.	03/17/2003

Task Order # : 200 AP 1000 EXPERIMENTS Oper Amt. = $200

Work Period	Deliverable
Mar, 2003 thru Feb, 2004 Concurrent T.O.	TBD

Procurement Milestones	Dates
Send Startup Package	2/17/2003
Send RFPA to DCPM	2/24/2003
Receive Proposal	3/03/2003
Complete Prop. Eval.	3/10/2003
Issue Modification	3/17/2003

JOB CODE : Y6795

TITLE: APEX AP 1000 TEST PROGRAM
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rhee, Gene S. Phone: (301) 415-6489

OBJECTIVE: To conduct a test in the Oregon State University APEX (Advanced Plant Experment) Facility to investigate a beyond-design-basis accident scenario of the AP1000 reactor.

REGULATORY USE: The data obtained from the OSU APEX facility will help understand how the AP1000 reactor will behave in a certain beyond-design-basis accident scenario. This data will be utilized in reviewing a licensee's safety analysis report for the AP1000 reactor.

WORK SCOPE: 1. The OSU will prepare detailed test conditions based on NRC's selected accident scenario.

2. The OSU will conduct a test following a prescribed test condition.

3. The OSU will prepare a test report.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	25	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: New Project

CONTRACTOR: Oregon State University CONTRACT NO: DR-04-03-062

FUNDING PERIOD: Feb,2003 through May,2003

PERIOD OF PERFORMANCE: Feb,2003 through May,2003

PROCUREMENT MILESTONES

Send Startup Package	9/27/2002
Send RFPA to DCPM	10/28/2002
Complete Evaluation	1/27/2003
Award Contract	2/17/2003

JOB CODE : Y6801

TITLE: AR/SA CODE DEVELOPMENT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: To develop the system level severe accident code MELCOR for advanced reactor applications.

REGULATORY USE: The severe accident code MELCOR is routinely used by NRC for licensing review pertaining to modeling of plant accidents and transients for both primary system and containment of operating LWRs. The current work will be used to assist the NRC in addressing risk informed safety of advanced water reactor designs and to provide a technical basis for formulating appropriate regulatory guidelines.

WORK SCOPE: The scope of work includes: (1) identification of phenomenological models that need to be incorporated into MELCOR for advanced reactor calculations; (3) assessment of MELCOR with regard to advanced reactor applications, and (2) minor improvement of existing models for advanced reactor applications.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	100	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: May,2003 through Nov,2003

PERIOD OF PERFORMANCE: May,2003 through Dec,2006

JOB CODE : Y6802

TITLE: MELCOR SA CODE DEVELOP & ASSESSMENT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Behbahani, Ali Phone: (301) 415-6768

OBJECTIVE: To develop, assess, and maintain the system level MELCOR code that will provide the NRC with the capbility to model key accident phenomena in nuclear power plants in adequate detail.

REGULATORY USE: With the capbility to model plant accidents and transients for both primary system and containment for operating LWRs as well as ALWRs, the code will be used to assisst the NRC in addressing risk informed safety and to provide the NRC with technical basis for formuating appropriate regulatory guidelines. Additionally, the code will be used to perform audit calculations for operating plants and will provide necessary inputs to probabilistic risk analysis.

WORK SCOPE: The scope of work under this job code include: (1) development of improved models for primary system and containment thermal-hydraulics and for fission product release and transport; (2) modernization of teh code for ease of use; (3) assessment of the code against experimental data base as well as plant analysis; (4) NRC technical assisstance and code user support; and (5) maintenance and quality assurance of the code.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	628	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: May,2003 through Nov,2003

PERIOD OF PERFORMANCE: May,2003 through Nov,2007

PROCUREMENT MILESTONES

Send SOW to Lab	12/02/2002
Rcv. DOE Proposal (189)	2/17/2003
Issue Form173 to DOE	3/19/2003
Rec. Signed Form 173	4/18/2003

JOB CODE : Y6804

TITLE: ESBWR CONTAINMENT SUPPORT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Notafrancesco, Allen Phone: (301) 415-6499

OBJECTIVE: To perform an assessment of the CONTAIN code against PANDA experimental data which supports the ESBWR design.

REGULATORY USE: CONTAIN will be used to provide independent audit calculations in regards to the review of the ESBWR containment perfromance.

WORK SCOPE: see objective

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	51	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Jul,2003 through Dec,2003

PERIOD OF PERFORMANCE: Jul,2003 through Dec,2003

PROCUREMENT MILESTONES

Send SOW to Lab	3/03/2003
Rcv. DOE Proposal (189)	5/19/2003
Issue Form173 to DOE	6/18/2003
Rec. Signed Form 173	7/18/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6806

TITLE: REVIEW OF GE SCALING REPORT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Staudenmeier, Joe Phone: (301) 415-7002

OBJECTIVE: Review GE Topical Reports on Scaling and Testing for ESBWR

REGULATORY USE: The work will provide input to Technical Evelauation Reports that will provide the technical basis for NRR Safety Evaluation Reports.

WORK SCOPE: Review GE Topical Reports on ESBWR Scaling and Testing and their supporting documents. Generate RAIs on the documents. Provide input for Technical Evaluation Reports.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	181	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: New Project

RFPA NUMBER: RES-02-054

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

FUNDING PERIOD: Interval undefined.

PERIOD OF PERFORMANCE: Interval undefined.

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

Job Code : Y6812 Title : ACR 700 INPUT MODEL DEVELOPMENT

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Rubin, Michael B. Phone: (301) 415-6769

OBJECTIVE: Objectives are 1) develop RELAP5 and TRAC-M input models for ACR-700, 2) experimental facility input model development and 3) using both RELAP5 and TRAC-M, perform sequence analysis.

REGULATORY USE: To develop independent audit capability to evaluate ACR-700 performance.

WORK SCOPE: See "Objective"

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	320	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement).

THIS ACTION: New Project

RFPA NUMBER: RES-02-054

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

PERIOD OF PERFORMANCE: Jun,2003 through Jun,2005

PROCUREMENT MILESTONES

Title	Date
Send Startup Package	10/14/2002
Send RFPA to DCPM	11/13/2002
Issue Comp. Range Rpt.	04/14/2003
Issue Final Eval. Rpt.	05/29/2003
Award Contract	06/19/2003

Task Order # : 10 ACR-700 Input Model Development Oper Amt. = $320

Work Period	Deliverable
Jun, 2003 thru Dec, 2004	TER

THIS ACTION
New Task Order

Procurement Milestones	Dates
Send Startup Package	4/01/2003
Send RFPA to DCPM	4/16/2003
Receive Proposal	5/16/2003
Complete Prop. Eval.	6/02/2003
Award Task Order	6/17/2003

JOB CODE : Y6813

TITLE: ACR 700 PHENOMENOLOGY/SUPPORTING EXPERIMENTS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Bessette, David E. Phone: (301) 415-6763

OBJECTIVE: Develop PIRTs for ACR-700 in 3 areas, Neutronics, thermal-hydraulics and severe accidents.

REGULATORY USE: To support development of NRC codes to audit perfromance of ACR-700 design.

WORK SCOPE: see "Objective"

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	350	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Jul,2003 through Jan,2004

PERIOD OF PERFORMANCE: Jul,2003 through Dec,2004

PROCUREMENT MILESTONES

Send SOW to Lab	3/03/2003
Rcv. DOE Proposal (189)	5/19/2003
Issue Form173 to DOE	6/18/2003
Rec. Signed Form 173	7/18/2003

JOB CODE : Y6830

TITLE: TRAC-M DEVEL ASSESS - ROSA-IV TESTS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Murray, Christopher Phone: 415-6745

OBJECTIVE: Perform assessment of the TRAC-M code to calculate SBLOCA phenomena simulated in the ROSA-IV test facility and to quantify the safety margins between code predictions and experimental data

REGULATORY USE: To validate computer codes used to perform confirmatory analysis of vendor calculations

WORK SCOPE: The contractor shall perform a part of the developmental assessment of the TRAC-M code to calculate SBLOCA phenomena simulated in the ROSA-IV test facility and to quantify the safety margins between code predictions and experimental data

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	123	

PROCUREMENT METHOD: Minority Small Business Contract (8a).

THIS ACTION: New Project

CONTRACTOR: Advanced Systems Technology and Management Inc. CONTRACT NO: NRC-04-03-064

FUNDING PERIOD: Jun,2003 through Dec,2003

PERIOD OF PERFORMANCE: Jun,2003 through Dec,2003

PROCUREMENT MILESTONES

Send Startup Package	2/24/2003
Send RFPA to DCPM	3/11/2003
Complete Evaluation	5/26/2003
Award Contract	6/16/2003

Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6831

TITLE: METHODS DEVELOPMENT FOR ACR-700
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Bessette, David E. Phone: (301) 415-6763

OBJECTIVE: Identify TRAC code modelling that needs to be upgraded to assure the code is adequate to perform ACR-700 calculations.

REGULATORY USE: To support development of independent audit capability to evaluate ACR-700 performance.

WORK SCOPE: see "Objective"

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	100	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Undesignated.

FUNDING PERIOD: Aug,2003 through Feb,2004

PERIOD OF PERFORMANCE: Aug,2003 through Feb,2004

PROCUREMENT MILESTONES

Send SOW to Lab	4/02/2003
Rcv. DOE Proposal (189)	6/16/2003
Issue Form173 to DOE	7/16/2003
Rec. Signed Form 173	8/15/2003

JOB CODE : Y6881

TITLE: SA PHENOMENA EVAL FOR ADV RX
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lee, Richard Phone: (301) 415-6795

OBJECTIVE: To evaluate severe accident phenomena for ESBWR, ACR-700, and other advanced water reactor concepts in support of pre-licensing application review.

REGULATORY USE: Consistent with the Commission guidance for safety review of advanced reactor designs in a risk-informed regulatory framework, the work to be accomplished in this project will be used to provide the NRC with a technical basis for formulating appropriate regulatory guidelines.

WORK SCOPE: The scope of work includes: (1) review of ESBWR design documentation submitted by the licensee for the purpose of identifying the need for information required to perform the severe accident analyses; (2) prepare a MELCOR 1.8.5 (or the latest version) input deck for ESBWR identifying risk significant sequences; (3) perform the baseline analysis and sensitivity studied of accident sequences; (4) perform all the above activities for ACR-700; and (5) provide technical assistance to NRC.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	200	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: New Project

CONTRACTOR: Energy Research, Inc. CONTRACT NO: NRC-04-02-075

FUNDING PERIOD: Interval undefined.

PERIOD OF PERFORMANCE: Interval undefined.

Monday, July 21, 2003

Nuclear Regulatory Commission

Project Approval Status Report For FY 2003

Projects Selected For:

Division: Division of Sys. Anal. & Regul. Effectiveness

Branch: Regulatory Effectiveness Assessment & Human Factors Branch

Job Code	Title	PM Name	Contracto
B7488	HALDEN REACTOR PROJECT	Persensky	HALDEN
K6703	COOP AGREE W/CENTER FOR ADV NUC ENERGY SYS	Kadambi	MIT
Y6022	CREDIT FOR OPERATOR ACTION	Lewis	BNL
Y6406	ASSESS AND IMPROVE REGULATORY EFFECTIVENESS	Feld	ISL INC
Y6522	SYNERGISTIC EFFECTS OF POWER UPGRADES	Lanik	ISL INC
Y6630	DEV REG GUIDE & ANALYTICAL TECHNIQUE FOR ASSESS NPP STAFFING	Persensky	MICRO AN
Y6646	ROLE OF HUMAN PERFORMANCE IN ADV REACTORS	Kramer	BNL
Y6791	VUL. ASSESS.INPUT/GUID.FORCE-ON-FORCE THREAT	Persensky	SNL
Y6792	VUL ASSESS INPUT/GUID FOR INSIDER THREAT	Persensky	DTIC

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : B7488

TITLE: HALDEN REACTOR PROJECT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Persensky, Julius Phone: (301) 415-6759

OBJECTIVE: To participate in the OECD Halden Reactor Project during 2000-2002 The Halden Reactor Project is a cooperative agreement among a number of countries belonging to the Organization for Economic Cooperation and Development. The Objective of the project is to provide technical basis in the form of research reports for issues related to human performance, digital I&C, fuel behavior and materials. These reports will then serve as a portion of the basis for new regulatory tools.

REGULATORY USE: The benefits derived from past and continued participation in the Halden Reactor Project are: (1) the research products can provide part of the technical bases for the development of rules, regulatory guides, and revisions of the Standard Review Plan, as well as for licensing reviews, in the areas of man-machine interfaces, advanced control room design reviews, and advanced instrumentation and controls, (2) the Project provides vital information on new technology in the areas of software, displays, and digital systems, and (3) the Project provides a forum for international cooperation and information exchange in support of NRC projects.

WORK SCOPE: The research program conducted at Halden consists of studies on fuel performance and computer-based man-machine interfaces. The NRC's primary interest is in the computer-based man-machine interface research conducted at Halden. There are five main areas of research consisting of: 1) verification and validation of software, 2) man-machine interaction research, 3) surveillance and support systems, 4) advanced control rooms, and 5) fuels and materials (W6673).

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	13,152	300	

PROCUREMENT METHOD: Fund an International Agreement.

THIS ACTION:

AGENCY: Halden Institutt for Energiteknikk IA NO: RES-88-202

FUNDING PERIOD: Jan,2002 through Dec,2002

PERIOD OF PERFORMANCE: Oct,1987 through Dec,2005

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : K6703

TITLE: COOP AGREE W/CENTER FOR ADV NUC ENERGY SYS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Kadambi, N.P. Phone: (301) 415-5896

OBJECTIVE: To improve NRC's access to state-of-the-art knowledge and information on advanced reactors.

REGULATORY USE: Enable more effective and efficient decision-making on all regulatory aspects of advanced reactors.

WORK SCOPE: The areas of reserach interest include (1) Fuel performance, piping issues, fuel design issues in LWRs; (2) Fuel performance modelling and testing, accident analysis, thermal-hydraulic analysis, material properties research, pebble flow modelling, advanced I&C, and core neutronics of gas cooled reactors; and (3) generic topics such as licensing strategies and risk management strategies for all reactor types.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	250	330	

PROCUREMENT METHOD: Cooperative Agreement (Grant).

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-02-079

GRANTEE: Massachusetts Institute of Technology GRANT NO: NRC-04-02-079

FUNDING PERIOD: Jan,2003 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2002 through Aug,2005

PROCUREMENT MILESTONES

Send RFFA to DCPM	12/02/2002
Rccv. Oblg. Doc DCPM	1/16/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6022

TITLE: CREDIT FOR OPERATOR ACTION
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lewis, Paul Phone: (301) 415-6767

OBJECTIVE: The objective is to develop review guidance and acceptance criteria for NRC review of licensee proposals to take credit for operator actions, especially in applications for changes to the licensee's licensing basis. The review guidance and acceptance criteria shall consist of a set (a "tool kit") of multiple review guidelines and criteria for multiple review areas. The tool kit should include both qualitative and quantitative review guidance. The review guidance should include both conventional and risk-informed guidance.

REGULATORY USE: The review guidance will be used by NRC/NRR reviewers of licensee proposals to take credit for operator actions.

WORK SCOPE: The review guidance will include both conventional and risk-informed review guidance. The effort should focus primarily on review guidance for operating plants, but also include review guidance for future plants.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	571	100	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION:

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Apr,1999 through Mar,2004

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

Job Code : Y6406 Title : ASSESS AND IMPROVE REGULATORY EFFECTIVENESS

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Feld, Sidney E. Phone: (301) 415-6193

OBJECTIVE: The objective is to provide technical assistance to support DSARE in the performance of its program to assess and improve regulatory effectiveness

REGULATORY USE: Regulatory use is threefold:
1.to perform regulatory effectiveness reviews to assess whether recent regulatory changes have accomplished their intended objectives;
2. to support the development and implementation of high-level performance-based guidelines in order to promote reliance on performance-based approaches to regulatory activities; and
3. develop a technical basis and identify opportunities to reduce unnecessary regulatory burden

WORK SCOPE: This contract supports all facets of RES' program to assess and improve regulatory effectiveness. This entails regulatory effectiveness reviews, increasing reliance on performance-based regulatory approaches, and reducing unnecessary regulatory burden

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	426	79	

PROCUREMENT METHOD: Fully Competitive Commercial Contract (Task Ordering Agreement)

RFPA NUMBER: RES-01-067

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-01-067

PERIOD OF PERFORMANCE: Aug,2001 through Dec,2003

Task Order # : 1 Regulatory Effectiveness of USI-A45-Decay Heat Removal Oper Amt. = $0

Work Period	Deliverable
Aug, 2001 thru Jul, 2003	report on regulatory effectiveness of USI A-45

THIS ACTION
New Task Order

Procurement Milestones	Dates
N/A	N/A

Task Order # : 2 support devlpmt of NUREG/BR on Performance-Based Approaches Oper Amt. = $0

Work Period	Deliverable
Feb, 2002 thru Dec, 2002	input to NUREG/BR on Performance-Based Approaches

Future T.O.

Procurement Milestones	Dates
N/A	N/A

Task Order # : 3 Cost Analysis in Support of GSI-189 Oper Amt. = $0

Work Period	Deliverable
Mar, 2002 thru Jun, 2003 Future T.O.	results of applying high-level performance.-based guidelines to NRR list of burden relaxation rule changes

Procurement Milestones	Dates
N/A	N/A

Task Order # : 4 Resolution of Comments Regarding Event Probabilities Oper Amt. = $0

Work Period	Deliverable
Apr, 2002 thru Oct, 2002	tbd
THIS ACTION New Task Order	

Procurement Milestones	Dates
N/A	N/A

Task Order # : 5 Access and Improve Regulatory Effectiveness Oper Amt. = $0

Work Period	Deliverable
Jun, 2002 thru Apr, 2003	tbd
THIS ACTION New Task Order	

Procurement Milestones	Dates
N/A	N/A

Task Order # : 6 Independent Review of ASME PRA Standard Oper Amt. = $0

Work Period	Deliverable
Jul, 2002 thru Jun, 2003	tbd
THIS ACTION New Task Order	

Procurement Milestones	Dates
N/A	N/A

Task Order # : 7 tbd

Oper Amt. = $200

Work Period	Deliverable
Feb, 2003 thru Dec, 2003 Future T.O.	to be determined

Procurement Milestones	Dates
Send Startup Package	12/02/2002
Send RFPA to DCPM	12/17/2002
Receive Proposal	1/16/2003
Complete Prop. Eval.	1/31/2003
Award Task Order	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

Job Code : Y6522

Job Code : Y6522 Title : SYNERGISTIC EFFECTS OF POWER UPGRADES

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Lanik, George F. Phone: (301) 415-7490

OBJECTIVE: Evaluate the impact of synergistic effects on plant risk due to large power uprates, in conjunction with other plant changes such as hight fuel burnup, longer operating cycles, and plant aging.

REGULATORY USE: Determine if synergistic effects are risk significant enough to require modifications to regulations or regulatory guides.

WORK SCOPE: Initial focus on risk analysis of events such as ATWS to determine if synergistic effects have an impact.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	488	500	

PROCUREMENT METHOD: Sole Source Commercial Contract (Task Ordering Agreement)

RFPA NUMBER: RES-02-054

CONTRACTOR: Information Systems Laboratories, Inc. CONTRACT NO: NRC-04-02-054

PERIOD OF PERFORMANCE: Mar,2002 through Dec,2005

Task Order # : 3 BWR Synergy Oper Amt. = $450

Work Period	Deliverable
Mar, 2002 thru Sep, 2003	Technical report documenting results of the working group activities.

THIS ACTION
New Task Order

Procurement Milestones	Dates
Send RFPA to DCPM	1/29/2003
Rcv. Oblg. Doc DCPM	3/17/2003

JOB CODE : Y6630

TITLE: DEV REG GUIDE & ANALYTICAL TECHNIQUE FOR ASSESS NPP STAFFING

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Persensky, Julius Phone: (301) 415-6759

OBJECTIVE: The primary objective of this research is to develop guidance and an analytical technique for the review of staffing plans for nuclear reactors. Within this objective are several sub-objectives that need to be accomplished:
A. Identify and prioritize the human factors issues associated with nuclear power plant staffing that can be used for the development of review guidance;
B. Identify appropriate procedures, data requirements, and analytical techniques for assessing nuclear power plant staffing proposals for new plant designs, and;
C. Prepare design review guidance and an analytical technique for assessing staffing plans and issues that could adversely affect safe operations at a nuclear power plant.

REGULATORY USE: The resulting guidance and modeling tool will be used to review waivers from 10CFR50. 54(m) for current and advanced reactors

WORK SCOPE: 1. Conduct background research on techniques for performing staffing ananlyses
2. Identify Appropriate Procedures, Data Requirements, and Analytical Techniques for Assessing Nuclear Power Plant Staffing Proposals for New Plant Designs
3. Conduct Peer Review and Guidance Revision
4. Support development of final guidance for review of Staffing Plans
5. Develop and deliver training on the use of the guidance and modeling tool

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	170	137	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION:

RFPA NUMBER: RES-02-069

CONTRACTOR: Micro Analysis & Design, Inc. CONTRACT NO: RES-02-069

FUNDING PERIOD: Oct,2002 through Oct,2003

PERIOD OF PERFORMANCE: Jul,2002 through Mar,2004

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6646

TITLE: ROLE OF HUMAN PERFORMANCE IN ADV REACTORS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Kramer, Joel Phone: (301) 415-5891

OBJECTIVE: The objective of this project is to provide insights on the role of human performance in advanced reactor performance from a safety perspective, and to identify human performance issues associated with operation and maintenance that require research, what research facilities are needed, and what regulatory review guidance will be needed to address these issues.

REGULATORY USE: Assist NRC in developing regulatory guidance of human performance in advanced reactor designs.

WORK SCOPE: BNL will develop an insights report on the role of human performance in advanced reactors by conducting the following tasks:
Examine Concept of Operations and the Role of Automation
Review Existing Requirements
Review Existing Human Performance Research Facilities
Prepare and Submit Insights Reports

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	150	149	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION:

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Sep,2002 through Nov,2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Job Code : Y6791

Advance Procurement Plan for FY 2003

Job Code : Y6791 Title : VUL. ASSESS.INPUT/GUID.FORCE-ON-FORCE THREAT

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Persensky, Julius Phone: (301) 415-6759

OBJECTIVE: Develop information on the characterization of human performance in force-on-force modeling for use in land based attacks at nuclear facilities to be incorporated into vulnerability assessments and for the selection of development of a modeling tool and guidance for the review of licensee programs.

REGULATORY USE: Improve guidance for evaluation of land based attacks.
Provide input to vulnerability assessments

WORK SCOPE: 1. Identify and assess various techniques for characterizing human performance in force-on-force modeling tools to determine the most appropriate for use in the nuclear arena for vulnerability assessment and for use in monitoring industry implementation of best practices.
2. Assess existing Force-on-Force Models
3. Conduct Industry Practices Survey
4. Select/Develop a force-on-force model that best captures human performance for NRC Use
5. Provide Support to NRC Staff and Other Contractors for Inclusion of Human Performance Information into Vulnerability Assessments.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	100	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement (Task Ordering Agreement).

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

PERIOD OF PERFORMANCE: Aug,2003 through Nov,2003

PROCUREMENT MILESTONES

Title	Date
Issue Form 173 to DOE	07/16/2003
Receive Signed Form 173	08/15/2003

Task Orders Not Defined for This Project

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6792

TITLE: VUL ASSESS INPUT/GUID FOR INSIDER THREAT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Persensky, Julius Phone: (301) 415-6759

OBJECTIVE: Develop information on techniques for identifying indicators which would reduce the potential inclusion of a person who would be considered an insider threat (access authorization) and techniques for identifying indicators which would encourage a person to become an insider (behavioral observation) at licensee facilities. These indicators would be used for possible development of guidance for the review of licensee programs to assess insider threat, including access authorization and behavioral observation.

REGULATORY USE: Impoved guidance for access authorization and behavioral observation programs aimed at reducing both active and passive insider threat

WORK SCOPE: 1. Assess State-of-the-Art for assessing Insider Threat
2. Review industry practices
3. Identify gaps in guidance
4. Perform proof of concept test

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	100	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: New Project

AGENCY: Defense Technical Information Center IAA NO: N/A

FUNDING PERIOD: Aug,2003 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2003 through Dec,2004

PROCUREMENT MILESTONES

Send Startup Package	4/17/2003
Complete Draft IA	5/19/2003
Send IA Letter to Agency	6/03/2003
Receive ltr fm Agency	7/03/2003
Send Oblig Memo to OCFO	8/18/2003

Monday, July 21, 2003

Nuclear Regulatory Commission

Project Approval Status Report For FY 2003

Projects Selected For:

Division: Division of Sys. Anal. & Regul. Effectiveness

Branch: Radiation Protection Environmental Risk & Waste Management Branch

Job Code	Title	PM Name	Contracto
G6071	BEIR-VII	Jones	NAS
G6251	RADIATION PROTECTION STANDARDS DEVELOPMENT	Jones	ICRP
G6589	NCRP STUDY ON RADIATION PROTECTION ISSUES	Burrows	NCRP
G6610	SUPT FOR US NATIONAL COMMITTEE	Philip	NAS
W6409	RADIONUCLIDE SOLUBILITIES	Reed	PNL
Y6020	INTEGRATED GROUND-WATER MONITORING STRATEGY	Nicholson	AES
Y6133	COLLECTION AND ANALYSIS OF OCCUP RAD EXPOSURE DATA	Burrows	SAIC
Y6298	TECHNICAL BASES INFORMATION FOR CLEARANCE	Feldman	COHEN S
Y6329	ANALYSIS OF RESULTS OF SEWER SURVEY	Jones	EHA
Y6330	SUPPORT FOR IA COOPERATIVE RESEARCH	Cady	ANL
Y6331	LONG TERM CONTAIN STABILIZATION CONCRETE STRUCTURES	Philip	NIST
Y6363	FIELD STUDIES CONFIRM UNCERT ESTS GROUNDWATER RECHARGE	Nicholson	ARS/USDA
Y6407	NUREG-1640 FINALIZATION -- CLEARANCE	Meck	COHEN S
Y6417	MARSSIM MAINTENANCE	Meck	COHEN S
Y6433	EXTREMITY CODE	Karagiannis	COLO ST
Y6448	GROUND-WATER MODELING TECH SUPPORT	Cady	CE/WES
Y6460	UPDATE CODES FOR ASSESSING RAD DOSES	Karagiannis	ORNL
Y6462	DEV DATABASES TO SUPPORT SORPTION MODELING	Randall	USGS
Y6463	ASSESS PERFORMANCE OF NON-CONCRETE BARRIERS	Philip	CE/WES
Y6464	RADIONUCLIDE SORPTION IN SOILS	O'Donnell	SNL
Y6465	HYDRO CONCEPT, PARAM & SCENARIO UNCERT ASSESS	Nicholson	PNL
Y6467	DEVELOPMENT OF PROBABILISTIC RESRAD-OFFSITE	Mo	ANL
Y6469	EVAL RADIONUCLIDE PATHWAYS AND UPTAKE	Reed	PNL
Y6470	FRAMES SOFTWARE DEVELOPMENT	Cady	PNL
Y6628	UNCERTAINTY ASSESSMENT FOR CONSEQUENCE MODELS	Mitchell	SNL
Y6643	RISK MGMT ANALYSIS FOR DECOMM SITES	Cady	NCRP
Y6644	BAYESIAN SUBSURFACE RADIOLOG SURVEY & ANAL	Powers	U TENN
Y6657	RETARD OF RADIONUCLIDES IN THE ENVIRONMENT	Reed	PNL
Y6692	VALID OF SUBSURFACE BAYESIAN STAT SURVEY ANAL	Powers	EML
Y6698	SUPT NEA INFO SYS ON OCCUPATIONAL EXPOSURES	Karagiannis	NEA/ISOE
Y6724	MODEL ABSTRACTION TECHNIQUES FOR SOIL WATER FLOW & TRANSPORT	Nicholson	ARS/USDA
Y6785	PLUME MODEL ADEQUACY EVALUATION	Mitchell	LLNL
Y6786	MACCS CODE MODIFICATION/VULNERABILITY STUDIES	Mitchell	SNL
Y6787	RADIOLOGICAL DISPERSION DEVICES	Mitchell	SNL
Y6834	NDE & EVAL OF SENSORS FOR ENTOMBED STRUCTURES	Philip	BAA

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : G6071

TITLE: BEIR-VII

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Jones, Andrea R. Phone: (301) 415-6231

OBJECTIVE: Conduct a comprehensive reassessment of the health risks resulting from exposures to ionizing radiation using data and information available since the 1990 Biological Effects of Ionizing Radiation (BEIR V) report. The NAS committee will consider data derived from molecular, cellular, animal and human epidemiologic studies, and soon-to-be completed studies, concerning the risks to humans of exposure to low levels of ionizing radiation.

REGULATORY USE: Health effects risk assessment. Results of the BEIR VII will be evaluated by NRC staff for implications on radiation protection standards, Federal Guidance, risk harmonization, and other regulatory impacts.

WORK SCOPE: Establish a committee of approximately 15 persons to perform phase-2 of the BEIR VII study. The committee will conduct a comprehensive review of all the relevant epidemiologic data related to risk from exposure to low doses, low LET radiation; define and establish principles on which quantitative analyses can be based, assess the current status and relevance to risk models of biologic data and models of carcinogenesis; develop risk models for all cancer sites; provide examples of specific risk calculations based on the models and explain the appropriate use of the risk models; describe and define limitations and uncertainties of the risk models and their results; and identify critical gaps in knowledge that should be filled by future research.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	300	100	

PROCUREMENT METHOD: Non-Educational Grant.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-98-061

GRANTEE: National Academy of Sciences GRANT NO: NRC-04-98-061

FUNDING PERIOD: Dec,2002 through Oct,2003

PERIOD OF PERFORMANCE: Sep,1998 through Oct,2003

PROCUREMENT MILESTONES

Send RFFA to DCPM	1/01/2003
Rccv. Oblg. Doc DCPM	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : G6251

TITLE: RADIATION PROTECTION STANDARDS DEVELOPMENT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Jones, Andrea R. Phone: (301) 415-6231

OBJECTIVE: Objective: To have the ICRP, the preeminent international authority on radiation protection, prepare general recommendations on radiation protection against ionoizing radiation in different fields. The basis of ICRP recomnmendations is how best to protect mankind from sources of ionizing radiation, recognozing that an appropriate standaard of protection should be balanced against unduly limiting the beneficial practices giving rise to radiaiton exposure.

NRC financial assistance helps toward travel costs for American members of the ICRP. Committees and task groups meet on their own at least once yearly to discuss and prepare their reports.

REGULATORY USE: Regulatory use: The work of the ICRP has contributed effectively to the international harmonization of radiation protection standards. The radiation protection standards recommended by ICRP bear directly on ther regulatory program of the NRC, forming the basis for most NRC radiation protection guidelines and regulations (e.g. 10 CFR Part 20, "Standards for Protection Against Radiation.")

WORK SCOPE: Work Scope: Much of the work of the ICRP in the next few years will be a consequence of the new basic recommendations on radiological protection published in ICRP-60 (1990). ICRP task groups will provide information on radiation-associated risks of cancer and severe heredity effects; on the application basic recommendations in terms of secondary limits; and on the principles of optimation and management of radiological protection. The ICRP is considering the revision of ICRP-60 and contemplating the publication of a new set of recommendations by 2005. The intent of the new recommendations is to simplify the current system of radiological protection.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	50	25	

PROCUREMENT METHOD: Non-Educational Grant.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-01-047

GRANTEE: International Council for Radiation Protection GRANT NO: NRC-04-01-047

FUNDING PERIOD: Apr,2003 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2001 through Apr,2004

PROCUREMENT MILESTONES

Send RFFA to DCPM	3/03/2003
Rccv. Oblg. Doc DCPM	4/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : G6589

TITLE: NCRP STUDY ON RADIATION PROTECTION ISSUES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Burrows, Sheryl A. Phone: (301) 415-6086

OBJECTIVE: To support the NCRP in developing recommendations regarding radiation protection. This grant represents NRC's shared cost in this standards setting group.

REGULATORY USE: NRC uses the Council's recommendations to develop regulations and guidance documents. These reports provide the technical basis for decision-making in this area.

WORK SCOPE: NCRP is chartered by Congress to develop and disseminate information and recommendations on radiation protection to the public.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	50	60	

PROCUREMENT METHOD: Non-Educational Grant.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-02-050

GRANTEE: National Council on Radiation Protection GRANT NO: NRC-04-02-050

FUNDING PERIOD: Feb,2003 through Nov,2003

PERIOD OF PERFORMANCE: Feb,2002 through Sep,2004

PROCUREMENT MILESTONES

Send RFFA to DCPM	1/01/2003
Rccv. Oblg. Doc DCPM	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : G6610

TITLE: SUPT FOR US NATIONAL COMMITTEE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Philip, Jacob Phone: (301) 415-6211

OBJECTIVE: Participation in the activities of the NAS under the Committee on Geological and Geotechnical Engineering gives the NRC staff (i) Access to the interactions with the activities of other boards at NAS in areas of NRC activities related to HLW, LLW, management of uranium tailings and decommissioned sites (ii) Informal peer reviews of NRC activities related to waste management and decommissioning and (iii) Expert opinion on emerging technologies to solve problems related to waste disposal and decommissioning.

REGULATORY USE: NRC's participation in the Board's activities will help the staff to better understand the role of hydrology, the performance of engineered barriers and flow and transport phenomena to achieve more credible performance assessments of waste management and decommissioned facilities.

WORK SCOPE: The Board has undertaken a major study of the performance of engineered barriers in performance assessments of waste disposal and decommissioned sites.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	25	25	

PROCUREMENT METHOD: Non-Educational Grant.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-02-064

GRANTEE: National Academy of Sciences GRANT NO: NRC-04-02-064

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Feb,2002 through Jan,2004

PROCUREMENT MILESTONES

Send RFFA to DCPM	1/01/2003
Rccv. Oblg. Doc DCPM	2/17/2003

JOB CODE : W6409

TITLE: RADIONUCLIDE SOLUBILITIES

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Reed, Phillip R. Phone: (301) 415-7845

OBJECTIVE: To study radionuclide solubilites and the chemical and physical factors that effect the solubility of radionucides generically for applicability to SDMP decommissioning sites and waste disposal facilitiy performance assessments. To apply radionuclide solubilty data in a risk-informed performance based regulatory environment. To characterize SDMP site and waste disposal facility samples for radionuclilde and chemical content. To determine the solubilities, release rates and colloids of radionuclides from SDMPsites (e. g., slags, soils) and waste disposal facility samples under varying chemical conditions. To determine radionuclide parent/daughter relationships in field samples. To assess solubility conceptual models, parameters, uncertainty analysis and data sources for performance assessment dose calculations. To determine probabilistic distributions from radionuclide solubility data for use in performance assessment codes.

REGULATORY USE: To provide generic data and information on radionuclide solubilities to model radionuclide source term releases from SDMP sites and waste disposal facilities. To provide solubility data for SDMP and LLW performance assessment soure term codes. To provide an underestanding and improve knowledge on radionuclide solubilities under varying chemical and physical environments. To support the development of regulatory criteria (e.g., BTPs) , to provide data base of radionuclide solubilities to quantify uncertainties in technical basis for licensing, and provide independent basis for evaluating applicants or licensees data, information and performance assessment analyses. To provide radionuclide releases for use in performance assessment computer codes and for determining guidance on release rates.

WORK SCOPE:
1. Complete research program on SDMP soil sites, (e.g., Safety Light).
2. Collect SDMP samples samples from SDMP Sites (e.g., soils).
3. Characterize water, soil and vegetation samples for radionuclide and chemical content.
4. Determine radionuclide solubilities present in SPDM samples as a function of pH, ionic strength, and carbonate/bicarbonate concentration).
5. Determine radionuclide release rates.
6. Determine presence of radiocolloids in leachates .
7. Determine probability distributions of radionuclide solubilities
8. Calculate chemical species of radionuclides in soils and ground and surface waters at sites.
9. Provide solubility conceptal models, probability distribution functions, uncertainty analysis and data sources
10. Complete literature review on radionucide solubilities and chemical issues affecting solubility.
11. Prepare NUREG/CR report on uranium, thorium and other radionucide solubility and leaching from SDMP soil sites .
12. Prepare final NUREG/CR report on generic radionuclide solubility data and information for waste disposal facility and decommissioning performance assessments.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	1,279	75	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Jun,2003

PERIOD OF PERFORMANCE: Sep,1995 through Jun,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/06/2002
Rec. Sign Form 173	1/15/2003

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6020

TITLE: INTEGRATED GROUND-WATER MONITORING STRATEGY
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Nicholson, Thomas J. Phone: (301) 415-6268

OBJECTIVE: Develop an integrated and systematic ground-water monitoring strategy to confirm nuclear waste and decommissioning site performance. Strategy will provide information on: monitoring ground-water flow and transport through the unsaturated zone to the underlying water-table aquifer; identifying and monitoring critical performance indicators of the hydrologic system; and connecting site characterization and performance assessment to performance confirmation monitoring. Test the strategy over a range of hydrogeologic systems and performance measures indicative of nuclear facilities and decommissioning sites. Develop technical bases as citable references, identified guidance and analytical tools, and test case applications of the integrated monitoring strategy.

REGULATORY USE: Confirmation of performance assessment models can be achieved through monitoring of risk-significant features, events and processes simulated in performance codes. Infiltration and ground-water flux have been identified as important processes that affect site performance and are need to characterize the ground-water pathway for a variety of NRC-licensend facilities involving potential contaminant migration scenarios. Monitoring strategies which confirm these processes help to confirm the PA models. Also, site remediation options identified by EPA include monitored natural attenuation. EPA monitoring guidance and technical support has focused on the deeper saturated zone, and does not directly address "real-time" monitoring of infiltration and ground-water recharge at the capillary fringe and local water table. Conventional dose assessment and contaminant transport models used to evaluate performance of decommissioning and nuclear waste sites assume complete and instantaneous mixing and dilution of contaminants at the capillary fringe and shallow transient water-table unit. The appropriateness of this assumption; the use of simplified steady-state parameter estimates of these processes in dose models (e.g., RESRAD and DandD) used to evaluate site performance, and the degree of uncertainties introduced by them need to be evaluated. Similarly, monitoring is needed to confirm engineered containment system peformance. The project will provide technical bases for developing a comprehensive and integrated monitoring strategy for the natural setting and engineered containment systems in both the unsaturated and saturated zones, and to evaluate performance confirmation model outcomes using monitoring systems. The integrated strategy will assist in establishing monitoring protocols for decommissioning facilities where contaminant plumes exist; proposed waste disposal facilities; and decomissioning facilities that may be entombed.

WORK SCOPE: The investigators will review existing ground-water monitoring strategies including monitoring programs and studies by DOE, EPA, USGS, U.S. Army Corps of Engineers and NRC (e.g., methodology in NUREG/CR-5698); develop an integrated and systematic monitoring strategy; develop a test plan with identified datasets; test the strategy by application to monitoring datasets; document the strategy and its application; and conduct technology transfer via seminars and workshops to the NRC staff. Limited field studies may be authorized if datasets are not adequate for testing the strategy. Monitoring data will be analyzed and used to evaluate the practicality and robustness of the strategy to confirm facility performance and assumptions in performance assessment models. The project will document the detailed steps and guidance in the strategy including its technical bases. The strategy will have external peer review prior to publication.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	300	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: New Project Follow-on to Project W6151

RFPA NUMBER: RES-03-061

CONTRACTOR: Advanced Environmental Solutions CONTRACT NO: NRC-04-03-061

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Feb,2003 through May,2006

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6133

TITLE: COLLECTION AND ANALYSIS OF OCCUP RAD EXPOSURE DATA
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Burrows, Sheryl A. Phone: (301) 415-6086

OBJECTIVE: 10 CFR Part 20 requires licensees to submit reports of individual exposure annually. In addition, licensees must submit statistical summaries of occupational exposure data by work and job function annually. This project computerizes these data, performs a statistical analysis of the data and provides the analysis to the project manager for presentation in annual volumes of NUREG-0713. In addition, the Radiation Exposure and Information System (REIRS) database provides data for radiation exposure history requests by individuals or licensees submitted through the REIRS project manager, through the REIRS web site, or through FOIA requests.

REGULATORY USE: The analysis of the REIRS data shows industry trends which provide the basis for evaluating a licensee's ALARA performance, determines if individuals who were employed by more than one licensee do not exceed Part 20 dose limits, and provides the basis for epidemiological analysis of exposure to radiation at occupational levels.

WORK SCOPE: This contract computerizes the reported data, determines which data is outstanding, performs QA on the computerized data and performs analysis of the data.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	800	250	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-99-050

CONTRACTOR: Science Applications International Corporation CONTRACT NO: NRC-04-99-050

FUNDING PERIOD: Feb,2003 through Nov,2003

PERIOD OF PERFORMANCE: Sep,1999 through Sep,2003

PROCUREMENT MILESTONES

Send RFPA to DCPM	10/01/2002
Rcv Oblg. Doc DCPM	10/16/2002

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6298

TITLE: TECHNICAL BASES INFORMATION FOR CLEARANCE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Feldman, Carl Phone: (301) 415-6194

OBJECTIVE: Provide technical basis information on inventory and doses associated with clearance of materials and equipment.

REGULATORY USE: The Commission has requested the information to be delivered to aid their decision on whether to conduct a rulemaking on clearance of materials and equipment.

WORK SCOPE: The scope of the deliverables includes: the inventory of materials and equipment that could potentially be cleared by NRC and Agreement State licensees and from other generators, and the collective doses that could result from the potential clearance activities.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	957	311	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: Modify Scope

RFPA NUMBER: RES-01-049

CONTRACTOR: S. Cohen & Associates CONTRACT NO: NRC-04-01-049

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Dec,2000 through Sep,2003

PROCUREMENT MILESTONES

Send Startup Package	12/02/2002
Send RFPA to DCPM	12/17/2002
Receive Proposal	1/16/2003
Complete Prop. Eval.	1/31/2003
Issue Modification	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6329

TITLE: ANALYSIS OF RESULTS OF SEWER SURVEY
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Jones, Andrea R. Phone: (301) 415-6231

OBJECTIVE: The contractor shall provide technical support to the NRC by developing and maintaining a database of the questionnaire and survey results and assisting in the analysis of the survey results.

REGULATORY USE: GAO recommended that NRC determine the extent to which radioactive contamination of sewage sludge and ash is occurring and establish acceptable limits for radioactivity in sewage sludge and ash in order to ensure the health and safety of treatment workers and the public.

WORK SCOPE: Design and develop a database. Participate in the Sewage Sludge Subcommittee meetings by teleconference. Summarize and analyze the survey results as a function of parameters determined by the NRC. Display POTWs and/or survey results on a GIS map.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	160	25	

PROCUREMENT METHOD: Sole Source Commercial Contract.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-01-051

CONTRACTOR: Environmental Health Associates, Inc. CONTRACT NO: NRC-04-01-051

FUNDING PERIOD: Feb,2003 through Mar,2003

PERIOD OF PERFORMANCE: Mar,2001 through May,2003

PROCUREMENT MILESTONES

Send RFPA to DCPM	1/16/2003
Rcv Oblg. Doc DCPM	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6330

TITLE: SUPPORT FOR IA COOPERATIVE RESEARCH
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Cady, Ralph E. Phone: (301) 415-6249

OBJECTIVE: The U.S. Departments of Defense (DOD) and Energy (DOE), the Environmental Protection Agency (EPA), the Nuclear Regulatory Commission (NRC), and other federal and state agencies share responsibility for protecting human health and the environment from adverse impacts resulting from the production, use, and disposal of radioactive materials. In carrying out their radiation protection work, regulators and those whom they regulate frequently must make sophisticated and complex site and risk assessments. There are considerable differences among the various tools that they traditionally have employed for these purposes, however, and this has often led to inconsistent results. Such discrepancies may cause confusion and disagreements among the regulatory agencies, or between the agencies and the regulated community. This work is to provide support for an interagency effort to harmonize transport and exposure modeling within the federal government.

REGULATORY USE: The product of this work would greatly enhance consistency and coordination of radionuclide-transport and exposure modeling among regulators, users, and others, both in the preparation of relevant regulations and in the demonstration of compliance with remediation or other regulations. That, in turn, would lead not only to legally far more defensible application of models, but also to more efficient use of the diminishing available resources.

WORK SCOPE: The cooperative program is currently poorly defined at present, but we anticipate that the scope will involve selecting and perhaps modifying computer code and methodologies to be consistent with the needs of the cooperating federal agencies.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	25	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Apr,2003 through Sep,2003

PERIOD OF PERFORMANCE: Apr,2003 through Sep,2003

PROCUREMENT MILESTONES

Send Startup Package	11/15/2002
Complete Draft IA	12/16/2002
Send IA Letter to Agency	12/31/2002
Receive ltr fm Agency	1/30/2003
Send Oblig Memo to OCFO	3/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6331

TITLE: LONG TERM CONTAIN STABILIZATION CONCRETE STRUCTURES

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Philip, Jacob Phone: (301) 415-6211

OBJECTIVE: The objectives are three fold:

1) Evaluate strategiesfor assessing the condition of an entombed structure prio to entombment. the purpose of this activity is to focus on the evaluation of methodologies to assess and quantify the degradation of the structure's components and obtain the necessary inputs to concrete performance codes in the PA of the facility.

2) Conduct research on promising non-destructive technologies identified under item 1) with focus on techniques that can characterize the orientation, extent, widt and spacing of cracks and other imperfections in concrete that may provide rapid pathways for radionuclide transport.

3) Assess strategies for surveillance and monitoring of entombed structures with focus on obtaining data to confirm the performance modeling of these structures.

REGULATORY USE: The results from this research will provide information for use in the evaluation of the effectiveness of concrete engineered barriers in the performance assessments for nuclear waste facilities and entombed structures.

WORK SCOPE: 1) Obtaining parameters necessary as inputs for PA of entombed structures, evaluating strategies to assess penetrations in the concrete structure and inaccessible areas of the structure, reviewing existing ACI documents and identifying promising technologies for non-destructive structure (NDT) evaluations.

2) Conducting detailed evaluations of promising NDT methods identified above.

3) Evaluation of techniques and methodologies for conducting surveillance and monitoring of entombed facilities. The focus of this activity is to obtain data to confirm the performance modeling of the entombed structure.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	140	100	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: Follow-on to Project W6812 Incrementally Fund

AGENCY: National Institute of Science and Technology IAA NO: RES-02-001

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jan,2002 through Apr,2005

PROCUREMENT MILESTONES

Send Startup Package	1/01/2003
Send IA Letter to Agency	1/16/2003
Send Oblig Memo to OCFO	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6363

TITLE: FIELD STUDIES CONFIRM UNCERT ESTS GROUNDWATER RECHARGE

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Nicholson, Thomas J. Phone: (301) 415-6268

OBJECTIVE: Confirm "real-time" monitoring data needs, field instrumentation and analytical methods (e.g., PNNL Water Budget Model) used to estimate uncertainties associated with infiltration and ground-water recharge calculations using field monitoring data from both small (e.g., lysimeter) to large (e.g., watershed) scales representative of datasets relevant to decommissioning and waste disposal facilities.

REGULATORY USE: Research will develop and evaluate the technical bases for reviewing estimates of "real-time" net infiltration and ground-water recharge rates at decommissioning and nuclear waste sites and facilities. The ARS "real-time" field datasets can be used to evaluate analytical methods (e.g., PNNL's Water Balance Model) used by the NMSS licensing and/or Agreement State staff in their review of decommissioning and nuclear waste site and faciltiy performance.

WORK SCOPE: ARS researchers, working cooperatively with RES staff under this Interagency Agreement, will (1) calculate ground-water recharge estimates using "real-time" piezometer and multi-sensor capacitance probe data; (2) confirm temporal and spatial data needs and methods for estimating ground-water recharge; (3) calculate infiltration and ground-water recharge estimates using watershed-scale data; (4) document uncertainty estimation procedures and results; and (5) provide technology transfer to the NRC staff at NRC Headquarters and stakeholders at NRC-convened seminars and at professional society meetings.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	30	25	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: Incrementally Fund

AGENCY: Agricultural Research Service IAA NO: RES-00-006

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2000 through Mar,2004

PROCUREMENT MILESTONES

Send Startup Package	1/01/2003
Send IA Letter to Agency	1/16/2003
Send Oblig Memo to OCFO	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6407

TITLE: NUREG-1640 FINALIZATION -- CLEARANCE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Meck, Robert A. Phone: (301) 415-6205

OBJECTIVE: Resolve comments on draft NUREG-1640 and publish as final.

REGULATORY USE: Technical basis for rulemaking. Analytical approach for case-by-case license ammendments.

WORK SCOPE: Normalized factors for converting dose to concentrations on steel, aluminum, copper, and concrete.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	584	327	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION:

RFPA NUMBER: RES-01-065

CONTRACTOR: S. Cohen & Associates CONTRACT NO: NRC-04-01-065

FUNDING PERIOD: Interval undefined.

PERIOD OF PERFORMANCE: Jul,2002 through Jul,2003

JOB CODE : Y6417

TITLE: MARSSIM MAINTENANCE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Meck, Robert A. Phone: (301) 415-6205

OBJECTIVE: Contractor assistance and support is required to research and develop various field measurement processes applicable to implementation of MARSSIM, including the sampling and measurement strategies for demonstrating regulatory compliance with criteria pertaining to subsurface radioactivity, clearance of materials and equipment, the use of surrogate nuclides in ratios, etc. The technical objective is to provide and incorporate, in cooperation with the MARSSIM Work Group, the new measurement processes in Supplements to MARSSIM, provide answers to frequently asked questions, evaluate MARSSIM implementation and provide feedback to the Work Group in writing, update, clarify, and conduct training on the MARSSIM.

REGULATORY USE: Regulatory guidance

WORK SCOPE: sampling and measurement strategies for demonstrating regulatory compliance with criteria pertaining to subsurface radioactivity, clearance of materials and equipment, the use of surrogate nuclides in ratios, etc. provide answers to frequently asked questions, writing, update, clarify, and conduct training on the MARSSIM.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	9	20	

PROCUREMENT METHOD: Commercial Small Purchase.

THIS ACTION: Modify Scope

CONTRACTOR: S. Cohen & Associates REQUISITION NO: DR-01-0103

FUNDING PERIOD: Apr,2003 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2001 through Dec,2004

PROCUREMENT MILESTONES

Send Startup Package	1/30/2003
Send RFPA to DCPM	2/14/2003
Receive Proposal	3/17/2003
Complete Prop. Eval.	4/01/2003
Issue Modification	4/16/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6433

TITLE: EXTREMITY CODE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Karagiannis, Harriet Phone: (301) 415-6377

OBJECTIVE: The objective of developing VARSKIN Mod 2 code is to provide a windows- based code for accurate assessment of the skin dose and eliminate the errors and limitations that could lead to seriously incorrect dose estimations under certain conditions.

REGULATORY USE: The revised VARSKIN code will continue to be used by the NRC staff to confirm skin calculations made by licensees for demonstrating compliance with regulations.

WORK SCOPE: The VARSKIN revision will correct errors/limitations identified by licensees, the NRC staff and other organizations.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	145	29	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: Incrementally Fund

CONTRACTOR: Colorado State University CONTRACT NO: NRC-04-02-055

FUNDING PERIOD: Jun,2003 through Nov,2003

PERIOD OF PERFORMANCE: Sep,2002 through Apr,2004

PROCUREMENT MILESTONES

Send RFPA to DCPM	5/16/2003
Rcv Oblg. Doc DCPM	6/16/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6448

TITLE: GROUND-WATER MODELING TECH SUPPORT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Cady, Ralph E. Phone: (301) 415-6249

OBJECTIVE: The broad objective of the WES/NRC collaboration is to provide the evolving ground-water modeling technologies, training and support in the Ground-Water Modeling System (GMS) software to NRC and to enhance GMS to readily solve problems in ground-water migration of radioactive contaminants common to NRC-licensed sites. A secondary objective is to establish a process whereby NRC and other consortium members will develop and share more advanced modeling tools in the future.

REGULATORY USE: To assess the potential consequence of licensing actions, the Nuclear Regulatory Commission (NRC) must evaluate the potential for human exposure to radioactive contaminants. This assessment may include the potential future human exposure as a result of contaminant migration through complex geologic environments. The common approach to these assessments includes modeling ground-water flow and contaminant transport from the contaminant source to points of potential human exposure (wells or surface-water bodies). Common tools applied to these assessments are limited in applicability by the model's inherent assumptions and simplifications. While a simple conceptualization of ground-water systems and associated models may be appropriate for many NRC-licensed sites, some sites are sufficiently complex that additional realism is warranted for assessment of the ground-water pathway. This work is designed to support analyses at these complex sites. Critical to appropriate modeling of these complex sites is the ability to readily merge results from domain-specific modeling activities into the complete assessment of the problem. The ground-water modeling tools that are to be provided, supported and developed under this work will be integrated into the complete assessment by additional tools to be supported by future NRC collaboration with other federal agencies.

WORK SCOPE: Provide executables for the most recent version of GMS to NRC.
Provide onsite training in the use of GMS.
Provide GMS consultation; both online consultation and off-site in-person consultation.
Provide a demonstration of GMS radionuclide transport capabilities.
Provide recommendations for improving radionuclide transport models.
Provide continued GMS software maintenance and development.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	72	10	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: Incrementally Fund

AGENCY: Corps of Engineers/Waterways Experiment Station IAA NO: RES-01-002

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2001 through Sep,2005

PROCUREMENT MILESTONES

Send Startup Package	1/01/2003
Send IA Letter to Agency	1/16/2003
Send Oblig Memo to OCFO	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6460

TITLE: UPDATE CODES FOR ASSESSING RAD DOSES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Karagiannis, Harriet Phone: (301) 415-6377

OBJECTIVE: To obtain data from Oak Ridge National Laboratory prepared by K. F. Eckermann on dose coefficients and examine the extent of the changes implied by the updated recommendations of the ICRP, both for workers and the public.

REGULATORY USE: Changes in some of the more important implications of the dose coefficients will be incorporated in the regulatory effort of dose assessment.

WORK SCOPE: To examine some of the more improtant implications of the cahnges of dose coefficients.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	100	200	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Oct,2003

PERIOD OF PERFORMANCE: Aug,2002 through Oct,2003

PROCUREMENT MILESTONES

Issue Form173 to DOE	5/16/2003
Rec. Sign Form 173	6/16/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6462

TITLE: DEV DATABASES TO SUPPORT SORPTION MODELING
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Randall, John D. Phone: (301) 415-6192

OBJECTIVE: To test and document the validity of variable distribution coefficients for modeling retardation and chemical reactions of radionuclides under varying biogeochemical conditions as these processes contribute to the overall environmental mobility of radionuclides in the environment.

REGULATORY USE: The results of this research will be used by NMSS to understand and model radionuclide migration in complex chemical environments. For simple systems these results may be used to bound constant distribution coefficients for use with simple models such as RESRAD. For complex systems, more sophisticated models wherein the distribution coefficient is a function of the geochemical environment will be employed to achieve more realistic simulations of potential system performance.

WORK SCOPE: Task 1: Study cesium and iodine migration under variable biogeochemical conditions in both laboratory and field experiments.
Task 2: Extend the generalized composite surface complexation modeling approach for retardation of radionuclides to Ni and Np with laboratory experiments using aquifer sedimants.
3. Development of field based techniques for the evaluation of and utilization of laboratory determined distribution coefficients.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	75	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: New Project Follow-on to Project W6813

AGENCY: United States Geological Survey IAA NO: RES-03-006

FUNDING PERIOD: Apr,2003 through Nov,2003

PERIOD OF PERFORMANCE: Apr,2003 through Mar,2007

PROCUREMENT MILESTONES

Send Startup Package	12/16/2002
Complete Draft IA	1/15/2003
Send IA Letter to Agency	1/30/2003
Receive ltr fm Agency	3/03/2003
Send Oblig Memo to OCFO	4/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6463

TITLE: ASSESS PERFORMANCE OF NON-CONCRETE BARRIERS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Philip, Jacob Phone: (301) 415-6211

OBJECTIVE: Non-concrete based physical barriers e.g., soil caps, geomembranes, permeable and impermeable barriers have wide applications in containing and mitigating radionuclide migration from decommissioned facilities, uranium tailings piles and subsurface contaminated sites.

The objectives of the research are to,

1)Review and evaluate the literature on soil covers for waste disposal and decommissioning systems, concerning effective lifetimes.

2) Conduct one or two fully instrumented centrifuge tests to investigate the performance of the soil cover as a function of its moisture content, depth from the surface, thickness, clay content and type.

3) Evaluate and test appropriate numerical/empirical model(S) of soil cover performance using data from the centrifuge tests.

REGULATORY USE: Results from this work will help in the licensing of facilities using soils based engineered barriers as described above particularly in the credits to be taken for these barriers in PA.

WORK SCOPE: 1) Review of the literature on soil covers concerning the effective lifetimes of these barriers.

2) Conduct controlled accelerated tests using centrifuge testing to test and verify matematical models of cap performance.

3) Evaluate the centrifuge test results.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	37	149	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: Incrementally Fund

AGENCY: Corps of Engineers/Waterways Experiment Station IAA NO: RES-02-003

FUNDING PERIOD: Dec,2002 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2002 through Feb,2006

PROCUREMENT MILESTONES

Send Startup Package	1/01/2003
Send IA Letter to Agency	1/16/2003
Send Oblig Memo to OCFO	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6464

TITLE: RADIONUCLIDE SORPTION IN SOILS

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: O'Donnell, Edward Phone: (301) 415-6265

OBJECTIVE: To continue progress toward a more realistic methodology for estimating radionuclide retardation in soil. Specific objectives include: (1) identification of the sorption -controlling soil minerals for a particular waste site, (2) evaluation of the extent of radionuclide retention on the sorption-controlling minerals, (3) derivation of theoretical limits on the range of KD values for selected radionuclide-mineral pairs through molecular simulation of the sorption process, and (4) probabilistic analysis of sorption parameter uncertainty and its' influence on radionuclide migration. The regulatory objective is to provide data and geochemical models that can be used in a multi-media environmental transport model associated with a flexible computational platform such as FRAMES.

REGULATORY USE: The regulatory objective is to provide data from sorption models associated with reactive transport processes into a probabliistic analysis code which can be used for regulatory decisions relating to decommissioning, site clearance, and radioactive waste disposal.

WORK SCOPE: The project is using focused laboratory measurements and theoretical calculations to characterize the processes controlling radionuclide sorption on soil. Simulations at an atomistic scale of both anionic (e.g. 129I and I- and 99Tc as TcO4-) and metallic cationic (e.g. 137Cs as Cs+ and 90Sr as Sr2+) species will provide insights into the processes involved. Results of the characterization and simulation research will be combined into a probabilistic analysis of sorption parameters and hydrologic flow which are to be applied in the prediction of performance at one or more actual field sites.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	236	350	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jul,2002 through Sep,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/06/2003
Rec. Sign Form 173	1/15/2003

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : Y6465

TITLE: HYDRO CONCEPT, PARAM & SCENARIO UNCERT ASSESS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Nicholson, Thomas J. Phone: (301) 415-6268

OBJECTIVE: Develop an integrated strategy for selecting methods and tools for assessing hydrologic conceptual model, parameter, and scenario uncertainties. Apply the comprehensive strategy to a series of "real" sites which encompass a range of hydrogeologic settings, conditions and complexities to test the strategy's robustness and completeness. Establish hydrological data base incorporating regional and national data. Link scenario uncertainty to the conceptual model and parameter uncertainty within the integrated strategy.

REGULATORY USE: Uncertainties attendant to performance assessment predictions need to be determined and communicated to decision makers. The research will provide both a strategy and related tools for determining these uncertainties inherent in the conceptual ground-water flow and transport models, parameter distributions, and scenario assumptions used in performance assessments. The integrated strategy will be applied to technical issues identified in licensing actions. The strategy will address hydrologic issues common to performance analyses of nuclear facilities and sites such as: (1) abstracting and representing hydrogeologic system heterogeneities and site conditions, (2) scaling of representative parameter distribution values, (3) testing assumptions of; dimensionality, transient versus steady-state flow and transport, and initial boundary conditions, and (4) confirming performance assessment models.

WORK SCOPE: The investigators will: (1) couple the UAZ and PNNL strategies developed for conceptual model and parameter uncertainties, respectively; (2) incorporate scenario uncertainty assessment into the strategy to provide a unifying and integrating aspect to ground-water flow and transport conceptual model selection, use and evaluation; (3) test the strategy by application to specific "real" site datasets which represent hydrologic conditions and scenarios assumptions in licensing performance assessment models; (4) document the strategy and its applications; and (5) provide technology transfer of the research results including the tested strategy to the NRC staff and Federal cooperative partners thru documentation and a technology transfer seminar at NRC Headquarters.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	179	360	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Follow-on to Project W6933 Incrementally Fund

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jul,2002 through Nov,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/06/2003
Rec. Sign Form 173	1/15/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6467

TITLE: DEVELOPMENT OF PROBABILISTIC RESRAD-OFFSITE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Mo, Tin Phone: (301) 415-8151

OBJECTIVE: Through an Interagency Agreement (IAG) with U.S. DOE, co-fund the development and maintenance of software in the RESRAD family of codes currently used by NRC, enhance and customize the probabilistic version of the RESRAD-OFFSITE code (released by DOE for public use) for NRC performance assessment of contaminated sites that have the potential for off-site migration of radionuclides and support DOE in the development of the RESRAD-BIOTA code.

REGULATORY USE: The RESRAD-OFFSITE and RESRAD-BIOTA codes will be used for performance assessment (dose and risk analysis) of sites with existing ground water contamination or sites with the potential for off-site migration of radionuclides to demonstrate compliance with the License Termination Rule, 10CFR Part 20, Subpart E, for decommissioning options involving onsite disposal of incidental wastes from decontamination, partial site release, restricted site release per 20.1403, or under alternate criteria per 20.1404 and other NRC regulations related to NEPA at sites for which an Environmental Impact Statement (EIS) is being prepared and for long term licensing or licensing in perpetuity of contaminated sites. These codes may also be used in designing (or evaluating the effectiveness of) environmental monitoring programs for detecting off-site migration of radionuclides and for assessing radiological impacts to the members of the public and the environment.

WORK SCOPE: Test and evaluate codes using NRC test cases. Develop data template file and dose calculation capabilities to customize the codes for NRC applications. Perform and document generic sensitivity analysis for exposure scenarios and associated parameters for decommissioning options such as partial or restricted site release and for long term licensing or licensing in perpetuity of contaminated sites. Develop capabilities for site-specific probabilistic dose and risk assessment to support Environmental Impact Statements. Develop and document the source and justification (technical basis) for the default scenario and parameter distributions to be contained within the codes for NRC applications. Develop training course to perform Technology Transfer to NRC.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	140	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project Follow-on to Project Y6112

LABORATORY: Argonne National Laboratory

FUNDING PERIOD: Mar,2003 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2003 through Nov,2007

PROCUREMENT MILESTONES

Send SOW to Lab	10/31/2002
Rcv. DOE Proposal (189)	1/14/2003
Issue Form173 to DOE	2/13/2003
Rec. Signed Form 173	3/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6469

TITLE: EVAL RADIONUCLIDE PATHWAYS AND UPTAKE
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Reed, Phillip R. Phone: (301) 415-7845

OBJECTIVE: To review, evaluate and determine data and information for the important features, events and processes of radionuclide food-chain pathways for calculating dose to the critical group or maximally exposed individuals living near waste disposal facilities and decommissioned sites. To obtain experimental field and laboratory data and information on radionuclide food-chain pathways. To perform confirmatory analyses and identify possible deficiencies in current biosphere models. To assess food-chain pathway conceptual models, parameters, uncertainty analysis, probability distribution functions, and data sources in performance assessment codes. To investigate verification of food-chain pathways models. To determine data to assess both adult and children total effective dose equivalent. To improve performance assessment capability by considering more modern dosimetric data widely used that have been adopted internationally.

REGULATORY USE: The results of the research program are planned to be used to: (a) support the development of regulatory criteria (e.g., technical positions, guidance), (b) provide an independent basis for staff to evaluate applicants or licensee data, analysis, and computer codes, (c) provide an understanding and data base for staff to quantify uncertainties in technical basis for regulating and licensing radionuclide pathway issues, and (d) provide parameters and data for use in biosphere models of performance assessment computer codes that calculate dose to members of the critical groups or maximally exposed individuals.

WORK SCOPE:
1. Review and evaluate data and information published on food-chain and microorganism pathways including studies performed by the scientific community including the United Kingdom of Ministry of Agriculture, Fisheries and Food and the International Union of Radiologists.
2. Assess radionuclide food-chain and microorganism biosphere models, parameters, data, uncertainty analysis, and data sources for performance assessments.
3. Determine long-lived radionuclide data for microorganism-radionuclide interactions and microorganism produced organic compound-radionuclide interactions.
4. Determine long-lived radionuclide soil-to-plant concentration ratios, animal product transfer coefficients, weathering losses, and translocation fractions and other food-chain pathway data. Determine food preparation and consumption values for children and adults.
5. Assess water irrigation methods on food-chain pathway data including long-term radionuclide build up in soils and plant interception factors.
6. Provide research results in probabilistic distribution function format where possible.
7 Develop strategies to verify food-chain pathway models.
8 Conduct field studies to validate food-chain and microorganism pathway computer codes.
9 Develop data to support calculations of dose to children and adults.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	150	148	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Sep,2002 through Sep,3006

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/16/2003
Rec. Sign Form 173	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6470

TITLE: FRAMES SOFTWARE DEVELOPMENT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Cady, Ralph E. Phone: (301) 415-6249

OBJECTIVE: The primary objective of this work are to provide NRC/NMSS with a dose-assessment tool for licensing decisions with sufficient power, flexibility and utility that it can serve as their primary platform for analyzing the hazards associated with licensing actions at those "complex" sites at which the traditional dose-assessment tools are inappropriate. A secondary objective is to provide NRC/RES with a tool with sufficient power, flexibility and utility that it can be used as: a platform to evaluate the sensitivity and significance to dose from varying conceptualizations of structure or processes within the radionuclide transport and exposure problem, a platform to test the utility of these conceptualizations within a PA context, and a stabile interface design target for "PA-suitable" code produced by RPERWMB research projects.

REGULATORY USE: This work will provide NRC/NMSS with a licensing tool with sufficient power, flexibility and utility that it can serve as their primary platform for analyzing the hazards associated with licensing actions at those "complex" sites at which traditional radionuclide-transport and dose-assessment tools are inappropriate.

WORK SCOPE: The current development of FRAMES is being supported by contracts from DOE, EPA, Corp of Engineers Waterways Experiment Station. With this alliance, we gain the opportunity to leverage others funds and access to a stable development team. The scope of NRC-specific work is under development as we evaluate the current system and on-going work sponsored by the other federal agencies.

NRC-specific components will be minimized as our focus is quite similar to the current focus of the other participants. The EPA's HWIR brings to FRAMES a more comprehensive consideration and treatment of uncertainty and an increased dimensionality in the ground-water pathway. The DoD's ARAMS implementation and future plans bring added sophistication to a number of the pathways and an emphasis on meeting the regulatory requirements for risk assessment (documentation of data pedigree, etc.). The DoD is anxious to link FRAMES with input to and output from their Groundwater Modeling System (multi-model and multi-dimensional analyses of flow and transport), Surface-Water Modeling System and Watershed Modeling System codes.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	156	260	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Jun,2002 through Sep,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/03/2002
Rec. Sign Form 173	1/15/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6628

TITLE: UNCERTAINTY ASSESSMENT FOR CONSEQUENCE MODELS
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Mitchell, Jocelyn Phone: 415-5289

OBJECTIVE: The objective of this project is to develop and maintain the NRC's code, MACCS, for estimation of off-site consequences following a release of radioactive material into the atmosphere. There is, in addition, a small effort on user support for DandD.

REGULATORY USE: Maccs is used for determining the expected value of different off-site consequences. These values can be used for emergency planning, for value/impact analyses, and for Environmental Impact Statements.

WORK SCOPE: The ability to estimate output uncertainty due to uncertainty in input parameters and to upgrade or add models for vulnerabilty assessment.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	225	246	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: May,2002 through Mar,2004

PROCUREMENT MILESTONES

Issue Form173 to DOE	1/06/2003
Rec. Sign Form 173	1/15/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6643

TITLE: RISK MGMT ANALYSIS FOR DECOMM SITES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Cady, Ralph E. Phone: (301) 415-6249

OBJECTIVE: Current regulatory guidance and practice in regulating the risk of public exposure to radiological materials from NRC-licensed sites and facilities are viewed by many as being at odds with the regulatory guidance and practice of the U.S. Environmental Protection Agency (EPA). Recent studies (Environmental Law Institute, 2001) and presentations (Kocher, 2000) have described the inconsistencies, analyzed the underlying approaches and highlighted compelling needs for harmonization. The primary objectives of this work are to 1) identify and analyze the current regulatory guidance and practice used by the NRC for decommissioning licensed sites and facilities, 2) identify and analyze the current guidance and practice used by the U.S. Environmental Protection Agency (EPA) under CERCLA, and 3) if possible, propose an approach to achieve consistency between these two management strategies.

REGULATORY USE: The regulatory use of this work is initally abstract and depends on the outcome and recommendations from this work. This work may provide recommendations on an approach to achieve consistency between regulatory strategies of NRC and EPA, and, as such, may suggest regulatory changes.

WORK SCOPE: This work requires the contractor to organize and convene a panel of experts to author a NCRP Commentary or NCRP Report including the background and ultimate recommendations of the panel. Tasks include: 1) identifying current NRC and EPA guidance and practices used by agencies in the cleanup of radiologically contaminated sites, 2) identifying, examining and summarizing the historical basis for the current practices, the significant differences and commonalities, and the current and future implications of the current practices as they relate to public perception, uncertainty, measurability, and dose estimates, and 3) identifying, examining and summarizing potential reasonable means to converge upon consistent approaches to decision-making regarding the clean up of radiologically contaminated sites.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	50	100	

PROCUREMENT METHOD: Commercial Small Purchase.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-02-072

CONTRACTOR: National Council on Radiation Protection REQUISITION NO: NRC-04-02-072

FUNDING PERIOD: Oct,2002 through Sep,2003

PERIOD OF PERFORMANCE: Aug,2002 through Dec,2003

PROCUREMENT MILESTONES

Send RFPA to DCPM	1/16/2003
Rcv Oblg. Doc DCPM	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6644

TITLE: BAYESIAN SUBSURFACE RADIOLOG SURVEY & ANAL
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Powers, G. Edward Phone: (301) 415-6212

OBJECTIVE: The objective of this project is to expand the NRC freeware "proof-of-concept" version of SADA into a functional program for conducting defensible technical calculations for designing and analyzing surveys of subsurface radioactive contamination in heterogenous geometric configurations of contamination below the soil surface. The development of these calculations is closely linked to EML's and others efforts to (1) develop subsurface survey criteria for soils, buildings and materials which may or may not have an adequate reference area(s) or material(s) or area(s) for comparison and (2) develop survey criteria for radioactive materials that may not be in directly accessible areas.

REGULATORY USE: The required subsurface sampling and survey protocol will be used in staff reviews of characterization and final surveys of sites with subsurface soil contamination. It will also be used by performance assessment staff for developing a realistic subsurface or volumetric source-term when conducting dose modeling analyses for demonstration of compliance with the dose criteria in the license termination rule (LTR) under 10 CFR Part 20, Subpart E. The protocol would also supplement NUREG-1727 and NUREG-1575 on subsurface sampling and survey.

WORK SCOPE: The products include a NUREG describing approaches and methodologies for subsurface measurements, sampling, characterization, and surveys. A software package and associated user's manual to help staff visually and numerically display results at the 2-D and 3-D levels and perform the required statistical analysis (e.g., standard statistical analysis, ordinary/simple Kriging, Indicator Kriging, and uncertainty analysis). The software would also be used to assess radionuclide concentration and examine assumptions regarding average concentration and distribution of radionuclides in subsurface media. The software is anticipated to be integrated and directly linkable to MARSSIM software (i.e., COMPASS) and to the codes/models used in dose modeling or performance assessment analysis.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	200	260	

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-02-057

CONTRACTOR: University of Tennessee CONTRACT NO: NRC-04-02-057

FUNDING PERIOD: Mar,2003 through Nov,2003

PERIOD OF PERFORMANCE: Jul,2002 through Feb,2005

PROCUREMENT MILESTONES

Send RFPA to DCPM	1/16/2003
Rcv Oblg. Doc DCPM	2/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6657

TITLE: RETARD OF RADIONUCLIDES IN THE ENVIRONMENT
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Reed, Phillip R. Phone: (301) 415-7845

OBJECTIVE: To obtain sorption data for long-lived radionuclides for use in performance assessments to calculate dose to members of the critical group or to the maximally exposed individual. To determine sorption data and information on the sorption and desorption of long-lived radionuclides in ground water flowing through soils and fractured rock systems for use in radiological performance assessments. To study sorption of radionuclides under varying water quality chemical and physical conditions in soils and fractured rocks. To provide insights regarding the interaction between hydrodynamic and sorption mechanisms that affect radionuclide transport and prediction of radionuclide transport in the unsaturated zone. To assess differences between chemical equilibrium and nonequilibrium chemical kinetics in radionuclide sorption mechanisms in soils and fractured rock systems.

REGULATORY USE: The results of this research program will be used: (1) as input data for the sorption parameters in waste disposal or decommissioning performance assessments, (2) to support the development of regulatory criteria (e.g., technical positions, guidance) in areas of radionuclide sorption in groundwater and soil and fractured rock systems, (3) to provide an independent basis for staff to evaluate applicant's or licensees data, analyses or computer codes, (4) to provide a data base and scientific expertise for staff to quantify uncertainties involving sorption issues, and (5) to provide insights on sorption and flow mechanisms affecting radionuclide transport in unsaturated sediments.

WORK SCOPE: 1. Determine sorption and desorption coefficients (e.g., Kd, Freundlich, Langmuir) for long-lived radionuclides (e.g., Be-10, Nb-94, Sn-126, Cm-244, Pu-239, Np-237) in soils and fractured rocks using batch and flow systems.
2. Determine radionuclide sorption data and information under varying groundwater chemistry (e.g., pH, carbonate concentrations, ionic strength) and physical (e.g., soil particle size, moisture saturation, temperature) conditions.
3. Study sorption in saturated and unsaturated ground water conditions.
4. Calculate important radionuclide species involved in the sorption processes using chemical codes. Attempt to experimentally determine the radionuclide chemical species in solution and the sorption processes. Compare results and determine differences, if any.
5. Collect soil and fractured rock samples from licensed and proposed wasted disposal facilities.
6. Provide results in probabilistic distributions suitable for use in NRC performance assessment models.
7. Determine, if needed, the chemical thermodynamic data to calculate radionuclide sorption coefficients and chemical species under varying chemical and physical conditions.
8. Participate in field studies to determine radionuclide sorption in soils, fractured rock and matric media systems. Compare field study data with laboratory sorption studies results.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	16	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: New Project

LABORATORY: Pacific Northwest National Laboratory

FUNDING PERIOD: Mar,2003 through Nov,2003

PERIOD OF PERFORMANCE: Mar,2003 through Nov,2006

PROCUREMENT MILESTONES

Send SOW to Lab	10/31/2002
Rcv. DOE Proposal (189)	1/14/2003
Issue Form173 to DOE	2/13/2003
Rec. Signed Form 173	3/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6692

TITLE: VALID OF SUBSURFACE BAYESIAN STAT SURVEY ANAL
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Powers, G. Edward Phone: (301) 415-6212

OBJECTIVE: The objective of this project is to support the expansion of the NRC freeware "proof-of-concept" version of SADA being developed by another contractor into a functional program for conducting defensible technical calculations for designing and analyzing surveys of subsurface radioactive contamination in heterogenous geometric configurations of contamination below the soil surface.

REGULATORY USE: Not Defined.

WORK SCOPE: Update and incorporate the development of subsurface sampling design and analysis into a technical basis document that specifies how SADA is to perform subsurface sampling and analysis, at the mathematical level.
Update and finalize the Interim Draft Report for Comment and Use, NUREG-1505 Rev.1. "A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys," June 1998.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	80	110	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION:

LABORATORY: Environmental Measurements Laboratory

FUNDING PERIOD: Oct,2002 through Dec,2003

PERIOD OF PERFORMANCE: Jun,2002 through Dec,2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6698

TITLE: SUPT NEA INFO SYS ON OCCUPATIONAL EXPOSURES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Karagiannis, Harriet Phone: (301) 415-6377

OBJECTIVE: The objective is to establish a system for the collection and maintenance of occupational exposure data since the NRC and other foreign regulators use such data.

REGULATORY USE: NRC's participation in the ISOE program proved very useful during the development of the ALARA inspection module by NRR and regional staff by allowing staff access to ALARA information for U.S. utilities.

WORK SCOPE: The NRC uses the occupational exposure data to compare and contrast U.S. and foreign nuclear power plant initiatives and identify and adopt best-practices during common maintenance and operation procedures.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	29	40	

PROCUREMENT METHOD: Commercial Small Purchase.

THIS ACTION: Incrementally Fund

RFPA NUMBER: RES-02-076

CONTRACTOR: NEA Information System on Occupational Exposure REQUISITION NO: DR-04-02-076

FUNDING PERIOD: Jun,2003 through Nov,2003

PERIOD OF PERFORMANCE: Aug,2002 through Jul,2003

PROCUREMENT MILESTONES

Send RFPA to DCPM	5/16/2003
Rcv Oblg. Doc DCPM	6/16/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6724

TITLE: MODEL ABSTRACTION TECHNIQUES FOR SOIL WATER FLOW & TRANSPORT

Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Nicholson, Thomas J. Phone: (301) 415-6268

OBJECTIVE: Identify, test and confirm various model abstraction techniques for characterizing and simulating water flow and contaminant transport through soils.

REGULATORY USE: The identified and tested model abstraction techniques will assist NMSS licensing staff and Agreement State regulators, and their contractors in their reviews of performance assessments of nuclear facilities and sites involving water flow and contaminant transport in soils. These abstraction techniques will allow the reviewers to focus on the realistic and significant processes and conditions thus reducing the complexity and details of modeling site-specific systems.

WORK SCOPE: ARS investigators shall work cooperatively with NRC research staff to: (1) identify and review appropriate model abstraction techniques for application in the assessment of flow and transport for specific soils and environmental conditions; (2) select and recommend the set of model abstraction techniques useful for simulating flow and transport; (3) develop a test plan for evaluating the selected model abstraction techniques, (4) test and confirm the appropriateness of the model abstraction approach through comparisons with conventional complex flow and transport models; and (5) document the model abstraction methodology and its application. The research findings will be communicated to the NRC staff and Federal MOU cooperative partners thru a technology transfer seminar at NRC Headquarters.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	50	20	

PROCUREMENT METHOD: Non-DOE Interagency Agreement.

THIS ACTION: Incrementally Fund

AGENCY: Agricultural Research Service IAA NO: RES-02-008

FUNDING PERIOD: Jul,2003 through Nov,2003

PERIOD OF PERFORMANCE: Sep,2002 through Sep,2004

PROCUREMENT MILESTONES

Send Startup Package	6/02/2003
Send IA Letter to Agency	6/17/2003
Send Oblig Memo to OCFO	7/17/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6785

TITLE: PLUME MODEL ADEQUACY EVALUATION
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Mitchell, Jocelyn Phone: 415-5289

OBJECTIVE: This work will test the assumption in off-site consequence modeling that a simplified atmospheric transport and diffusion model adequately compensates for loss of fine structure by averaging over numerous trials. This work at LLNL will provide the state-of-the-art (long-running) code evaluations to compare results. The results of the simplified model will be provided under another job code at Sandia.

REGULATORY USE: Based on this work and the comparison with the Sandia work, a decision will be made either that the current simple off-site consequence code provides average results that are sufficently close to those obtained from this work for use in level 3 PRA analyses or that the simple model must be modified to improve its atmospheric transport and diffusion capability.

WORK SCOPE: (1) Preparation of the protocol for the two-laboratory effort including site choice, weather sequence choices (300), and comparison metrics; (2) 300 runs of the state-of-the-art code LODI; (3) Comparison of the results with the simple code results from Sandia and NUREG/CR report preparation.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	250	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION: New Project

LABORATORY: Univ. of Calif. - Lawrence Livermore National Laboratory

FUNDING PERIOD: Dec,2002 through Dec,2003

PERIOD OF PERFORMANCE: Dec,2002 through Dec,2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6786

TITLE: MACCS CODE MODIFICATION/VULNERABILITY STUDIES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Mitchell, Jocelyn Phone: 415-5289

OBJECTIVE: This work supports the Homeland Security tasks in MACCS2 code development. MACCS2 is the NRC's off-site consequence code; its major development is supported under another Job Code. The new capabilities being supported under this job code will be useful for reactor, Radiological Dispersion Device, fuel cycle, and spent fuel vulnerability studies.

REGULATORY USE: Factors of importance to vulnerability assessments will be better modeled following these improvements.

WORK SCOPE: Two versions of the code, with increasing capability will be provided. Changes in the interim code will be: accounting for recent changes in emergency planning, improving plume rise and far-field lateral plume spread models, adding a parameterized explosive dispersal capability, and editing certain economic parameters. If model developments are successful, the second version of the code will include: certain aspects of urban environments, certain fuel cycle materials, and improved mixing height and runoff models.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	400	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Dec,2002 through Dec,2003

PERIOD OF PERFORMANCE: Dec,2002 through Dec,2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6787

TITLE: RADIOLOGICAL DISPERSION DEVICES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Mitchell, Jocelyn Phone: 415-5289

OBJECTIVE: Evaluation of health and economic consequences of postulated Radiological Dispersal Device (RDD) use requires understanding of explosive dispersal of material from sources of radioactive material. DOE has developed experimental data on sources of interest to them. While some of these materials are also of interest to us, certain aspects of source design and material form are different in sources of interest to us. This work will survey the sources of interest to the NRC and the existing database and provide explosive dispersal experiments that will fill out the database. Of specific interest is encapsulation of material.

REGULATORY USE: Based on this work, decision makers will have a better understanding of the health and economic consequences of RDD use.

WORK SCOPE: (1) Review the NRC/DOE report on materials of interest, (2) Recommend a test matrix that will expand the existing database to explore the materials and source designs of interest to NRC, and (3) provide explosive dispersal experiments and calculations as approved by NRC.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	0	106	

PROCUREMENT METHOD: DOE Work Order for an Urgent Requirement.

THIS ACTION: New Project

LABORATORY: Sandia National Laboratories

FUNDING PERIOD: Mar,2003 through Dec,2003

PERIOD OF PERFORMANCE: Mar,2003 through Dec,2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6834

TITLE: NDE & EVAL OF SENSORS FOR ENTOMBED STRUCTURES
Division of Sys. Anal. & Regul. Effectiveness
Program Manager: Philip, Jacob Phone: (301) 415-6211

OBJECTIVE: To provide information on NDE techniques for evaluating existing and proposed entombed structures and for monitoring their long-term performance. To evlauate sensors for monitoring long-term properties of concrete to confirm the concrete degradation model and thus the performance of entombed structures.

REGULATORY USE: To provide the NRC staff with a methodology for the condition assessment of nuclear structures proposed for entombment and verification of code predictions of concrete performance by use of monitoring data.

WORK SCOPE: 1. Evaluate NDE techniques for concrete structures with emphasis on identification of micron-size crack properties.

2. Evaluate sensors that can provide data on concrete properties for verification of concrete degradation codes.

FUNDING ($1000):	Prior Year Obligations	FY03	FY04	FY05	FY06	FY07	Total Project Cost
	0	70	205	205	70	0	550

PROCUREMENT METHOD: Fully Competitive Commercial Contract.

THIS ACTION: New Project

CONTRACTOR: Broad Agency Announcement CONTRACT NO: RES-03-063

FUNDING PERIOD: Sep,2003 through Dec,2004

PERIOD OF PERFORMANCE: Sep,2003 through Feb,2006

PROCUREMENT MILESTONES

Send Startup Package	1/13/2003
Send RFPA to DCPM	2/12/2003
Issue Comp. Range Rpt.	7/14/2003
Issue Final Eval. Rpt.	8/28/2003
Award Contract	9/18/2003

Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Advance Procurement Plan for FY 2003

JOB CODE : Y6073

TITLE: SCIENTIFIC SOFTWARE AND DATA DISTRIBUTION
Program Mgmt., Policy Devel. & Analysis Staff
Program Manager: Millman, Gilbert C. Phone: (301) 415-5843

OBJECTIVE: Manage and control the dissemination of software and data compilations developed under the sponsorship of the Nuclear Regulatory Commission. Functions include storage and archiving software, disseminating software in accordance with NRC guidelines, and serving as software information center to support NRC offices, NRC contractors, and the public.

REGULATORY USE: The NRC recognizes the need for centralized distribution of NRC's scientific and technical computer codes and related activities, including correspondence, announcement bulletins, abstracts, request services, packaging, mailing, follow-up, and support.

WORK SCOPE: Software Support Center for NRC and its contractors.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	445	125	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Incrementally Fund

LABORATORY: Oak Ridge National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Nov,1998 through Nov,2005

PROCUREMENT MILESTONES

Issue Form173 to DOE	12/01/2002
Rec. Sign Form 173	12/16/2002

Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Advance Procurement Plan for FY 2003

JOB CODE : A3988

TITLE: NUCLEAR SAFETY RESEARCH CONFERENCE (NSRC)
Program Mgmt., Policy Devel. & Analysis Staff
Program Manager: Nesmith, Sandra R. Phone: (301) 415-6437

OBJECTIVE: Provides personnel, services, and materials to arrange for the annual Nuclear Safety Research Conference (NSRC), formerly known as the Water Reactor Safety Information Meeting sponsored by the NRC Office of Nuclear Regulatory Research (RES). This meeting includes workshops and review group meetings on nuclear safety research programs of international interest.

REGULATORY USE: The meeting is announced in the Federal Register and several scientific journals and the proceedings are published as NUREG/CP reports and will be posted to the NSRC website.

WORK SCOPE: This is a 3-day meeting attended by about 400 people from U.S. laboratories, various research firms and independent laboratories, reactor vendors, utilities, universities, and a variety of foreign countries. BNL provides administrative support for this meeting.

FUNDING ($1000):	Prior Year Obligations	FY03	[redacted]
	879	146	

PROCUREMENT METHOD: DOE Work Order.

THIS ACTION: Modify Scope

LABORATORY: Brookhaven National Laboratory

FUNDING PERIOD: Oct,2002 through Nov,2003

PERIOD OF PERFORMANCE: Oct,1989 through Feb,2008

PROCUREMENT MILESTONES

Send SOW to Lab	12/30/2002
Rcv. DOE Proposal (189)	1/29/2003
Issue Form173 to DOE	2/13/2003
Rcv. Signed Form 173	3/17/2003

Overview of the Research Programs

1. Integrity of Reactor Systems and Components

1.1 Environmentally assisted cracking of reactor pressure boundary components and vessel internals
1.2 Reactor pressure vessel integrity
1.3 In-service inspection effectiveness and reliability
1.4 Steam generator tube integrity
1.5 Piping integrity

2. Aging-Related Effects on Systems and Components

2.1 Environmental qualification of aging electric cables, wire system safety, and aging of active electrical components
2.2 Aging of passive structures and components

3. Safety Assessment of Digital Technologies

4. Regulatory Infrastructure and Improvement Initiatives

4.1 Managing and resolving generic safety issues (GSIs)
4.2 Important aspects of human performance
4.3 Integrated evaluation of regulatory effectiveness
4.4 Reactor safety goal policy
4.5 Risk informing the inspection and incident response process
4.6 Development and endorsement of consensus codes and standards
4.7 Impact of advancements in earth sciences

5. Assessment of Operations

5.1 Acceptance criteria for extended fuel burn-up
5.2 Synergistic effects of design and operational change

6. Probabilistic Risk Analyses and Applications

6.1 Operational event risk analysis and data assessment
6.2 Risk-informing the agency's regulation and regulatory actions
6.3 Development of PRA methods and standards
6.4 Development of technical basis to support risk-inform NRC regulations and regulatory actions

7. Assessing and Maintaining Reactor and Systems Codes

7.1 Thermal-hydraulics (e.g., TRAC-M)
7.2 Fuel behavior codes (e.g., FRAPCON-3)
7.3 Severe accident codes (e.g., MELCOR)

8. Assessment of the Health Effects

8.1 Effectiveness of as low as is reasonably achievable (ALARA) programs
8.2 Validation of current health effects models (MACCS)

9. Preparation for Mixed-Oxide fuel Licensing

Table 1.1 Past, Ongoing and Planned Activities in The Environmentally Assisted Cracking of Reactor Pressure Boundary Components and Vessel Internals

Issue Description: *Cracking of reactor pressure boundary components , such as piping, vessel penetrations and vessel internals has been observed and has been attributed to the deleterious effects of the water coolant environment. Degradation of these components could impair the ability to shut down and cool the reactor core. Data and methods to assess the structural margins of these components will assist NRC in making timely and realistic decisions about the impacts of cracking and the effectiveness of repair strategies.*

Activity	Major Task (s)
Complete testing and analysis of fatigue life data for piping and pressure vessel materials. Develop appropriate regulatory guidance to augment codes and standard actions.	• Complete fatigue tests of low alloy and stainless steel with different surface finish in air and in LWR environments. **(Completed 12/02) UN** • Complete fatigue tests of sensitized stainless steels with different compositions and heat treatments conditions in LWR environments **(target: 09/03)**. Prepare final topical report **(target: 03/04). UN**
Evaluate the structural integrity of reactor components including head penetrations and dissimilar metal welds. Evaluate proposed repair techniques involving welding. Develop and validate structural integrity evaluations.	• Report summarizing efforts to understand the expected leakage from cracking in the CRDM nozzle to RPV head joint at operating conditions, in particular considering the characteristics of PWSCC cracks, possible plugging of these cracks and the effect of the fit between the CRDM nozzle and the RPV head on expected leakage. **(Completed 12/02) UN**
Conduct testing and analysis to provide independent evaluation of EAC and PWSCC in nickel-bas alloys used as reactor internals and other components, such as vessel head penetrations and vessel safe ends. Includes studies related to crack growth, residual stresses, repairs and mitigation and PWSCC susceptibility for Alloy 600, Alloy 690, and associated welds, including mixed metal welds. This task also includes corrosion, erosion and wastage studies owing their source to cracking of vessel head penetrations or other vessel attachments. This activity includes participation in international cooperative activities with multiple countries.	• Provide a report on the adequacy of current susceptibility models for Alloy 600 base metal and Alloy 82/182 welds, including consideration of domestic and overseas experience with PWSCC. This report should also consider recommendations for possible improvements to the susceptibility models. **(Completed 02/03)** • Complete supporting tests, (tensile tests and metallographic) of the CRDM nozzle and J-weld alloys. **(Target: 05/03) UN** • Complete potentiodynamic anodic polarization tests and ECP measurements of A600, A182, 308 SS, and A533B, in boric acid solutions. **(Target: 08/03) UN** • Participate in Round Robin on CRGR testing of nickel alloys and weld metals. **(Target: 09/03)**

UN=NRR User Need

Table 1.1 Past, Ongoing and Planned Activities in The Environmentally Assisted Cracking of Reactor Pressure Boundary Components and Vessel Internals (Continued)

Activity	Major Task (s)
Conduct testing and analysis to provide independent evaluation of EAC and PWSCC in nickel-bas alloys used as reactor internals and .....(Cont'd)	• Complete preliminary CGR tests on laboratory prepared Alloy 182 weld and submit topical report on CGRs in PWR environments and the effects of key parameters. **(Target 02/04)** • Complete SCC growth rate tests of the Davis-Besse CRDM nozzle and J-weld alloys in simulated PWR environments at 316 C. **(Target: 12/03) UN** • Complete topical report on crack growth rates in Alloy 182 in PWR environments, including the effects of weld orientation, temperature and water chemistry. **(Target: 03/04)** • Complete wastage tests of A533B vessel steel and 308 SS cladding. **(Target: 02/04) UN** • Complete a NUREG report on the results from the wastage and ECP tests. **(Target: 03/04) UN** • Issue technical letter report describing the model. **(Target: 03/04) UN** • Complete a topical report describing the results of the crack growth tests and supporting information (support of Davis-Besse issues). **(Target: 03/04) UN** • Initiate CGR tests on Alloy 690 and laboratory prepared Alloy 152 weld in simulated PWR environments with focus on effects of weld constraint, weld composition and welding process. **(Target: 10/04)** • Complete CGR testing on V.C. Summer sample and compare results with database on laboratory welds (by technical letter report). **(Target 07/05)** • Complete CGR tests on Alloy 690 and laboratory prepared Alloy 152 weld in simulated PWR environments. **(Target: 07/06)**
Evaluate environmental effects in fastening materials contribution to LOCA. Evaluate conditions leading to hydrogen accumulation and combustion in piping.	No work defined in FY2003

Table 1.1 Past, Ongoing and Planned Activities in The Environmentally Assisted Cracking of Reactor Pressure Boundary Components and Vessel Internals (Continued)

Activity	Major Task (s)
Conduct irradiations, testing and analysis to provide independent evaluation of EAC and PWSCC in stainless steels used as reactor internals such as core support structures, core shrouds, core barrels, and similar applications. Develop a better understanding of the key factors affecting IASCC by obtaining experience and research data, develop a methodology to predict component behavior in relation to IASCC, and identify possible countermeasures to IASCC. This activity includes participation in the Halden Reactor Project - Materials Research Program, and participation in other international cooperative activities with multiple countries pursuing the same goals relating to the safe operation of nuclear steam supply systems.	• Complete a topical report on fracture toughness and CGR data on Halden Phase-I specimens. **(Target: 06/03) UN** • Complete the dry irradiations of CT/SSRT specimens as defined in Phase-I1 of HRP irradiations. **(Target: 03/04) UN** • Complete a summary report on IASCC susceptibility as a function of fluence, material composition, fabrication, and water chemistry based on SSRT tests on model SSs irradiated in Halden Phase-I. **(Target: 06/04) UN** • Complete CGR tests on Halden Phase-I1 low fluence irradiation of stainless steel welds. **(Target: 08/04) UN** • Complete report on CGR in low-fluence Halden Phase-II tests. **(Target: 12/04) UN** • Complete CGR tests on Halden Phase-I high-fluence irradiations of stainless steel welds. **(Target: 09/06** may be affected by HRP fuel failures.**) UN** • Complete report on CGR in high-fluence irradiated stainless steel welds. **(Target: 12/06) UN**
Develop and implement action plans based on recommendations of the Davis-Besse reactor vessel head degradation Lessons-Learned Task Force (LLTF).	• Develop draft action plan for "Barrier Integrity." **(Completed: 02/03) EDOD** • Summary report regarding adequacy of susceptibility models. (LLTF 3.1.4(1)- Medium) (Target: 05/03) **EDOD** • Coordinate consensus of Operating Experience Steering Committee proposals for implementation. **(Target: 12/03) EDOD** • Assemble foreign and domestic information concerning Alloy 600 (and other nickel based alloys) nozzle cracking from technical studies, previous related generic communications, industry guidance, and operational events. **(Target: 12/03) EDOD**

EDOD= EDO Direction

Table 1.1 Past, Ongoing and Planned Activities in The Environmentally Assisted Cracking of Reactor Pressure Boundary Components and Vessel Internals (Continued)

Activity	Major Task (s)
Develop and implement action plans based on recommendations of the Davis-Besse reactor vessel head degradation Lessons-Learned Task Force (LLTF). (Cont'd)	•Coordinate and assist the development of an implementation plan bases on accepted proposals. **(Target: 01/04) EDOD** •Assist NRR in review of plant alarm response procedure requirements for leakage monitoring systems and assess their adequacy for identification of RCPB leakage. **(Target: 03/04) EDOD** •Coordinate and assist in establishing processes to monitor effectiveness. **(Target: 06/04) EDOO** •Coordinate and assist in developing and implementing improved barrier integrity PI based on current requirements and measurements. **(Target: 06/04) EDOO** •Assemble foreign and domestic information concerning boric acid corrosion from technical studies, previous related generic communications, industry guidance, and operational events. **(Target: 07/04) EDOD** •Re-evaluate basis for RCS leakage requirements and assess the capabilities of currently used and state-of-the-art leakage detection systems. Prepare a technical report. **(Target: 07/04) EDOD** •Coordinate and assist in developing recommendations for inspection guidance pertaining to RCS unidentified leakage that includes action levels to trigger increasing levels of NRC interaction with licensees in response to increasing levels of unidentified RCS leakage. **(Target: 01/05) EDOD** • Coordinate and assist in developing recommendations for: 1) improving plant procedures for identifying RCPB leakage, 2) consistent TS, and 3) use of online, enhanced leakage detection systems on critical components. **(Target: 03/05) EDOD** • Determine the feasibility of establishing a risk-informed barrier integrity PI. **(Target: 06/05) EDOD** • Coordinate and assist in developing and, if feasible, implementing an additional PI capable of tracking the number, duration, and rate of primary system leaks. **(Target: 12/05) EDOD**

Table 1.2 Past, Ongoing and Planned Activities in Reactor pressure vessel integrity

Issue Description: *The reactor pressure vessel is the only component in the primary systems whose failure cannot be accommodated by the engineered safety features. Thus its integrity has been and continues to be a high priority. New information on radiation Induced degradation which raises questions about the integrity of the pressure vessel will continue to emerge as plants age. Additionally the fracture mechanics analysis methodologies used to make best-estimate' assessments of vessel structural Integrity which Is a critical factor In maintaining adequate protection continue to have significant uncertainties. Improved data and analytical tools are needed to support timely and realistic decisions on the Integrity of reactor pressure vessels for the current operating license period and for license renewal.*

Activity	Major Task (s)
Calculate thermal fluences for an operating BWR Reactor Pressure Vessel, comparing calculated values with fluences based on measurements, comparing calculated BWR fluence results from a well-established computer code (TORT) with those from a newer Code. Evaluate dosimetry measurement and calculation for addition to RPV regulatory framework.	• Calculate thermal fluences from a well-established computer code for an operating BWR and compare calculated values with measured fluences. Compare calculated fluences from well-established code with those from a newer, state-of-the-art computer. **(Completed: 04/03)**
Conduct evaluation and validation of RPV structural component integrity analysis methods by benchmarking them against large-scale experiments. This is accomplished through participation in international activities and cooperative agreements with multiple countries on RPV integrity to leverage the RES budget and to gain access to related work and expertise in other countries.	• Participate in OECD/NEA, IAE Sub-Group on Metal Components, sponsored analyses on "Probabilistic Structural Integrity of a PWR Reactor Pressure Vessel (PROSIR)" round robin RR-1 and RR-2. (Completion depends on EdF of France supplying information in a timely manner.) **(Target: 12/03)** •Participate in OECD/NEA, IAE Sub-Group on Metal Components, sponsored analyses on "Probabilistic Structural Integrity of a PWR Reactor Pressure Vessel (PROSIR)" round robin RR-3 and RR-4. (Completion depends on EdF of France supplying information in a timely manner.) **(Target: 06/04)**

Table 1.2 Past, Ongoing and Planned Activities in Reactor pressure vessel integrity (Continued)

Activity	Major Task (s)
Conduct studies and tests to evaluate effects of Irradiation on welds and RPV materials to validate and correlate embrittlement trend curves. This work supports development of the technical bases for revision to regulatory guidance on estimation of radiation embrittlement which will be used by NRR and licensees in estimating embrifflement levels for operating RPVs. This is used in setting operating P-T limits and LTOP set points, and In comparing to the 10 CFR 50.61 PTS screening criteria.	• Complete irradiation of the Midland beltline welds. **(Completed 01/03) UN** •Issue letter report on experimental characterization and modeling of dose rate effects. **(Completed 02/03) UN** • Complete first draft of Reg. Guide 1.99, "Radiation Embrittlement of Reactor Vessel Materials", revision for NRR review. **(Target: 12/03) UN** • Issue letter report on dose and flux effects on hardening and embrittlement. **(Target: 08/03) UN** •Complete final draft of Reg. Guide 1.99 revision and publish for public comment. (need NRR concurrence) **(Target: 12/04) UN**
Complete probabilistic fracture mechanics analysis of the reactor pressure vessels of selected plants in support of developing technical basis for the revision of 10 CFR 50.61. Provide support for rule-making and revising regulatory framework.	•. Present the technical basis for proposed changes in 10 CFR 50.61 PTS screening criterion to ACRS. **(Complete: 02/03) RIRIP** •Publish a NUREG/CR documenting the entire project for the development of a generic flaw density and size distribution. This will be an update of the previous flaw distribution NUREG/CR published in 2002. **(Complete: 04/03)** . Finalize technical basis for revision of PTS rule (includes comments from peer review). **(Target: 06/04) UN**

Table 1.2 Past, Ongoing and Planned Activities in Reactor pressure vessel integrity (Continued)

Activity	Major Task (s)
Perform probabilistic risk analyses of events leading to pressurized thermal shock accidents, and assess related acceptance criteria, in support of the reevaluation of the technical basis of the PTS rule (10 CFR 50.61).	•Provide status report on PTS screening criterion to Commission **(Complete: 01/03) RIRIP** •Provide input to DET for final NUREG report **(Target: 09/03) RIRIP**
Perform RELAP5 analyses to support rulemaking for PTS and reactor vessel P-T limits.	•Brief ACRS on thermal hydraulic uncertainty analysis. **(Complete: 12/02) UN** •Prepare draft NUREGICR on pressurized thermal shock research performed at Oregon State University **(Complete: 03/03) UN** •Prepare draft report on RELAP5 analyses of the post-PTS RPV failures for Calvert Cliffs. **(Target: 08/03) UN**
Provide technical support to PTS rulemaking.	• No work defined in FY 2003.
Validation, evaluation and application of advanced fracture mechanics technology for the safety assessment of RPV integrity. This includes both experimental and analytical tasks.	•Develop recommendations on evaluations of thermal driving force for fracture (Kth) for use in P-T limits calculations. **(Complete: 03/03) UN** Develop a draft Research Plan for advanced fracture mechanics. **(Complete: 03/03) UN**

Table 1.3 Past, Ongoing and Planned Activities in In-service inspection effectiveness and reliability

Issue Description: *The reliability and effectiveness of non-destructive evaluation methods used by licensees to detect degradation before structural Integrity is Impaired are key factors in assuring the integrity of components such as the reactor pressure vessel, vessel penetrations, piping, and other components and structures such as spent fuel storage casks. Data are needed to support timely and realistic decisions about Industry non-destructive Inspection methods and programs.*

Activity	Major Task (s)
Evaluate reliability and effectiveness of advanced NDE techniques used in inspecting primary system components for use by NRR and the ASME Code in evaluating ISI systems and procedures used in the field.	•Prepare a letter report stating the results of a review of the capabilities of phased array UT and Synthetic Aperture Focusing Technique (SAFT-UT) to improve coverage of weld configurations that are difficult to examine using center-ray transducers. Upon review of the data from the letter report staff will prepare a white paper for possible ASME code revisions, specifically, UT examinations performed from one side of the weld, and UT examinations that do not provide meaningful information. **(Target: 12/03) UN** •Using the existing expertise with SAFT-UT and other work to date at PNNL enhance techniques and methods that would allow for consistent and reliability discrimination between coherent ultrasonic energy scattered from grain boundaries in coarse-grained steel components and further enhance the SAFT-UT software so that it's data analysis is both timely and economical. **(Target: 12/03) UN**
NDE reliability for coarse grained boundaries to include cladded pipe, inner-surface cladding of RPVs, CCSS piping, DMW, weld-overlay-repaired pipe joints, far side inspections and other components/mechanisms identified in the reactor coolant pipe cracking experience. This activity will include international collaboration.	•Organize an international workshop to discuss PWSCC and Alloy 600 issues. **(Target: 12/03) UN** •Develop international cooperative with SKI and other organizations to identify and address the major problems associated with NDE reliability as well as EAC and other mechanisms identified in the reactor coolant pipe cracking experience. **(Target: 06/03) UN** •Write a technical letter report summarizing the compiled information relating to PWSCC incidents at nuclear power plants. **(Target: 08/03) UN** •Develop a research testing plan to quantify the effectiveness of NDE in detecting and characterizing PWSCC. **(Target: 10/03) UN**

Table 1.4 Past, Ongoing and Planned Activities in Maintaining adequate safety margins for steam generator tube integrity

Issue Description: *Cracking and wastage have been Identified as degradation mechanisms which may unacceptably erode the Integrity of steam generator tubes, possibly leading to a containment bypass event. This raises questions about our understanding of the nature and effects of in-service degradation mechanisms, effectiveness and reliability of Inspection techniques, new repalr techniques, and the accuracy of predictive models.*	
Activity	**Major Task (s)**
Evaluate the behavior of major RCS components for comparison with behavior of SG tubes under severe accident conditions and validate models used to predict tube failure under those conditions.	•Develop models to evaluate failures, such as creep, of selected RCS active and passive components. Components to be considered include RCS piping, PORVs, SRVs and steam generator manways. Other considerations include the potential effects of materials properties at welds, such as the weld metal, base metal, heat affected zone, in the presence of flaws and applied stress. **(SGAP Item) (Target: 09/03) EDOD** •Apply predictive models to evaluate failures for determining expected failure locations, failure modes, and times-to-failure, for selected components. **(SGAP Item) (Target: 09/04) EDOD**
Assess risk from accident sequences involving failures of steam generator tube integrity.	•Develop improved methods for assessing the risk associated with SG tubes under accident conditions. **(SGAP Item) (Target: 06/03) UN** •Provide pilot application and methodology refinement for assessing risk associated with SG tubes under accident conditions. **(Target: 02/04) UN**
Assess steam generator tube integrity during a severe accident. Perform benchmark testing.	•Perform CFD plant analysis to address the effects on inlet plenum mixing resulting from tube leakage and hot leg orientation (CE design impact). **(Complete: 02/03) EDOD** •Perform more rigorous uncertainty analyses with system level code to address inlet plenum mixing by developing distribution functions for mixing parameters based on available data. **(Target: 08/03) EDOD**

Table 1.4 Past, Ongoing and Planned Activities in Maintaining adequate safety margins for steam generator tube integrity (Continued)

Activity	Major Task (s)
Assess steam generator tube integrity during a severe accident. Perform benchmark testing. (Cont'd)	•Perform SCDAP/RELAP5 calculations and input to an overall risk-informed evaluation of steam generator tube repairs. Publish a topical report. **(Target: 08/03) EDOD** •Examine the uncertainty in the T-H conditions associated with core melt progression. **(Target: 09/03) EDOD**
Perform severe accident and consequence analyses of steam generator tube rupture; in-kind contribution to the ARTIST program.	•When available, use data from the ARTIST program (planned in Switzerland) to develop a better model of the natural mitigation of the radionuclide release that could occur in the secondary side of the SGs during a SGTR. **(Target: 09/04) UN**
Develop prototypical SG tube leak and rupture facility and perform tests of flawed and degraded tube under simulated service and transient conditions. This will provide data to validate and support inspection methods and methods to predict tube integrity.	•Address ACRS comments on current risk assessments and develop a better understanding of the potential for damage progression of multiple steam generator (SG) tubes due to depressurization of the SGs (e.g., main steam line break (MSLB)) or other secondary side design basis accidents, obtain information from existing analyses related to loads and displacements (axial, bending, cyclic) experienced by SG structures under MSLB conditions. **(Target: 12/02) UN** •Using information from activity for determining the thermal hydraulic conditions and analysis of loads, estimate upper bound loads and displacements. **(Target: 12/02) UN** •Estimate crack growth, if any, for a range of crack types and sizes using bounding loads from calculated addition to the pressure stresses and including the effects of tube support plate movement in these evaluations and any effects from cyclic loads. **(SGAP Item)** **(Target: 12/02) EDOD**

Table 1.4 Past, Ongoing and Planned Activities in Maintaining adequate safety margins for steam generator tube integrity (Continued)

Activity	Major Task (s)
Develop prototypical SG tube leak and rupture facility and perform tests of flawed and degraded tube under simulated service and transient conditions. This will provide data to validate and support inspection methods and methods to predict tube integrity. (Cont'd)	• Estimate the margins to crack propagation for a range of crack sizes for MSLB loads and displacements in addition to pressure stresses. **(SGAP Item) (Target: 12/02) EDOD** • Perform technical assessment of current SCC knowledge base in steam generators with emphasis on crevice corrosion. Develop a technical report. (Complete: 12/02) •Predict crevice chemistries using thermodynamic and electrochemical principles developed in literature and provide a report with summary of techniques and results. (Target: 12/03) •Compare results determined from literature to results calculated by EPRI's predictive code, MULTEQ©, and make recommendations for possible code improvements. **(Target: 12/03)** •Conduct tests of degraded tubes under pressure and with axial and bending loads to validate the analytical results. **(SGAP Item)** **(Target: 06/03) EDOD** • Collaborate with DSARE staff to develop and incorporate heat transfer principles into crevice chemistry predictions and determination of crevice physical state. **(Target: 11/03)** • Prepare a report with recommendations for incorporation of heat transfer principles into crevice chemistry predictive codes such as MULTEQO. **(Target: 03/04)** • Conduct analyses with refined load estimates, if necessary. **(Target: 03/04) UN**

Table 1.5 Past, Ongoing and Planned Activities in Evaluation of design and operational adequacy of NPP safety systems and components

Issue Description: *Occasionally, domestic and foreign operational events Identify conditions or postulated accidents which Indicate that a mechanical system or component Important to the safe operation of a nuclear power plant may not operate as Intended or face unanticipated challenges. For ensuring that the emergency systems function as expected, defense In depth is maintained, or safety margin is maintained, analytical and experimental research Is conducted to verify that the mechanical system or component will operate under the postulated accident or design condition.*

Activity	Major Task (s)
Evaluate the potential effect of LOCA generated debris blockage on PWR sump design and operational characteristics to ensure that post-LOCA long term cooling requirements per 10 CFR 50.46 are met (GSI-191).	• Issue draft Reg. Guide 1.82 for public comment. **(Complete: 02/03) UN** •Submit for publication the final NUREGICR on sump clogging. **(Complete: 02/03) UN** •Present draft Reg. Guide 1.82 "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident " to the ACRS. **(Target: 07/03) UN**
Provide research results on motor operated valve (MOV) operation under degraded conditions to assist in evaluating the adequacy of industry and licensee programs to periodically verify the design-basis capability of safety-related MOVs in response to GL 96-05.	•Issue final contractor report on age-related changes in valve stem grease friction factor. **(Complete: 12/02) UN** •Issue final contractor report on Stellite valve material to NRR. **(Complete: 12/02) UN**

Table 1.6 Past, Ongoing and Planned Activities in advancements in the field of piping integrity

Issue Description: *Piping analysis, Inspections, maintenance and replacement represent significant operational costs and affect safety. As age related Issues, e.g., fatigue, continue to emerge, NRC should be prepared to address licensee burden reduction Initiatives and emerging safety Issues.*

Activity	Major Task (s)
Develop the technical basis for the revision of Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis" and prepare revised guidance.	•Develop DG-1127 (draft Rev. 2 of Reg. Guide 1.92) for public comment. **(Target: 07/03) UN** •Send DG-1127 to ACRS/CRGR for review, if necessary. **(Target: 07/03) UN** •. Publish and issue DG-1 127 for public comment. **(Target: 04/04) UN**
In cooperation with international partners, perform analysis and tests to assess seismic margins in degraded piping. These analyses will improve the understanding of the behavior of degraded piping which is necessary to develop the technical basis for resolving several key issues and codifying results of research through standards and regulatory processes.	•Finalize revised SQUIRT code. **(Complete: 03/03) UN** •Hold 4th Technical Advisory Group (TAG) meeting of the BINP program. (Schedule depends on participation by members from other countries.) **(Target: 09/03) UN** •Send to publications NUREG/CR on the results of the Battelle Integrity of Nuclear Piping (BINP) Program examining fracture behavior of cracked piping. (Schedule depends on participation by members from other countries.) **(Target: 09/03) UN**

Table 2.1 Past, Ongoing and Planned Activities in Environmental qualification of aging electric cables, wire system safety, and aging of active electrical components

Issue Description: *Research Is needed to address whether the current EQ process Is adequate for the qualification of low-voltage I&C and power cables and splices for the current license term of 40 years, whether there Is a need for additional EQ requirements for the license renewal, and how effective are the condition monitoring techniques to determine cable conditions. Research Is needed to assess the aging of medium voltage metal clad switch gear and Its effects on switch gear performance, energetic faults and fire.*	
Activity	**Major Task (s)**
Perform analyses to evaluate risk associated with cable aging and failure.	•Complete letter report on cable reliability physics models and cable failure probabilities. **(Target: 08/03) RIRIP** •Complete draft NUREG/CR on risk associated with cable aging for internal review. **(Target: 10/03) RIRIP**
Collaborative research on wire system aging. This will be partially implemented by implementation of new international activity	•Participate in the development of the national strategy document on wire system safety (On-going) **(Target: 09/03)** •Develop OECD/NEA wire system aging report. **(Complete: 12/02)** •Complete preliminary assessment of broadband impedance technology (developed by FAA/Boeing/Eclypse) for nuclear power plant application. **(Target: 09/03)**
Scoping study on the effects of switchgear aging on energetic faults.	• Complete a scoping study to evaluate the aging effects. **(Target: 02/04)** •Complete a risk sensitive study on the effects of switch gear aging on energetic faults **(Target: 06/04)**

Table 2.2 Past, Ongoing and Planned Activities in aging of passive structures and components

Issue Description: *Aging degradation has been observed In passive structures and components, and new modes can reasonably be expected to appear as plants continue to age. t will be Important to determine If Inspection techniques can reliably detect the extent of degradation and the extent to which safety margins remain adequate when such degradation occurs.*	
Activity	**Major Task (s)**
Develop validated analytical tools needed to resolve issues/concerns about containments that have experienced degradation of containment capacity, including a fragility analysis technique.	•Complete a draft summary report containing sample license submittals with different containment degradations using the risk-informed approach presented in Reg. Guide 1.174. **(Complete: 02/03) UN**
Conduct tests at Battelle in Columbus, OH of degraded piping using the pipe loop facility in cooperation with several international partners. Conduct analyses needed to support the tests and to gain insights. Tests and studies are needed to address LBB and margins of degraded piping. Develop LBB regulatory guide.	•A report summarizing the findings of the adequacy of current leakage detection requirements (including the need for implementing enhanced leakage and cracking detection methods and the adequacy of current requirements for walkdowns visual inspections for leakage detection) and the impact of PWSCC and current leakage detection methods on LBB evaluations. **(Target: 12/02) UN** •Incorporate results of BINP program into technical basis for LBB Reg. Guide. **(Target: 02/04) UN** •Publish for public comment the draft Regulatory Guide on leak-before-break evaluations. (Schedule depends on meeting of the international collaborators.) **(Target: 09/04) UN** •Publish final Reg. Guide on LBB. **(Target: 09/05) UN**

Table 2.2 Past, Ongoing and Planned Activities in aging of passive structures and components (Cont'd)

Activity	Major Task (s)
Develop validated analytical tools needed to resolve issues/concerns about structures and components that have experienced degradation.	•Issue draft NUREG/CR on buried piping to NRR for comment. **(Target: 05/03)** •Submit to Publications the final NUREG/CR on buried piping. **(Target: 07/03)** •Issue draft NUREG/CR on tanks to NRR for comment. **(Target: 09/03)** •Submit to publications the final NUREG/CR on tanks. **(Target: 11/03)** •Issue draft NUREG/CR on anchorages and masonry walls to NRR for comment. **(Target: 09/04)** •Submit to publications the final NUREG/CR on anchorages and masonry walls. **(Target: 12/04)**

Table 3 Past, Ongoing and Planned Activities in Risk important aspects of digital instrumentation and control (I&C) equipment

Issue Description: *Digital I&C equipment, Including the related software, may a) have unique failure modes, b) have different reliability than analog equipment and c) may present challenges to operating personnel that are not currently well understood. NRC needs to systematically develop data, models and risk Information to form the basis for timely and realistic decisions as this equipment Is Increasingly Introduced Into reactor designs.*	
Activity	**Major Task (s)**
Develop technical bases for review guidelines to evaluate advanced I&C systems. Maintain international cooperation through continued participation in the OECD Halden Reactor Program	•Review CY03 plans for Halden projects on human factors and I&C, and provide comments to Front Office. **(Complete: 01/03)**
Provide NRR with the technical bases and regulatory guidance for the environmental qualification of I&C systems.	•Present the draft final regulatory guide (DG-1077) to the ACRS. **(Complete: 02/03) UN** • Submit for publication final Regulatory Guide (DG-1077) for the environmental qualification of digital I&C system by incorporating both industry and ACRS comments. (Date is TBD - on hold pending outcome of IEEE-323-2003 ballot) **(Target: 04/03) UN**
Provide qualitative tools and assessment methods to ensure the effective review of current applications of digital instrumentation and control.	• Provide draft NUREG documenting the technical basis for regulatory guidance on lightening to NRR for review. **(Complete: 01/03) UN** •Present the draft final Reg. Guide 1.180, Rev. 1 (Draft DG-1119), "Guidelines for Evaluating Electromagnetic and Radio-Frequency Interference in Safety-Related Instrumentation and Control Systems to the ACRS. **(Complete: 03/03) UN** •Submit for publication final Reg. Guide 1.180. **(Target: 07/03) UN**

Table 3 Past, Ongoing and Planned Activities in Risk important aspects of digital instrumentation and control (I&C) equipment (Cont'd)

Activity	Major Task (s)
Provide qualitative tools and assessment methods to ensure the effective review of current applications of digital instrumentation and control. (Cont'd)	•Revise draft Reg. Guide 1.168, " Verification, Validation, Reviews, and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," to address public comments and send to NRR and OGC for concurrence. **(Target: 06/03) UN** •Brief the ACRS on final Reg. Guide 1.168. **(Target: 11/03) UN** •Develop draft Reg. Guide on lightning protection and send to NRR and OGC for concurrence. **(Target: 08/03)** •Send draft Reg. Guide on lightning protection to ACRS and CRGR for review. **(Target: 11/03)** •Brief the ACRS and CRGR on final Reg. Guide on lightning protection. **(Target: 06/04)** •Develop draft Reg. Guide 1.97, "Criteria for Accident Monitoring Functions." **(Target: 09/03) UN** • Send draft Reg. Guide 1.97 to ACRS and CRGR for review. **(Target: 04/04) UN** • Assess RETRANS usability and capability to analyze TELEPERM system. **(Target: 06/04) UN**
Develop criteria and methods for failure mode assessment and reliability assessment of digital instrumentation and control systems in nuclear power plants.	• Transmit draft revision of digital I&C research plan to stakeholders for comment. **(Target: 07/03)** • Validate digital reliability assessment method(s) suitable for nuclear powerplants. **(Target: 09/03)** • Transmit draft digital I&C research plan to ACRS with office concurrences. **(Target: 12/03)**

Table 3 Past, Ongoing and Planned Activities in Risk important aspects of digital instrumentation and control (I&C) equipment (Cont'd)

Activity	Major Task (s)
Identify and resolve the technical issues for treating digital systems in PRA, including evaluating viable approaches and developing analysis tools for near-term risk-informed applications.	• Complete a draft report which includes interim guidance for the review of risk-informed applications involving digital systems. **(Target: 12/03) UN**
Develop and evaluate information on newly emerging digital systems and technology (such as, SMART sensor, wireless, and on-line monitoring, advance instrumentation) to determine what new regulatory issues will be encountered and what new data and tools will be needed to review these technologies.	• Send to publication final NUREG and report on status of emerging technology. (Provide annual updates.) **(Complete: 03/03) UN** • Issue report on the use of wireless technology in nuclear power plant applications. **(Target: 12/03)** • Complete NUREG on wireless communications. **(Target: 12/04)** • Provide biennial updates to report on status of emerging technology. **(Target: 03/05)**

Table 4.1 Past, Ongoing and Planned Activities in Managing and resolving generic safety issues (GSIs)

Issue Description: *GSIs will continue to arise from licensing, plant design or operational Issues, and NRC must have a capability to respond appropriately to these Issues In a timely and realistic manner. The processes used to estimate the potential risk and burden reduction and associated costs need to be streamlined and strengthened so that issues are resolved more effectively and efficiently.*	
Activity	**Major Task (s)**
Continue to prioritize new generic safety issues.	•Screen two new GSI issues, as needed. **(Target: 09/03) GSI** •Obtain and assess peer review comments on draft technical assessment of GSI-186 on heavy loads. **(Target: 12/02) GSI** •Issue GI-80 re-prioritization report. **(Complete: 02/03)** •Complete initial screening of GI-194 on implications of updated seismic hazard curves. **(Target: 05/03) GSI** •Complete initial screening write-up of GI-1 93 on BWR ECCS suction concerns. **(Target: 05/03) GSI** •Transmit for publication NUREG on crane operating experience for GI-1 86. **(Target: 06/03) GSI** •Provide report on GSI-1 85 to ACRS. **(Target: 05/03) GSI** •Complete screening panel review of GI-193 on BWR ECCS suction. **(Target: 05/03) GSI** •Issue recommendations for addressing GSI-186 based on assessment of GI-186 contained in the final NUREG. **(Target: 05/03) GSI** •Issue revised Task Action Plan for GI-156.61, "High Energy Line Break Inside Containment." **(Target: 06/03) GSI**

Table 4.1 Past, Ongoing and Planned Activities in Managing and resolving generic safety issues (GSIs) (Cont'd)

Activity	Major Task (s)
Continue to prioritize new generic safety issues. (Cont'd)	•Complete screening write-up of GI-195 on hydrogen combustion in foreign BWR piping. **(Target: 05/03) GSI** •Complete panel review of GI-195 on hydrogen combustion in foreign BWR piping. **(Target: 07/03) GSI** •Revise task action plan on GSI-156.6.1 based on contractor report (high energy line breaks inside containment). **(Target: 07/03) GSI** •Provide recommendation on GSI-185 to NRR. **(Target: 07/03) GSI** •Brief ACRS on GI-186. **(Target: 09/03) GSI**
Track issue resolution through the Generic Issues Management Control System (GIMCS) and maintain a Generic Issues repository through NUREG-0933, "A Prioritization of Generic Safety Issues."	•Perform safeguards review of NUREG-0933. **(Target: 12/02)** •. Quarterly update to GIMCS. **(Complete: 04/03)** •Annual update to NUREG-0933. **(Target: 07/03)** •Issue annual SECY paper on generic issue progress. **(Target: 08/03)**
Develop the technical bases for resolving generic issues or revise the plan for resolution.	•Receive updated consequence calculations, based on the NUREG-1 150 CRIC-ET computer code models and the generic plant site described in NUREG-0933, in the form of CRIC-ET consequence values files. **(Target: 12/03) GSI** •Complete staff trial checkout of CRIC-ET consequence values files. **(Target: 03/04) GSI** •Prepare white paper on technical bases for resolving generic issues using updated consequence files. **(Target: 08/04) GSI**

Table 4.1 Past, Ongoing and Planned Activities in Managing and resolving generic safety issues (GSIs) (Cont'd)

Activity	Major Task (s)
Perform thermal/hydraulic calculations for resolution of GSI-188.	•Perform T-H assessment of flow-induced vibrations during MSLB. Using the TH conditions calculated during the transient, generate a conservative estimate of flow-induced vibration displacement and frequency assuming stead state behavior. **(Target: 10/02) GSI** •Perform thermal-hydraulic (T-H) calculations and sensitivity studies using the 3-D hydraulic component of TRAC-M to assess the loads on the tube support plate and SG tubes during main steam line break (MSLB). Perform sensitivity studies on code and model parameters including numerics. Develop conservative estimate of loads and evaluate against similar analyses. **(Target: 10/02) GSI** •Conduct comparison of TRAC-M predictions for mass flow rate, void fraction, pressure, differential pressure and temperature to data from integral tests. **(Target: 06/03) GSI**
Technical support for resolution of GSI-189.	•Complete technical assessment of GSI-189. **(Target: 10/02) GSI** •Provide recommendation on GSI-189 to NRR. **(Target: 12/02) GSI** •Prepare cost analysis in support of resolution of GSI-189 on combustible gas control. **(Target: 12/02) GSI**

Table 4.1 Past, Ongoing and Planned Activities in Managing and resolving generic safety issues (GSIs)

Issue Description: *GSIs will continue to arise from licensing, plant design or operational Issues, and NRC must have a capability to respond appropriately to these Issues In a timely and realistic manner. The processes used to estimate the potential risk and burden reduction and associated costs need to be streamlined and strengthened so that issues are resolved more effectively and efficiently.*	
Activity	**Major Task (s)**
Continue to prioritize new generic safety issues.	•Screen two new GSI issues, as needed. **(Target: 09/03) GSI** •Obtain and assess peer review comments on draft technical assessment of GSI-186 on heavy loads. **(Target: 12/02) GSI** •Issue GI-80 re-prioritization report. **(Complete: 02/03)** •Complete initial screening of GI-194 on implications of updated seismic hazard curves. **(Target: 05/03) GSI** •Complete initial screening write-up of GI-1 93 on BWR ECCS suction concerns. **(Target: 05/03) GSI** •Transmit for publication NUREG on crane operating experience for GI-1 86. **(Target: 06/03) GSI** •Provide report on GSI-1 85 to ACRS. **(Target: 05/03) GSI** •Complete screening panel review of GI-193 on BWR ECCS suction. **(Target: 05/03) GSI** •Issue recommendations for addressing GSI-186 based on assessment of GI-186 contained in the final NUREG. **(Target: 05/03) GSI** •Issue revised Task Action Plan for GI-156.61, "High Energy Line Break Inside Containment." **(Target: 06/03) GSI**

Table 4.1 Past, Ongoing and Planned Activities in Managing and resolving generic safety issues (GSIs) (Cont'd)

Activity	Major Task (s)
Continue to prioritize new generic safety issues. (Cont'd)	•Complete screening write-up of GI-195 on hydrogen combustion in foreign BWR piping. **(Target: 05/03) GSI** •Complete panel review of GI-195 on hydrogen combustion in foreign BWR piping. **(Target: 07/03) GSI** •Revise task action plan on GSI-156.6.1 based on contractor report (high energy line breaks inside containment). **(Target: 07/03) GSI** •Provide recommendation on GSI-185 to NRR. **(Target: 07/03) GSI** •Brief ACRS on GI-186. **(Target: 09/03) GSI**
Track issue resolution through the Generic Issues Management Control System (GIMCS) and maintain a Generic Issues repository through NUREG-0933, "A Prioritization of Generic Safety Issues."	•Perform safeguards review of NUREG-0933. **(Target: 12/02)** •. Quarterly update to GIMCS. **(Complete: 04/03)** •Annual update to NUREG-0933. **(Target: 07/03)** •Issue annual SECY paper on generic issue progress. **(Target: 08/03)**
Develop the technical bases for resolving generic issues or revise the plan for resolution.	•Receive updated consequence calculations, based on the NUREG-1 150 CRIC-ET computer code models and the generic plant site described in NUREG-0933, in the form of CRIC-ET consequence values files. **(Target: 12/03) GSI** •Complete staff trial checkout of CRIC-ET consequence values files. **(Target: 03/04) GSI** •Prepare white paper on technical bases for resolving generic issues using updated consequence files. **(Target: 08/04) GSI**

Table 4.1 Past, Ongoing and Planned Activities in Managing and resolving generic safety issues (GSIs) (Cont'd)

Activity	Major Task (s)
Perform thermal/hydraulic calculations for resolution of GSI-188.	•Perform T-H assessment of flow-induced vibrations during MSLB. Using the TH conditions calculated during the transient, generate a conservative estimate of flow-induced vibration displacement and frequency assuming stead state behavior. **(Target: 10/02) GSI** •Perform thermal-hydraulic (T-H) calculations and sensitivity studies using the 3-D hydraulic component of TRAC-M to assess the loads on the tube support plate and SG tubes during main steam line break (MSLB). Perform sensitivity studies on code and model parameters including numerics. Develop conservative estimate of loads and evaluate against similar analyses. **(Target: 10/02) GSI** •Conduct comparison of TRAC-M predictions for mass flow rate, void fraction, pressure, differential pressure and temperature to data from integral tests. **(Target: 06/03) GSI**
Technical support for resolution of GSI-189.	•Complete technical assessment of GSI-189. **(Target: 10/02) GSI** •Provide recommendation on GSI-189 to NRR. **(Target: 12/02) GSI** •Prepare cost analysis in support of resolution of GSI-189 on combustible gas control. **(Target: 12/02) GSI**

Table 4.2 Past, Ongoing and Planned Activities in Important aspects of human performance

Issue Description: *Given the cross cutting Influence of human performance on safety and the large uncertainties In characterizing or modeling the risk significance of human actions, current methods and data need to be improved to better identify risk Important aspects of human performance as It could affect safety, given current designs and operating conditions.*

Activity	Major Task (s)
Support the development of human factors regulatory guidance for the review of human performance related events, the Reactor Oversight Process, and technical basis for regulation, including human-system interfaces, procedures, training, organizational issues and the personnel fatigue rule-making effort.	•Support development of IEEE human factors and reliability standards through participation on IEEE SC-5, "Human Factors, Control Facilities, and Reliability." (On-going) **(Target: 09/03)** •Support NRR on development of proposed rule on fatigue. (On-going) **(Target: 09/03) UN-NRR** •Support to NRR on the development of a position paper on Safety Culture. **(Date is TBD)** •Complete draft NUREG on guidance for the review of changes to operator actions, which will serve as a technical support guide for SRP Chapter 18. **(Target: 12/02) UN-NRR** •Approve for publication a NUREG/CR on fatigue assessment techniques and methods. **(Target: 12/02) UN-NRR** •Develop draft review guidance for reactor staffing. **(Complete: 03/03) UN-NRR** •Submit to NRR draft revision to Chapter 18 of revised SRP (NUREG-0800) to incorporate final guidance for credit for operator action and to incorporate Revision 1 to NUREG/CR-0711 and guidance from NUREG/CR-6689. **(Complete: 12/02) UN-NRR** •Develop a report on the relationship of human performance issues identified in utility problem identification and resolution programs and risk important human performance issues identified in plant IPEs and NUREG-1560. **(Target: 09/03) UN-NRR**

Table 4.2 Past, Ongoing and Planned Activities in Important aspects of human performance (Cont'd)

Activity	Major Task (s)
Support the development of human factors regulatory guidance for the review of human performance related events, the Reactor Oversight Process, and technical basis for regulation, including human-system interfaces, procedures, training, organizational issues and the personnel fatigue rule-making effort. (Cont'd)	•Develop final review guidance for reactor staffing. **(Target: 09/03) UN-NRR** •Submit to NRR final revision to Chapter 18 of revised SRP (NUREG-0800) to incorporate public comment and review comments in final guidance for credit for operator action and to incorporate Revision 1 to NUREG-0711 and guidance from NUREG/CR-6689. **(Target: 12/03) UN-NRR** •Complete final NUREG on guidance for the review of changes to operator actions, which will serve as a technical support guide for SRP Chapter 18. **(Target: 12/03) UN-NRR** •Develop and implement training program on revised Chapter 18 of the SRP (NUREG-0800). **(Target: 12/03) UN-NRR** •Hold workshop with former reactor operators to obtain insights on generic safety issues. **(Target: 04/04) UN-NRR**
Develop technical bases for review guidelines that will be used in subsequent years to evaluate human performance. Maintain international cooperation through continued participation in the OECD Halden Reactor Program (HRP). This is co-funded through a multi-country international agreement.	•Participation in experimental procedure advisory committee (Attend two meetings per year). (On-going) **(Target: 04/04)** •.Prepare Commission paper on NRC participation in HRP agreement for 2003-2005. **(Complete: 12/02)** •Hold retreat on human performance research. **(Complete: 04/03)** •Prepare retreat insights report on human performance research. **(Target: 07/03)** • Support inspection team on Davis-Besse safety culture review and associated inspection report. **(Target: 06/03) EDOD**

Table 4.3 Past, Ongoing and Planned Activities in Integrated evaluation of regulatory effectiveness

Issue Description: *Risk Information, inspection findings, operational experience and cost data need to be systematically evaluated in an integrated fashion to Identify ways to Improve* **the** *effectiveness of* **NRC** *regulatory requirements, guidance and processes, Including using performance based approaches where appropriate.*

Activity	Major Task (s)
Assess regulatory effectiveness using risk information.	•Revise RES OL No. 1, implementing research projects, to conform to OMB standards for peer review process. **(Target: 10/02)** •Prepare draft revision to NUREG/BR-0058, Rev. 3, regulatory analysis guidelines, to conform to OMB guidelines for uncertainty analyses. **(Target: 10/02)** •Issue draft report on effectiveness of USI A-45 resolution for internal peerreview. (need NRR concurrence) **(Target: 10/02) SRM** •Issue final report on effectiveness of 10 CFR 50. App J, Option B. **(Target: 10/02) SRM** •Support to other program offices on development of Commission paper concerning proposed criteria for treatment of individual requirements in regulatory analysis. **(Target: 12/02)** •Respond to ACRS concerning GSI-1 89 and treatment of uncertainty in regulatory analysis. **(Target: 12/02) GSI** •Develop draft for internal comments on initial trial assessment for comment on regulatory effectiveness implications of significant events and conditions. **(Complete: 02/023)** • Issue final report on effectiveness of USI A-45 resolution. **(Target: 12/02) GSI** •Prepare NUREG report providing detailed guidance for implementing high level performance-based guidelines. **(Target: 09/04)**

Table 4.4 Past, Ongoing and Planned Activities in Reactor Safety Goal Policy

Issue Description: *The agency has not revised its Safety Goal Policy since It was Issued In 1986. During FY 2001, the agency will issue a proposed revision to the Safety Goal Policy that articulates the agency's current policy concerning acceptable levels of risk from nuclear power plant operations. This revision will reflect decisions that the agency has made since 1986 that are not Included in the Safety Goal Policy. This update will ensure consistency with later agency guidance concerning risk-informed licensing decisions.*

Activity	Major Task (s)
Coordinate development of an agency-wide Risk-Informed Regulation Implementation Plan (RIRIP).	•Provide semiannual update to the Risk-informed Regulatory Implementation Plan (RIRIP) to the EDO (includes Materials and Waste Arenas). **(Complete: 03/03) RIRIP** •Transmit draft "unified safety concept" with preliminary results to NRR. **(Target: 03/03) RIRIP** •Provide semiannual update to the Risk-informed Regulatory Implementation Plan (RIRIP) to the EDO (includes Materials and Waste Arenas). **(Target: 09/03) RIRIP**

Table 4.5 Past, Ongoing and Planned Activities in Risk Informing the Inspection and Incident Response Process

Issue Description: *Inspections and findings resulting from them, if not properly focused and characterized from a risk perspective, may result In either unnecessary licensee burden or missed safety issues and hence to an inappropriate regulatory response. Improvements to the Significant Determination Process used by NRR and development of risk Insights for Incident Response will ensure appropriate regulatory response.*	
Activity	**Major Task (s)**
Support regulatory oversight process and assist in risk-informing the inspection process. Includes human performance issues and corrective action programs.	•Develop plan to update MD 8.5. (**Date is TBD** and will be determined one year after OE Task Force completes its assessment) •Prepare transmittal memo on formal decision making. **(Complete: 02/03) UN-NRR** •Prepare plan of case study for application of formal decision making. **(Target: 07/03)** •Apply decision-making model to "synergism" active draft finding. **(Target: 09/03)**

Table 4.6 Past, Ongoing and Planned Activities in Development and Endorsement of Consensus Codes and Standards

Issue Description: *Adequate consensus codes and standards can provide effective replacements for NRC generated regulations and regulatory guidance and must be considered to conform to federal laws and policies.*	
Activity	**Major Task (s)**
Manage the NRC's Codes and Standards Program and coordinate staff participation in consensus standards organizations. Establish process for reviewing NRC's use of standards for updating existing references.	•Provide support to Interagency Committee on Standards Policy (ICSP). (Ongoing, specific dates depend on ICSP schedule). **(Target: 09/03)** •Annual report on participation in Codes and Standards activities to OMB via NIST. **(Target: 09/03)** •Hold semi-annual public meeting with Standards Development Organizations to coordinate overall standards activities. **(Target: 09/03)** •Issue final process description to program offices NRC-wide. Update industry standard references (rules, RG, SEP). **(Target: 12/03)**
Follow code activities. Participate in Codes and Standards (ASME) meetings to provide staff input and guidance to help assure promulgated codes and standards can be endorsed in the regulatory process. Address modifications of requirements and exceptions.	• Attend and participate as member of ASME Section XI Task Group on risk informed containment (TGIRI-C) examination. The charter of the TG/RI-C is to advance the use of risk-informed and performance-based methodologies to determine appropriate examination requirements for nuclear power plant containments. Provide NRC briefing to the group including status of regulatory issues and their bases in a timely manner. Provide appropriate NRC staff with summary of task group meetings. (On-going) **(Target: 09/03)** •ASME/B16 Subcommittee N, Steel Valves - ASME activities involving valve design requirements. Report progress and initiate appropriate follow-up actions. (On-going) **(Target: 09/03)** •ASME O&M-ASME activities involving in-service testing of safety related 09103 pumps, including issues to implement risk-informed testing. Report progress and initiate appropriate follow-up actions. (On-going) **(Target: 09/03)**

Table 4.6 Past, Ongoing and Planned Activities in Development and Endorsement of Consensus Codes and Standards (Cont'd)

Activity	Major Task (s)
Follow code activities. Participate in Codes and Standards (ASME) meetings to provide staff input and guidance to help assure promulgated codes and standards can be endorsed in the regulatory process. Address modifications of requirements and exceptions. (Cont'd)	•Attend and participate as member of ASME Section Xi Working Group on implementation of risk-informed in-service inspection (RI-ISI). Provide NRC briefing to the group including status of regulatory issues and their bases in a timely manner. Provide comments on ASME XI Code Cases in coordination with NRR and report on progress of NRC documents such as regulatory guides related to RI-ISI. Provide appropriate NRC staff with summary of working group meetings. (On-going) **(Target: 09/03)** •ASME Section XI-ASME activities involving in-service inspection of safety related components including issues to implement risk-informed inspection. Report progress and initiate appropriate follow-up actions. **(Target: 09/03)** •ASME Section XI, Working Group on Containment. Assign staff members to attend and participate in relevant code meetings. Focus will be on potential revisions of IWE and IWL based on NDE research results. Report progress and initiate appropriate follow-up actions. (On-going) **(Target: 09/03)** •ASME Board On Nuclear Codes and Standards-ASME activities involving construction and in-service inspection of safety related components and in-service testing of safety related pumps and valves including issues to implement risk-informed inspection and testing. Report progress and initiate appropriate follow-up actions. (On-going) **(Target: 09/03)** •ASME O&M - ASME activities involving general requirements for in-service testing of safety related pumps, valves and snubbers, including issues to implement risk-informed testing. Report progress and initiate appropriate follow-up actions. (On-going) **(Target: 09/03)**

Table 4.6 Past, Ongoing and Planned Activities in Development and Endorsement of Consensus Codes and Standards (Cont'd)

Activity	Major Task (s)
Follow code activities. Participate in Codes and Standards (ASME) meetings to provide staff input and guidance to help assure promulgated codes and standards can be endorsed in the regulatory process. Address modifications of requirements and exceptions. (Cont'd)	•Attend ASME/NQA Main Committee meeting and ancillary meetings to discern ongoing and probable future actions by the committee with regard to changes to the standard which will affect its acceptability to NRC and act on NRC's behalf as appropriate. Coordinate staff participation in meetings, including involvement in a code day here at NRC when appropriate and preparation of a report to the ASME/NQA regarding ongoing QA related activities. (On-going) **(Target: 09/03)** • Attend and participate as member of ASME Section III Special Working Group (SWG) on probabilistic methods in design to discern ongoing and probable future actions by the group with regard to changes in the ASME Code which will affect its acceptability to NRC and act on NRC's behalf as necessary. The objective of this Group is to develop risk-informed analysis and design methodologies for ASME Section III piping utilizing the probabilistic procedure known as load resistance factor design (LRFD). Provide appropriate NRC staff with summary of working group meetings. (On-going) **(Target: 09/03)** •Continue participation in ASME Section XI meetings related to development of guidance on RPV Integrity. Report progress and initiate appropriate follow-up actions. (On-going) **(Target: 09/03)UN-NRR** •ASME Section III-ASME activities involving construction requirements for safety related components for nuclear power plants. Report progress and initiate appropriate follow-up actions. (On-going) **(Target: 09/03)UN-NRR** •ASME Main Boiler and Pressure Vessel Standards Committee-ASME activities involving construction and in-service inspection requirements for safety related components including issues related to risk-informed nspection. Report progress and initiate appropriate follow-up actions. **(Target: 09/03)UN-NRR**

Table 4.6 Past, Ongoing and Planned Activities in Development and Endorsement of Consensus Codes and Standards (Cont'd)

Activity	Major Task (s)
Follow code activities. Participate in Codes and Standards (ASME) meetings to provide staff input and guidance to help assure promulgated codes and standards can be endorsed in the regulatory process. Address modifications of requirements and exceptions. (Cont'd)	•Continue to participate in ASME SC XI-activities on pipe flaw evaluation methods. Report progress and initiate appropriate follow-up actions. (Ongoing) **(Target: 09/03)** •Participate as a member of the ASME NQA Working Groups on Standards Interface and Program Management Processes. Inform working groups in a timely manner of regulatory issues and their bases. Provide appropriate NRC staff with prompt summary of working group meetings. (On-going) **(Target: 09/03)**
Follow code activities. Participate in codes and standards (ASTM) meetings to provide staff input and guidance to help assure promulgated codes and standards can be endorsed in the regulatory process. Address modifications of requirements and exceptions.	•Participate in ASTM Committee D-33 on coatings for power generating facilities. (On-going) **(Target: 09/03)** •Participate in ASTM Committee E10 on irradiation effects on materials. (On-going) **(Target: 09/03)** •Participate in ASTM Committee E08 on fatigue and fracture. **(Target: 09/03)**
Follow code activities. Participate in codes and standards (IEEE) meetings to provide staff input and guidance to help assure promulgated codes and standards can be endorsed in the regulatory process. Address modifications of requirements and exceptions.	•Continue to participate in IEEE activities (Std. 692, Standard Criteria for Security Systems for Nuclear Power Generating Stations, Working Group 3.2) (On-going) **(Target: 09/03)** •Participate in IEEE activities related to EQ. Report progress and initiate appropriate follow-up actions (SC2). (On-going) **(Target: 09/03)** •Continue to participate in IEEE activities related to standards on operations, maintenance, aging and testing of electric equipment. Report progress and initiate appropriate follow-up actions (SC3). (On-going) **(Target: 09/03)**

Table 4.6 Past, Ongoing and Planned Activities in Development and Endorsement of Consensus Codes and Standards (Cont'd)

Activity	Major Task (s)
Follow code activities. Participate in codes and standards (IEEE) meetings to provide staff input and guidance to help assure promulgated codes and standards can be endorsed in the regulatory process. Address modifications of requirements and exceptions. (Cont'd)	•Continue to participate in IEEE activities related to standards on safety systems. Report progress and initiate appropriate follow-up actions (NPEC). (On-going) **(Target: 09/03)** •Develop Rev. 2 to Reg. Guide 1.153, "Criteria for Safety Systems" to reflect the current state-of-technology. Closely work with the NRR staff in developing the associated rulemaking (10 CFR 50.55 a(h)). **(Target: 09/05)** •Resolve public comments, prepare ACRS/CRGR package, and publish the final Reg. Guide 1.53, Rev. 1, "Application of the Single-Failure Criterion to Safety Systems." (need NRR and OGC concurrence) **(Target: 09/03)** • Develop draft Reg. Guide 1.75, "Independence of Safety-Related Equipments and Circuits," that endorses IEEE Std. 384-1992. (need NRR, OGC & CRGR concurrence) **(Target: 09/03) UN-NRR** • Submit for publication the final revision to Reg. Guide 1.75. **(Target: 09/04)UN-NRR**
Follow code activities related to civil and mechanical engineering and digital I&C. Participate in codes and standards meetings to provide staff input and guidance to help assure promulgated codes and standards can be endorsed in the regulatory process. Address modifications of requirements and exceptions.	•Input to ACI 349/359 Committee on tests of anchors and regulatory activities related to Seismic Category I Concrete Structures. Report progress and initiate appropriate follow-up actions. (On-going) Completion of this activity is based on ASME or ANS completing their portions. **(Target: 09/03) UN-NRR**
Coordinate NRC review of IAEA standards.	•Review the IAEA Standards in preparation for October 2003 NUSSC meeting. **(Target: 10/03)**

Table 4.7 Past, Ongoing and Planned Activities in Impact of Advancements in Earth Sciences

Issue Description: *Advancements in field investigation techniques, Instrumentation, and data analysis capabilities in earth sciences should be Incorporated Into the regulatory framework to assure maintenance of safety and to provide opportunities for reducing unnecessary licensee burden.*	
Activity	**Major Task (s)**
Participate in CSNI IAGE (old PWG-3), Seismic Subgroup.	•Attend and participate in the meeting of CSNI IAGE, Seismic Subgroup; organize and participate in workshops on seismic re-evaluation of nuclear power plants and seismic performance of multi-axes shear walls; participate in follow-on activities for Istanbul workshop on strong round motion including review of proceedings. **(Target: 09/03)**

Table 5.1 Past, Ongoing and Planned Activities in Acceptance Criteria for Extended Fuel Burn-up

Issue Description: *NRC has approved use of high burn-up fuel and Industry has notified NRC of its intention to request additional burn-up extensions. New data on the behavior of irradiated fuel suggests that current acceptance criteria for plant operation and long-term fuel use may not be adequate at high burn-ups. Further tests and analyses are necessary to confirm existing requirements or serve as the basis for revising them, and to provide the bases for additional burn-up extension that will be requested by the Industry.*

Activity	Major Task (s)
Determine adequacy of criteria and analyses for reactivity-initiated accidents (RIAs) for high-burnup fuel including the utilization of advanced cladding M5, Zirlo). This activity includes cooperative international work.	•Update the agency program plan for high burnup fuel. **(Target: 06/03)** •Complete final testing in sodium loop in Cabri test reactor. **(Complete: 12/02) SRM** •Complete mechanical properties tests on Robinson fuel. **(Target: 10/03) SRM** •Complete in-house calculations for temperature and pulse-width correction of test data. **(Target: 10/03) SRM** •Complete BNL RIA calculations for fuel enthalpy vs. control rod worth. **(Target: 10/03) SRM** •Summarize the results from PWR rod-ejection and BWR rod-drop accidents for fuel irradiated to 62 GWd/t burn-up and issue confirmatory assessment. (NOTE: Schedule for Cabri tests are decided by a foreign entity and are not controlled by the NRC.) **(Target: 12/03) SRM** •Issue RIL with confirmatory assessment of RIAs to 62 Gwd/t. **(Target: 01/04) SRM** •Complete construction of water loop in Cabri test reactor. **(Target: 12/05) SRM** Complete testing in Cabri of PWR rod-ejection accidents and provide technical basis for revisions of associated SRP and RG 1.77 as necessary. **(Target: 12/08) SRM**

Table 5.1 Past, Ongoing and Planned Activities in Acceptance Criteria for Extended Fuel Burn-up (Cont'd)

Activity	Major Task (s)
Determine adequacy of criteria and analyses for loss-of-coolant accidents (LOCAs) for high-burnup fuel including the utilization of Zircaloy cladding.	•Complete integral LOCA 3-test matrix of high burn-up BWR fuel. **(Target: 06/03) SRM** •Complete oxidation kinetics tests of Robinson high burn-up PWR cladding. **(Target: 08/03) SRM** •. Conduct first integral LOCA test of high burn-up PWR fuel. **(Target: 09/03) SRM** •Complete post-quench ductility tests on range of unirradiated cladding alloy. **(Target: 12/03) SRM** •Complete first in-reactor LOCA test in the Halden reactor with high-burnup fuel. **(Target: 03/04) SRM** •Issue staff assessment of low LOCA ductility in some Nb-bearing cladding alloys. **(Target: 03/04) SRM** •Complete post-quench ductility tests on irradiated Zircaloy cladding. **(Target: 06/04) SRM** •Issue confirmatory assessment of criteria in 10 CFR 50.46 and models in Appendix K for LOCA assessment of Zircaloy-clad fuel irradiated to 62 Gwd/t burn-up. **(Target: 12/04) SRM**
Nuclear fuel characterizations and modeling (Malibu data).	•Verify neutronics code using data from high burn-up rods. **(Target: 01/05)**
Determine adequacy of criteria and analysis for BWR oscillations	•Issue plan for analysis with GENFLOW-FRAPTRAN to support assessment of adequacy. **(Target: 09/03) SRM**
Determine adequacy of radiological source term (REBUS).	•Participate in ANS-5.4 standards committee meeting. **(Complete: 03/03)** •Acquire fission product data from Japan (VEGA) and France (VERCORS). **(Target: 01/05)**

Table 5.2 Past, Ongoing and Planned Activities in Evaluating Synergistic Effects of Design and Operational Changes

Issue Description: *Changes In fuel cycle length, power upgrades, and plant life extension have been postulated to have synergistic Interactions.*	
Activity	**Major Task (s)**
Provide technical assessment of the synergistic effect of design changes and operational changes due to deregulation. (Thermal-hydraulic, severe accident, and fuel)	•Complete TRAC-M assessment for synergy. **(Date is TBD)** •Start 3D kinetics ATWS calculations. **(Date is TBD)** Issue synergy project plan for first phase of analysis. **(Complete: 03/03)** •Complete summary of synergy expert panel review meetings. **(Target: 08/03)** •Complete deterministic analysis of selected synergy scenarios. **(Target: 10/03)** •Complete risk significance determination of selected synergy scenarios. **(Target: 01/04)** •Issue interim report on synergy project results. **(Target: 03/04)**
Provide technical assessment of the synergistic effect of design changes and operational changes due to deregulation.	•Provide support, as needed, to DSARE on PRA methods on synergistic effect issues. (On-going) **(Target: 09/03)**
Provide technical assessment of the materials engineering aspects of synergistic effect of design changes and operational changes due to power uprates and license renewal.	•Develop research plan to address synergistic effects of uprates and license renewal. **(Target: 11/02)**
Provide technical assessment of the mechanical engineering aspects of the synergistic effect of design changes and operational changes due to power uprates and license renewal.	•No work defined in FY 2003.

Table 6.1 Past, Ongoing and Planned Activities in The Operational Events Risk Analysis and Data Assessment

Issue Description: *The risk significance of operational events and trends In data from reactor operations Including trends In a) Initiating events, b) system reliability and availability, c) component reliability, d) occurrences of common cause failure modes and e) events occurring at low power and shutdown conditions need to be assessed In conjunction with current PRAs so that safety Vulnerabilities can be Identified on a timely basis and so that PRA assumptions can be updated to improve the accuracy and credibility of risk assessments.*

Activity	Major Task (s)
Industry trends support	• Complete report on the integrated industry initiating event indicator. **(Target: 09/03) UN** • Provide updated graphs and trends through FY 2002 for system reliability, common-cause failures, fire events, initiating events, and components. **(Target: 10/03) UN**
Conduct long-term analysis and evaluations of safety significant issues.	• Participation as a member of Operating Experience Task Force. **(On-going) EDOD** •Maintain scram database to facilitate independent review of operating experience. (On-going) **SRM** • Prepare draft report on operating experience on recurring risk significant events. **(Target: 02/04) SRM** • Issue final report for external review and comment on operating experience regarding synergistic effects between NPP and grid. **(Completed 04/03) SRM** • Issue draft report for comment on gas cooled reactor operating experience. **(Target: 06/03)** • Represent NRC at NEA/WGOE meeting **(10/03).**
Accident Sequence Precursor (ASP) program.	• Identify "significant" precursors for FY 2003 for input to OCFO. **(Target: 12/03) EDOD** • Forward to EDO the latest annual SECY report on the status of the ASP/SPAR model programs. **(Completed 03/03, Target: 03/04) SRM**

Table 6.1 Past, Ongoing and Planned Activities in The Operational Events Risk Analysis and Data Assessment (Continued)

Activity	Major Task (s)
Reactor performance data collection program.	• Finalize the consolidated data collection and coding system functional requirements specifications. **(Completed 02/03) SRM** •Reduce coding in SCSS by eliminating coding of sequences. **(Target: 06/03) SRM** • Complete design of initial OERAB data and analysis web pages and begin 3-month trial period on the RES internal web site. **(Target: 06/03) SRM** • Complete the development of the consolidated data collection and coding system, including key features from SCSS and beginning of trial use period. **(Target: 08/03) SRM** • Completion of final version of the OERAB data and analysis web pages. **(Target: 09/03) SRM** • Maintain and update the consolidated data collection and coding system with latest quarterly data to be available for use in the industry trend program updates. **(Target: 09/03) SRM** • Maintain and update the SCSS with the latest quarterly data available through 08/2003. **(Target: 09/03) SRM** • Complete evaluation of artificial intelligence software for use in consolidated data collection and coding system process. **(Target: 10/03) SRM**
Reactor Oversight Process (ROP) support.	• Complete a final report on SDP/ASP differences. **(Target: 09/03) UN** • Provide a draft report presenting the results of independent verification of mitigating system performance index values for the ROP pilot plants. **(Target: 09/03) UN**

Table 6.1 Past, Ongoing and Planned Activities in The Operational Events Risk Analysis and Data Assessment (Continued)

Activity	Major Task (s)
Operating Experience Task Force (Joint RES/NRR)	• Recommendation to the Steering Committee for the objectives and attributes of the agency reactor operating experience program. **(Completed 04/03)** • Draft report to the Steering Committee recommending specific program improvements and their bases. **(Target: 09/03)** •Final report to the Steering Committee. **(Target: 11/03)**

Table 6.2 Ongoing and Planned Activities in Risk-informing the agency's regulation and regulatory actions

Issue Description: *Many of NRC's existing regulations (e.g., Part 50) and practices were derived using deterministic bases and do not always focus on the most risk-significant items, leading to unnecessary burden on licensees and, potentially, less priority given to Important safety matters.*	
Activity	**Major Task (s)**
Technical support for risk-informed 50.44 rule-making.	• Provide final report on hydrogen control benefits for GSI-1 89. **(Completed: 12/02) UN** • Provide NRR with draft report on hydrogen source term uncertainty assessment. **(Completed: 03/03) UN**
Technical support for 50.46 rule-making.	•Complete letter report reviewing the concept and implementation of RI-ISI assumptions, approach, analysis methodology, and interpretation. **(Target: 12/02)** •Conduct LOCA issue development meeting as part of expert elicitation process. **(Completed 02/03)** •Complete technical letter report documenting the methodology and results utilized by EMCC to determine LOCA frequencies during the expert elicitation process. **(Target: 10/03)** •Complete report summarizing the results of the elicitation process including the individual elicitation results, the analysis of these results, and the determination of final LOCA frequency estimates. **(Target: 12/03)** •Complete report summarizing the elicitation process including assumptions, approach, and procedures. **(Target: 12/03)** •Complete report summarizing the findings of the flaw distribution evaluation of selected class 1 piping bimetal and stainless steel welds. The study will determine flaw density and sizing distribution for comparison with Prodigal predictions and RPV distributions. **(Target: 03/04)**

Table 6.2 Ongoing and Planned Activities in Risk-informing the agency's regulation and regulatory actions (Continued)

Activity	Major Task (s)
	• Complete-formal elicitation to support pipe break design basis redefinition. **(Target: 12/03) SRM** •Redefine the spectrum of pipe break sizes using the results from expert elicitation process. **(Target: 03/04) SRM** •Complete final technical letter report documenting the results of confirmatory analyses of LBLOCA frequency vs. break size using probabilistic LOCA code. **(Target: 06/05)** •Complete probabilistic LOCA computer code and users manuals. The code should incorporate the contributions of piping fracture, non-piping component failure, and future failure mechanisms to the LOCA frequency. The code must also develop initiating frequencies as a function of leak rate. **(Target: 07/05)** •Complete NUREG/CR report summarizing the findings and results of the Battelle/EMCC piping program from FYs 2002 thru 2005. **(Target: 08/05)** •Append pipe fracture encyclopedia CD-ROM to incorporate reports, computer codes, and data developed during FYs 2002 thru 2005. **(Target: 09/05)**
Provide technical support for 50.46 rule-making. Perform thermal hydraulic analysis.	•Complete technical analysis of rule-making petition including metal water reaction analysis of Zircaloy FLECHT tests and physical chemistry of zirconium oxidation. **(Target: 06/03) NRR-TAR** •Complete calculations and draft report on zirconium-steam reaction effects on LOCA peak cladding temperature to evaluate non-embrittlement aspects of 50.46 temperature limit. **(Target: 09/05) RIRIP**

Table 6.2 Ongoing and Planned Activities in Risk-informing the agency's regulation and regulatory actions (Continued)

Activity	Major Task (s)
Provide technical support for risk-informed and performance-based changes to Part 50.	•Conduct a public meeting to discuss the framework for risk-informing the technical requirements of 10 CFR Part 50 and options for future activities associated with risk-informing 10 CFR Part 50. **(Completed: 12/02) RIRIP** •Provide semiannual update to the Risk-informed Regulatory Implementation Plan (RIRIP) to the EDO. **(Completed: 01/03) RIRIP** •Complete initial assessment of regulatory activities for generic rule implications. **(Completed 04/03) RIRIP** •Provide status to Commission on Option 3. **(Target: 06/03) RIRIP**
Establish guidance for risk-informed licensing basis changes.	•Transmit SECY paper with proposed final regulatory guide on PRA quality (assuming no pilots). **(Target: 06/03) RIRIP** •Provide annual review of Reg. Guide 1.174 and SRP Chapter 19 to EDO. **(Target: 06/03) RIRIP** •Provide annual review of application specific risk-informed regulatory guides to EDO. **(Target: 08/03) RIRIP** •Finalize regulatory guide on use of PRA in risk-informed in-service inspection of piping. **(Target: 08/03) RIRIP** •Finalize NUREG addressing technical issues re: RI-ISI, Reg. Guide 1.178 and SRP 3.9.8. **(Target: 08/03) RIRIP** •Issue final Reg. Guide DG-1120, "Transient and Accident Analysis Methods." **(Target: 09/03) NRR-UN**

Table 6.3 Ongoing and Planned Activities in Development of PRA methods and standards

Issue Description: *Current PRA methods do not adequately address certain key aspects of plant risk, Including human reliability, fire, external events, shutdown operations and fuel storage and the most recent morbidity and mortality models. Uncertainty concerning the nature and magnitude of the contribution of these variables to plant risk, particularly as they affect such risk metrics as core damage frequency and large early release frequency, and the lack of standardization of PRAs are limiting progress toward risk-informed regulation. This is a COOPRA bilateral agreement.*

Activity	Major Task (s)
Support development of standards for probabilistic risk assessment by national standards committees, in support of NRC work to extend the use of PRA in agency regulatory activities.	• Issue draft data handbook for public comment. **(Complete 02/03) RIRIP** • Issue final data handbook (if no significant comments). **(Target: 09/03) RIRIP** •Final PRA standard on external hazards issued by ANS. **(Target: 09/03) RIRIP** •Provide update of draft NUREG/CR-6595 to address LERF evaluation for low power and shutdown conditions, in support of ANS standard on LPSD. **(Target: 09/03) RIRIP** •Draft PRA standard on LPSD issued by ANS for public comment. **(Target: 12/03) RIRIP** •Draft PRA standard on fire issued by ANS for public comment. **(Target: 10/04) RIRIP**
Develop improved methods for calculating risk in support of risk-informed regulatory decision-making.	• Support Halden performing simulator experiments for use in HRA modeling and data analysis. **(Target: 09/03) RIRIP** • Support international (e.g., CSNI) HRA activities on the identification of HRA data needs. **(Target: 09/03) RIRIP** • Provide final report on low power shutdown survey to CSNI working group risk. **(Target: 09/03) RIRIP (Draft Completed 03/03)** • Report on lessons learned from ATHEANA application to PTS. **(Complete 04/03) RIRIP**

Table 6.3 Ongoing and Planned Activities in Development of PRA methods and standards (Continued)

Activity	Major Task (s)
Develop improved methods for calculating risk in support of risk-informed regulatory decision-making. (Cont'd)	•Complete final report for management review on implications of hydrogen research on Level 2 PRA. **(Complete 03/03) RIRIP** •Draft on the review of second generation HRA methods and plan for addressing current HRA needs. **(Complete 04/03) RIRIP** •Guidance on performing and reviewing HRAs. **(Target: Draft 05/03, Final 12/03) RIRIP** •Initiate COOPRA HRA working group activities. **(Target: 05/03) RIRIP** •Develop proposed charter for COOPRA uncertainty analysis working group. **(Target: 06/03) RIRIP** •Convene seventh international cooperative PRA research program meeting in Paris, France. **(Target: 09/03) RIRIP** • Draft Prototype Extraction Tool allowing utilization of various HRA data sources. **(Target: 12/03) RIRIP** • Use of Prototype Extraction Tool on specific data source(s). **(Target: 12/03) RIRIP** • Report on lessons learned from ATHEANA applications on fire and SGTR. **(Target: 12/03) RIRIP**
Maintain analytical tools for staff risk applications.	• Continue ATHEANA maintenance (On-going). **(Target: 09/03) RIRIP** •Continue SAPHIRE computer code data entry and maintenance (On-going). **(Target: 09/03) RIRIP** •Finalize SAPHIRE validation and verification plan and recommendations. **(Target: 05/03) RIRIP**

Table 6.3 Ongoing and Planned Activities in Development of PRA methods and standards (Continued)

Activity	Major Task (s)
Develop and apply methods for assessing fire safety in nuclear facilities. This is an in-kind cooperative research with EPRI.	•Complete update on fire risk research plan. **(Target: 06/03) RIRIP** •Complete quantification framework for fire protection SDP revision. **(Completed: 02/03) RIRIP** •Develop final fire protection SDP methodology. **(Target: 09/03) RIRIP** •Complete report for second international benchmark exercise on turbine hall fires. **(Target: 09/03) RIRIP** •Complete report on fire risk requantification. **(Target: 12/03) RIRIP** •Complete report on third international benchmark and validation exercises on cable tray fires. **(Target: 12/03) RIRIP** •Conduct workshop on fire risk requantification study results and insights. **(Target: 12/04) RIRIP**
SPAR model development program	•Complete all Revision 3i SPAR models and issue for use. **(Target: 11/02) UN** •Document LERF SPAR models completed from 09/2002 through 08/2003. **(Target: 09/03) UN** •Document LP/SD SPAR models completed from 09/2002 through 08/2003. **(Target: 09/03) UN** •Document users' needs and results of evaluation of external events analysis methodology. **(Target: 09/03) UN** •Document completion of all onsite QA reviews of Rev. 3i SPAR models, revision of models to address review results, and certification of all 72 models as Rev. 3 SPAR models suitable for general use. **(Target: 01/04) UN**

Table 6.3 Ongoing and Planned Activities in Development of PRA methods and standards (Continued)

Activity	Major Task (s)
SPAR model development program (Cont'd)	•Issue draft program plan for developing a prototype SDP front-end interface for internal review. **(Target: 03/04) UN** •Issue draft program plan for developing prototype templates for external events and issue for internal peer review/evaluation by key users. **(Target: 03/04) UN** •Issue prototype SDP front-end interface to key users for beta testing/evaluation. **(Target: 06/04) UN** •Issue first prototype template for external events to key users for internal review/evaluation. **(Target: 06/04) UN** •Revise first prototype template for external events to address review comments and issue final template and associated users' guidance. **(Target: 09/04) UN** •Document LERF SPAR models completed from 09/2003 through 08/2004. **(Target: 09/04) UN** •Document LPISD SPAR models completed from 09/2003 through 08/2004. **(Target: 09/04) UN**
Response to ACRS recommendations on risk-informed decision-making techniques.	• Provide example decisions to COOPRA RIDEM task group. **(Target: 09/03)**

Table 6.4 Ongoing and Planned Activities in Development of Technical Basis to Support Risk-inform NRC Regulations and Regulatory Actions

Issue Description: *Many of NRC's existing regulations (e.g., Part 50) and practices were derived using deterministic bases and do not always focus on the most risk-significant Items, leading to unnecessary burden on licensees and, potentially, less priority given to Important safety matters.*	
Activity	**Major Task (s)**
Develop confirmatory data and analyses on the structural capacity and failure modes for the variety of containment designs up to and including severe accident pressures and temperatures.	•Submit to publications the NUREG/CR on structural failure mode test of prestressed concrete containment vessel. **(Complete: 03/03)**
Prepare revision of draft Regulatory Guide, DG-1099, "Anchoring Components and Structural Supports in Concrete," for public comment, and publish revision to regulatory guide.	•Resolve public comments and send final draft Reg. Guide DG-1099 to NRR and OGC for concurrence. **(Target: 05/03) UN** •Brief ACRS and CRGR on final Reg. Guide DG-1099. **(Target: 09/03) UN** •Publish final Reg. Guide on anchorage to concrete. **(Target: 12/03) UN**
Prepare revision of Reg. Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants." for public comment, resolve public comments, and publish revision to regulatory guide.	•Issue draft Reg. Guide 1.60 for public comment. **(Target: TBD)** •Submit draft revision of Reg. Guide 1.60 for office-level/ACRS review. **(Target: TBD)** •
Revise Regulatory Guide 1.165, "Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion," based on the results and insights obtained from the above activity which provided the technical basis to revise Regulatory Guide1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants."	•Issue draft Reg. Guide 1.165 for public comment. **(Target: TBD)** •Issue final Reg. Guide 1.165. **(Target: TBD)**

Table 6.4 Ongoing and Planned Activities in Development of Technical Basis to Support Risk-inform NRC Regulations and Regulatory Actions (Continued)

Activity	Major Task (s)
Develop confirmatory data and validated analytical techniques to assess the design and margin capacity of structures, systems, and components based on tests on the Tadotsu Shake Table, which are part of a cooperative program with Japan.	• Final NUREG/CR on soil-structure interaction to NRC for publication. **(Target: 06/03)** •Draft NUREG/CR on ultimate strength piping test program for NRC review. **(Target: 09/03)**
Reduce uncertainties associated with the propagation of earthquake ground motion through the collection and analyses of earthquake records and the benchmarking of analytical models and maintain NRC's geosciences capability.	•Earthquake record database upgrades received on a monthly basis. Alert management of significant events and recommend appropriate action. **(Ongoing)** • Receive contractors final report on seismic hazard analysis for Watts Bar. **(Target: 11/02)** •Present draft Reg. Guide 1.132 (DG-1101) "Site Investigations for Foundations of Nuclear Power Plants" to ACRS. **(Completed: 04/03) UN** • Submit for publication final Reg. Guide 1.132 (DG-1101). **(Target: 06/03) UN** •Incorporate public comments and provide draft Reg. Guide DG-1105, "Procedures and Criteria for Assessing Seismic Soil Liquefaction at Nuclear Power Plant Sites" to NRR for comment. **(Completed: 03/03) UN** •Present draft Reg. Guide DG-1105 to ACRS. **(Target: 09/03) UN** •Incorporate public comments and provide draft Reg. Guide 1.138 (DG-1109), " Laboratory Investigations of Soils and Rocks for Engineering Analysis and Design of Nuclear Power Plants", to NRR for comment. **(Target: 05/03) UN** •Present draft Reg. Guide DG-1 109 to ACRS. **(Target: 10/03) UN**

Table 7.1 Past, Ongoing and Planned Activities in Developing and Assessing Thermal-hydraulic Codes

Issue Description: *The thermal hydraulic codes must be updated to be able to handle broader classes of accidents and transients coupled with Improved knowledge of uncertainties to provide effective and efficient tools for use In licensing on a continuing basis and to make Independent safety Judgments Including 1) assessment of plant safety margins, 2) providing answers to "what-if scenarios In assessing operating events, and 3) providing technical bases for making risk-Informed decisions (e.g. Identifying conservatism In Initial and boundary conditions that Inhibit making 10 CFR 50.46 risk Informed). User support should be provided and any errors need to be identified and corrected.*

Activity	Major Task (s)
Provide RELAP5 maintenance, user support, and updates during transition to the TRAC-M consolidated code.	•Conduct RELAP5 workshop. **(Target: 07/03)**
Provide TRAC-M code maintenance, user support and code updates.	•Complete critical flow model assessment. **(Complete: 01/03)** •Issue beta version of TRAC-M. **(Complete: 04/03)** •Complete reflood model assessment. **(Target: 06/03)** •Complete BWR integral test assessment. **(Target: 01/04)** •Complete bypass model assessment. **(Target: 01/04)** •Provide draft TRAC-M Users Guide for BWR models and RELAP5. **(Target: 01/04)** •Public release of consolidated TRAC-M code. **(Target: 01/04)** •Perform PIRT-based developmental assessment of TRAC-M for BWR applications. Construct test matrix, perform initial assessment, issue comparison report and enter tests in the auto-validation tool. **(Target: 06/04)**

Table 7.1 Past, Ongoing and Planned Activities in Developing and Assessing Thermal-hydraulic Codes (Cont'd)

Activity	Major Task (s)
Provide TRAC-M code maintenance, user support and code updates. (Cont'd)	•Perform PIRT-based development assessment of TRAC-M for PWR SBLOCA and LBLOCA applications. Construct test matrix, perform initial assessment, issue comparison report and enter tests in the auto-validation tool. **(Target: 12/04)** •Complete PWR SBLOCA integral test assessment. **(Target: 01/05)**
Provide SNAP code maintenance and user support including extending code capability to other computer codes.	•Complete CONTAIN code post-processing using ACGRACE. **(Target: 12/02)** •Complete TRAC-M model editor and update SNAP to support new TRACM/RELAP5 consolidation. **(Target: 12/02)** •Add restart capability to TRAC-M model editor. **(Target: 05/03)** •Add CONTAIN code pre-processing capability to the SNAP model editor. **(Target: 09/03)**
Perform rod bundle heat transfer experiments to supplement the data base to improve the reflood model in the TRAC-M code.	•Define test matrix for Phase I interfacial drag tests. **(Target: 06/03)** •Perform Phase I of interfacial drag tests. **(Target: 12/03)**
Provide data and develop models to improve TRAC-M code.	•Prepare a draft NUREG/CR report summarizing experimental results and analytical model development for interfacial area transport. **(Target: 12/02)** •Prepare a draft NUREG/CR report summarizing experimental results and analytical model development for subcooled boiling at low pressures. **(Target: 01/03)**

Table 7.1 Past, Ongoing and Planned Activities in Developing and Assessing Thermal-hydraulic Codes (Cont'd)

Activity	Major Task (s)
Provide data and develop models to improve TRAC-M code. (Cont'd)	•Prepare a draft NUREG/CR report summarizing experimental results and analytical model development for phase separation in tees. **(Target: 12/02)** •Develop model for condensation with non-condensable gas for suppression pool. **(Target: 09/03)** •Develop model for condensation with non-condensable gas for PCCS. **(Target: 09/03)** •Incorporate improved subcooled boiling models in TRAC-M based on data obtained from UCLA rod bundle heat transfer tests. **(Target: 01/04)** •Improve the formulation of the energy equation in TRAC-M. **(Target: 01/04)** •Implement a droplet field in TRAC-M. **(Target: 01/04)** •Incorporate improved model for phase separation at tees based on ATLATS test data. **(Target: 01/04)** •Implement a fully implicit solution for 1-D components in TRAC-M. **(Target: 01/05)** •Develop a higher order differencing scheme in TRAC-M for boron transport and liquid energy equations. **(Target: 01/05)** • Implement two-group bubble model in pilot code. **(Target: 01/05)** •Develop model for interfacial friction for rod bundles at low pressure. **(Target: 01/05)** •Implement interfacial area transport model in TRAC-M. **(Target: 01/06)**

Table 7.1 Past, Ongoing and Planned Activities in Developing and Assessing Thermal-hydraulic Codes (Cont'd)

Activity	Major Task (s)
Provide data and develop models to improve TRAC-M code. (Cont'd)	•Improve reflood heat transfer model. **(Target: 01/06)**
LWR realistic uncertainty analysis Methodology using TRAC-M.	• No work defined in FY 2003.
Develop thermal hydraulic data at the University of Maryland loop, PKL, and PANDA for developing and assessing thermal hydraulic codes.	•Complete the test plan for PANDA containment tests. **(Complete: 12/02)** •Completion of PKL natural circulation tests. **(Complete: 02/03)** •Completion of PANDA tests. **(Target: 12/05)**

Table 7.2 Past, Ongoing and Planned Activities in Developing and Assessing Fuel Behavior Codes

Issue Description: *The fuel behavior codes must be updated to be able to handle high burnup fuel, MOX, and advanced fuel designs.*	
Activity	**Major Task (s)**
Provide updates to the FRAPCON and FRAPTRAN fuel codes which permit code use for licensing purposes for high burnup fuel, MOX, and advanced fuel designs.	• Conduct User Group Seminar. **(Target: 09/03)** •Incorporate mechanical property information for irradiated Zircaloy into MATPRO material property library. **(Target: 12/03)** • Acquire new Halden data for code improvements at Halden EHPG meeting. **(Target: 03/04)**

Table 7.3 Past, Ongoing and Planned Activities in Developing and Assessing Severe Accident Codes

Issue Description:	
Activity	**Major Task (s)**
Consolidate the capabilities of the current suite of severe accident codes into the MELCOR code and provide maintenance, user support, and updates during the transition to the consolidated Severe Accident Code.	• Conduct spring CSARP meeting and issue meeting summary. **(Target: 05/03)** •. Complete consolidation of SA codes. **(Target: 12/03)** •Release MELCOR 1.8.6. **(Target: 01/04)** •Complete MELCOR code modernization. **(Target: 12/04)**
Obtain experimental data on spent nuclear fuel and high burnup fuel under severe accident conditions, including air-oxidizing conditions to support consequence analysis and code model validation. This is a co-funded multi-country international project (PHEBUS)	•Milestones will be developed when international agreement is developed.
Technical support for containment issues (code assessment, MAPP review, licensing code support, etc.)	•Complete Point Beach CONTAIN calculations. **(Date TBD) UN-NRR** •Complete documentation of CONTAIN user guides for public availability. **(Complete: 03/03) UN-NRR** •Complete Beaver Valley CONTAIN calculations. **(Target: 09/03) UN-NRR** •Complete review and assessment of MAAP5 code. (Dependent on receipt of documentation) **(Target: 09/03) UN-NRR**

Table 7.3 Past, Ongoing and Planned Activities in Developing and Assessing Severe Accident Codes (Cont'd)

Activity	Major Task (s)
Obtain experimental data to support accident management and risk assessments that rely on cooling of a molten core in-vessel and to develop an improved basis for risk-informed decision making. Preserve the RASPLAV and MACE facilities. This is a co-funded multi-country international agreement with OECD.	• Complete DCH issue assessment for BWRs and issue report. **(Date is TBD)** •Complete SSWICS-1 and SSWICS-2 separate effect water ingression tests. **(Target: 12/02)** •Provide NRR with OECD SNL lower head failure report. **(Target: 01/03)** •Issue a RIL on the lower head failure. **(Target: 05/03)** •Complete higher temperature zircaloy-4 air oxidation tests under pressurized conditions. **(Target: 06/03)** •Complete low temperature Zirlo air oxidation tests. **(Target: 06/03)** •Finalize design for the first 2D-MCCI test. **(Target: 06/03)** •Complete post-test examination (chemical analysis and strength tests) of SSWICS-1 and SSWICS-2 debris bed. **(Target: 07/03)** •Complete analysis of Zircaloy4 test data and prepare draft report. **(Target: 07/03)** •Complete SSWICS-3 and SSWICS-4 separate effect water ingression tests under the OECD-MCCI Program. **(Target: 07/03)** •Complete prehydrided Zircaloy-4 air oxidation tests. **(Target: 09/03)** •Complete low temperature M5 air oxidation tests. **(Target: 09/03)**

Table 7.3 Past, Ongoing and Planned Activities in Developing and Assessing Severe Accident Codes (Cont'd)

Activity	Major Task (s)
Obtain experimental data to support accident management and risk assessments that rely on cooling of a molten core in-vessel and to develop an improved basis for risk-informed decision making. Preserve the RASPLAV and MACE facilities. This is a co-funded multi-country international agreement with OECD. (Cont'd)	•Provide insight report on chemical behavior of the molten pool (MASCA project). **(Target: 11/03)** •Complete the first 2D-MCCI test CCI-1. **(Target: 12/03)** •Finalize design for the large-scale crust breach tests. **(Target: 01/04)** •Complete post-test examination (chemical analysis and strength tests) of SSWICS-3 and SSWICS-4 debris bed. **(Target: 01/04)** •Issue a RIL on air oxidation of cladding. **(Target: 11/04)**

Table 8.1 Ongoing and Planned Activities in Effectiveness of as low as is reasonably achievable programs (ALARA)

Issue Description: *Achievement of ALARA In licensee operations Is a risk significant component of the NRC's radiation protection framework. Monitoring of licensee radiation exposure data and assessing the significance of any changes In performance are key to assuring that ALARA programs are effective. Also, disseminating information which would facilitate improvements In ALARA will help reduce occupational exposure.*	
Activity	**Major Task (s)**
Monitor licensee performance In meeting ALARA objectives in occupational and public exposure.	•Issue annual report of occupational exposure records reported by licensees as reflected in REIRS. (needs NRR & NMSS review) **(Target: 10/02) Regulatory Requirement**

Table 8.2 Ongoing and Planned Activities in Validation of current health effects models (MACCS)

Issue Description: *Evaluating new data on health effects will enable validation or modification of current health effects models.*	
Activity	**Major Task (s)**
Under the Joint Coordinating Committee for Radiation Effects Research and in cooperation with the former Soviet Union, conduct studies to examine deterministic effects of occupational exposure to radiation. Results will be used to evaluate consequence models used in PRA.	• Issue NUREG on the clinical case summaries of the 60 ARS patients for use in evaluating future over-exposure cases. **(Target: 05/03) SRM**
Maintain analytical tools for staff health effects applications.	• Develop database for reporting effluent data. **(Target: 09/03)** • Provide draft documentation of models, including the automated uncertainty feature, in the revised MACCS2 code for user evaluation as part of beta testing the code. **(Target: 12/03)** • Provide draft NUREG/CR to NRC on documented uncertainty ranges for revised MACCS. **(Target: 12/03)** • Provide the NRC with an updated VARSKIN code to more accurately assess skin doses. **(Target: 04/04)** **UN (NRR and NMSS)**

Table 9 Past, Ongoing and Planned Activities in Preparation for Mixed Oxide Fuel (MOX) Facility Licensing

Issue Description: *Duke Cogema Stone & Webster has submitted a construction authorization application for a DOE-sponsored mixed oxide (MOX) fuel fabrication facility that would produce fuel for commercial nuclear power plants using surplus plutonium from nuclear weapons. NRC is responsible for licensing and regulating such a facility and Is conducting a two-phase, licensing review for construction authorization and operating license in accordance with the SRP published as NUREG-1718. Research needs to be conducted In the areas of digital Instrumentation and control systems, human factors engineering for personnel systems, geologic and seismic engineering, structural analysis, and tornados.*

Activity	Major Task (s)
Review of geologic, seismic, structural and tornado engineering aspects of the MOX facility license application.	•Provide draft SER, Rev. 1 sections on structural and tornado analysis to NMSS. **(Complete: 01/03)** UN=NMSS • Provide draft SER, Rev. 1 sections on geosciences and seismic analysis to NMSS. **(Complete: 03/03)** UN=NMSS
Review the I&C aspects of the MOX facility license application.	•No work defined in FY 2003.
Support NMSS development and review of human factors associated with MOX fuel fabrication facility.	• Provide revised draft final safety evaluation report sections for construction phase to NMSS. **(Complete: 04/03)** UN=NMSS •Provide final safety evaluation report sections for construction phase to NMSS. **(Target: 09/03) UN-NMSS** •Prepare draft safety evaluation report input for operating license. **(Target: 02/04) UN-NMSS** •Prepare final safety evaluation report input for operating license. **(Target: 12/04) UN-NMSS**