

**CNWRA PROGRAM MANAGER'S PERIODIC REPORT
ON ACTIVITIES OF THE
CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES**

For the Fiscal Reporting Period

November 20, 1999 – December 17, 1999

PMPR No. FY2000-3

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ABBREVIATIONS

1D	One-Dimensional	CDF	Cumulative Distribution Function
2D	Two-Dimensional	CDOCS	Consolidated DOCument Management System
3D	Three-Dimensional	CDROM	Compact Disk Read Only Memory
AA	Atomic Absorption	CDTS	Commission Decision Tracking System
AAI	Average Annual Infiltration	CEB	Center for Environmental Biotechnology
AC	Acceptance Criteria	CÉC	Commission of the European Communities
ACD	Advanced Conceptual Design	CFD	Computational Fluid Dynamics
ACF	Alumina (in excess of alkali feldspar), Calcium Oxide, Ferromagnesian Oxide	CFR	Code of Federal Regulation
ACNW	Advisory Committee on Nuclear Waste	CHn	Calico Hills Nonwelded Tuff
ACRS	Advanced Computer Review System	CIAC	Computer Incident Advisory Capability
ACS	American Chemical Society	CISF	Centralized Interim Storage Facility
ADAMS	Agencywide Documents Access and Management System	CLST	Container Life and Source Term
AECL	Atomic Energy of Canada Limited	CM	Configuration Management
AES	Atomic Emission Spectrometry	CNWSA	Center for Nuclear Waste Regulatory Analyses
AMR	Analysis Model Report	COI	Conflict of Interest
AWF	Antler Wash Fault	COPS	CNWSA Operations
AGU	American Geophysical Union	CPP	Cyclic Potentiodynamic Polarization
AI	Administrative Item	CQAM	CNWSA Quality Assurance Manual
ALTS	Apache Leap Test Site	CRG	Center Review Group
AML	Areal Mass Loading	CRM	Corrosion Resistant Material
AMR	Analysis and Model Report	CRWMS	Civilian Radioactive Waste Management System
ANS	American Nuclear Society	CSCS	Constrained Stochastic Climate Simulator
ANSI	American National Standards Institute	CSH	Calcium Silicate Hydrate
AO	Annotated Outline	CSPE	Corrosion Science and Process Engineering
AP	Administrative Procedure	DAS	Data Acquisition System
APB	Acid-Producing Bacteria	DBE	Design Basis Event
AR	Assessment Report	DC	Division of Contracts
ARDR	Activities Related to Development of the NRC High-Level Waste Regulations	DCAA	Defense Contract Audit Agency
ASCE	American Society of Civil Engineers	DCB	Double Cantilever Beam
ASCII	American Standard Code for Information Interchange	DCF	Dose Conversion Factor
ASLB	Atomic Safety and Licensing Board	DCM	Dual Continuum Model
ASME	American Society of Mechanical Engineers	D&D	Decommissioning and Decontamination
ASTM	American Society for Testing and Materials	DECOVALEX	DEvelopment of COupled Models and Their VALidation Against EXperiments in Nuclear Waste Isolation
ASU	Arizona State University	DEIS	Draft Environmental Impact Statement
ATDTS	Automated Technical Data Tracking System	DEM	Digital Elevation Model
BDCF	Biosphere Dose Conversion Factor	DF	Dilution Factor
BEG	Bureau of Economic Geology	DFCSS	Division of Fuel Cycle Safety and Safeguards
BFD	Basis for Design	DIE	Determination of Importance Evaluation
BM	Bare Mountain	DIMNS	Division of Industrial and Medical Nuclear Safety
BMF	Bare Mountain Fault	DKM	Dual Permeability Model
BTP	Branch Technical Position	DLG	Digital Line Graph
CAI	Color Alteration Index	DLM	Diffuse Layer Model
CAM	Corrosion Allowance Material	DNAG	Decade of North American Geology
CAR	Corrective Action Request	DNFSB	Defense Nuclear Facilities Safety Board
CCDF	Complementary Cumulative Distribution Function	DOE	U.S. Department of Energy
CCL	Commitment Control Log		
CCM	Constant Capacitance Model		
CD-R	CDROM Recordable		

ABBREVIATIONS (cont'd)

DOE-DP	U.S. Department of Energy Defense Program	GEOTRAP	GEOlogic Transport of RADionuclides Predictions
DOE-RU	U.S. Department of Energy Regulatory Unit	GERT	General Employee Radiological Training
DRA	Division of Regulatory Applications	GET	General Employee Training
DST	Drift Scale Test	GFM	Geological Framework Model
DTED	Digital Terrain Elevation Data	GHGC	GeoHydrology and GeoChemistry
DTS	Dry Transfer System	GIA	Generalized Importance Analysis
DVD	Digital Versatile Disk	GIS	Geographic Information System
DWM	Division of Waste Management	GLGP	Geology and GeoPhysics
DWPF	Defense Waste Processing Facility	GMS	Goundwater Modeling System
EA	Environmental Assessment	GPS	Global Positioning System
EBS	Engineered Barrier System/Subsystem	GROA	Geologic Repository Operations Area
ECM	Equivalent Continuum Model	GSA	Geologic Society of America
ECRB	Enhanced Characterization of Repository Block	GTFE	Great Tolbachik Fissure Eruption
EDA II	Enhanced Design Alternative II	GUI	Graphics User Interface
EDO	Office of the Executive Director for Operations	GWB	Geochemist's WorkBench
EDX	Energy-Dispersive X-Ray Spectroscopy	GWSI	GroundWater System Integration
EIS	Environmental Impact Statement	GWTT	GroundWater Travel Time
EM	Element Manager	HE	Hydrogen Embrittlement
EMPA	Electron MicroProbe Analysis	HLW	High-Level Waste
ENE	East-NorthEast	HRTEM	High-Resolution Transmission Electron Microscopy
ENFE	Evolution of the Near-Field Environment	HTML	HyperText Markup Language
EnPA	Energy Policy Act of 1992	IA	Igneous Activity
ENS	European Nuclear Society	IBM	International Business Machines
EPA	U.S. Environmental Protection Agency	ICP	Inductively Coupled Plasma
EPR	Electrochemical Potentiokinetic Reactivation	ICPP	Idaho Chemical Processing Plant
EPRI	Electric Power Research Institute	ICRP	International Commission on Radiological Protection
EQA	External Quality Assurance	IDLH	Immediately Dangerous to Life and Health
EROS	Earth Resource Observation System	IHLRWMC	International High-Level Radioactive Waste Management Conference and Exposition
ESF	Exploratory Studies Facility	IM	Intermediate Milestone
ESP	Environmental Simulation Program	IME	Industrial Mobilization Exception
EW	East-West	IMS	Information Management Systems
EWDP	Early Warning Drilling Project	INEEL	Idaho National Engineering and Environmental Laboratory
EXAFS	Extended X-Ray Absorption Fine Structure	INETER	Instituto Nicaraguense de Estudios TERritoriales
FCRG	Format and Content Regulatory Guide	INTEC	Idaho National Technology and Engineering Center
FDSHA	Fault Displacement and Seismic Hazard Analysis	I/O	Input/Output
FEHM	Finite Element Heat and Mass Transfer	IP	Inspection Procedure
FEM	Finite Element Method	IPA	Iterative Performance Assessment
FEPs	Features, Events, and Processes	IR&D	Internal Research & Development
FFRDC	Federally Funded Research and Development Center	IRIS	Interim Records Information System
FFT	Fast Fourier Transform	IRM	Office of Information Resources Management
FOC	Field Operations Center	IRSR	Issue Resolution Status Report
FTE	Full-Time Equivalent	ISA	Integrated Safety Analysis
FTP	File Transfer Protocol	ISFSI	Independent Spent Fuel Storage Installation
FY	Fiscal Year	ISI	Integrated SubIssue
FYTD	Fiscal Year-To-Date		
GDF	Ghost Dance Fault		
GEM	General Electrochemical Migration		

ABBREVIATIONS (cont'd)

ISM	Integrated Site Model	NIST	National Institute of Standards and Technology
IUGG	International Union of Geodesy and Geophysics	NMSS	Office of Nuclear Material Safety and Safeguards
IVM	Interactive Volume Modeling	NNE	North-NorthEast
JC	Job Code	NNW	North-NorthWest
JPL	Jet Propulsion Laboratory	NOAA	National Oceanographic and Atmospheric Administration
JRC	Joint Roughness Coefficient	NRC	Nuclear Regulatory Commission
KESA	Key Elements of Subsystem Abstraction	NS	North-South
KTI	Key Technical Issue	NTS	Nevada Test Site
LA	License Application	NUREG	NRC Technical Report Designation
LAOO	License Application Annotated Outline	NWPA	Nuclear Waste Policy Act, as amended
LAN	Local Area Network	NWTRB	Nuclear Waste Technical Review Board
LANL	Los Alamos National Laboratory	OBES	Office of Basic Energy Sciences
LARP	License Application Review Plan	OCRWM	Office of Civilian Radioactive Waste Management
LAW	Low-Activity Waste	OECD	Organisation for Economic Co-operation and Development
LBNL	Lawrence Berkeley National Laboratory	OGC	Office of General Counsel
LBT	Large Block Test	OITS	Open-Item Tracking System
LHS	Latin Hypercube Sampling	OMB	Office of Management and Budget
LITC	Lockheed Information Technology Company	OPS	Operations Plans for the Repository Program
LLC	Limited Liability Company	ORR	Operations Readiness Review
LLNL	Lawrence Livermore National Laboratory	ORS	Overall Review Strategy
LLW	Low-Level Waste	OWFN	One White Flint North
LMAES	Lockheed Martin Advanced Environmental Systems	PA	Performance Assessment
LSA	Liquid Scintillation Analyzer	PAAG	Performance Assessment Advisory Group
LSS	Licensing Support System	PC	Personal Computer
LWR	Light Water Reactor	PC/TCP	Personal Computer/Transmission Control Protocol
M	Molar	PCT	Product Consistency Test
Ma	Million Years Ago	PDF	Probability Distribution Function
MAI	Mean Annual Infiltration	PDR	Public Document Room
MAP	Mean Annual Precipitation	PEL	Permissible Exposure Limit
MAT	Mean Annual Temperature	PEM	Program Element Manager
MC	Monte Carlo	PER	Prelicensing Evaluation Report
METRA	Mass and Energy TRANsport	PEST	Parameter ESTimation
MGDS	Mined Geologic Disposal System	PFA	PerFluoroAlkoxy
MH	Mechanical-Hydrological	PFD	Probabilistic Fault Displacement
MIC	Microbially Influenced Corrosion	PFDHA	Probabilistic Fault Displacement Hazard
MINC	Multiple Interacting Continua	PFS	Private Fuel Storage
MIT	Massachusetts Institute of Technology	PFSF	Private Fuel Storage Facility
MM	Major Milestone	PHA	Preliminary Hazard Analysis
M&O	Management and Operations	PI	Principal Investigator
MOU	Memorandum Of Understanding	PMDA	Program Management, Policy Development and Analysis Staff
MPC	Multi-Purpose Canister	PMPR	Program Manager's Periodic Report
MRS	Monitored Retrievable Storage	PMR	Process Model Report
MSS	MultiSpectral Scanner	PMT	Photo-Multiplier Tube
MTU	Metric Tonnes of Uranium	PNNL	Pacific Northwest National Laboratory
NAS	National Academy of Sciences	PO	Project Officer
NAWG	Natural Analogue Working Group	PPE	Prepassivated Platinum Electrode
NCR	NonConformance Report		
NEA	Nuclear Energy Agency		
NEI	Nuclear Energy Institute		
NFS	Network File Server		
NIOSH	National Institutes Of Safety and Health		
NIR	Near-InfraRed		

ABBREVIATIONS (cont'd)

PRA	Probabilistic Risk Assessment	SFVF	San Francisco Volcanic Field
PRT	Peer Review Team	SGI	Silicon Graphics, Inc.
PSAG	Probabilistic System Assessment Group	SGML	Standard Generalized Markup Language
PSHA	Probabilistic Seismic Hazard Analyses		
PSI	Process Safety Institute	SHE	Standard Hydrogen Electrode
PTFE	PolyTetraFluoroEthylene	SHT	Single Heater Test
PTn	Paintbrush Nonwelded Tuff	SKI	Swedish Nuclear Power Inspectorate
PUF	Pressurized Unsaturated Flow	S-L	Short Transverse-Longitudinal
PVHA	Probabilistic Volcanic Hazards Assessment	SLAR	Side Looking Airborne Radar
		SNF	Spent Nuclear Fuel
PVHView	Probability of Volcanic Hazards View	SNL	Sandia National Laboratories
		SOW	Statement Of Work
PVM	Parallel Virtual Machine	SR	Site Recommendation
PWR	Pressurized Water Reactor	SRB	Sulfate-Reducing Bacteria
QA	Quality Assurance	SRBS	Shafts, Ramps, Boreholes, and Their Seals
QAP	Quality Assurance Procedure		
GRAM	Quality Requirements Application Matrix	SRD	Software Requirements Description
		SRS	Savannah River Site
RAI	Request for Additional Information	SRSASF	Savannah River Site Aluminum-Based Spent Fuel
RASA	Regional Aquifer System Analysis		
RDCO	Repository Design, Construction, and Operations	SS	Stainless Steel
		SSSA	Soil Science Society of America
RDTME	Repository Design and Thermal-Mechanical Effects	SSC	Structures, Systems, and Components
		SSW	South-Southwest
REE	Rare Earth Element	STEM	Scanning Transmission Electron Microscopy
REECO	Reynolds Electrical and Engineering COmpany, Inc.		
		STP	Staff Technical Position
RES	Office of Nuclear Regulatory Research	SUFLAT	Stochastic Analyses of Unsaturated FLOW And Transport
RFP	Request For Proposal		
RH	Relative Humidity	SVF	Springerville Volcanic Field
RM	Review Method	SwRI	Southwest Research Institute
RSRG	Real Space Renormalization Group	SZ	Saturated Zone
RT	Radionuclide Transport	TA	Technical Assistance
RTS	Radwaste Treatment System	TAN	Test Area North
SAIC	Science Application International Corporation	TBD	To Be Determined
		TBM	Tunnel Boring Machine
SAP	Standards Approval Package	TCP/IP	Transmission Control Protocol/Internet Protocol
SAR	Safety Analysis Report		
SCA	Site Characterization Analysis	TDEM	Time-Domain Electro-Magnetic
SCC	Stress Corrosion Cracking	TEDE	Total Effective Dose Equivalent
SCCEX	Substantially Complete Containment EXample	TEF	Thermal Effects on Flow
		TEM	Transmission Electron Microscopy
SCE	Standard Calomel Electrode	TFE	TetraFluoroEthylene
SCFF	Southern Crater Flat Fault	TH	Thermal-Hydrologic
SCM	Surface Complexation Models	THC	Thermal-Hydrologic-Chemical
SCP	Site Characterization Plan	THMC	Thermal-Hydrologic-Mechanical-Chemical
SCR	Software Change Report		
SDMP	Site Decommissioning Management Plan	T-L	Transverse-Longitudinal
SDP	Software Development Plan	TLM	Triple-Layer Model
SDS	Structural Deformation and Seismicity	TM	Thermal-Mechanical
SECY	Secretary of the Commission, Office of the (NRC)	TMH	Thermal-Mechanical-Hydrological
		TMI-2	Three Mile Island Unit 2
SELM	Spectral ELEMent Method	TMS	The Minerals, Metals, and Materials Society
SEM	Scanning Electron Microscopy		
SER	Safety Evaluation Report	TOP	Technical Operating Procedure
SFPO	Spent Fuel Project Office	TP	Technical Position

ABBREVIATIONS (cont'd)

TPA	Total-system Performance Assessment	XRD	X-Ray Diffractometry
TPI	Time Period of Regulatory Interest	Y2K	Year 2000
TR2	DOE Seismic Topical Report No. 2	YM	Yucca Mountain
TRG	Technical Review Group	YMP	Yucca Mountain Project
TSAR	Topical Safety Analysis Report	YMR	Yucca Mountain Region
TSPA	Total System Performance Assessment	YMRP	Yucca Mountain Review Plan
TSPA-VA	Total System Performance Assessment- Viability Assessment	YMSCO	Yucca Mountain Site Characterization Office
TSPAI	Total System Performance Assessment and Integration	YTD	Year-To-Date
TSw-Chnv	Topopah Spring Welded-Calico Hills Nonvitric		
TVD	Total Variation Diminishing		
TWFN	Two White Flint North		
TWINS	Tank Waste Information Network System		
TWRS	Tank Waste Remediation System		
UA	University of Arizona		
UACH	Universidad Autónoma de Chihuahua		
UCLA	University of California, Los Angeles		
UDEC	Universal Distinct Element Code		
UK	United Kingdom		
UNLV	University of Nevada, Las Vegas		
UNM	University of New Mexico		
UR	Uranium Recovery		
U.S.	United States		
USDA	U.S. Department of Agriculture		
USFIC	Unsaturated and Saturated Flow Under Isothermal Conditions		
USGS	U.S. Geological Survey		
UTM	Universal Transverse Mercator		
UZ	Unsaturated Zone		
VA	Viability Assessment		
VCS	Version Control System		
VF	Vitrification Facility		
VSIP	Vertical Slice Implementation Plan		
WAN	Wide Area Network		
WAPDEG	Waste Package DEGradation		
WBS	Work Breakdown Structure		
WFO	Work For Others		
WGB	Western Great Basin		
WIPP	Waste Isolation Pilot Plant		
WNYNSC	Western New York Nuclear Service Center		
WOL	Wedge-Opening Loading		
WP	Waste Package		
WSRC	Westinghouse Savannah River Company		
WSS	Waste Solidification Systems		
WTSO	Washington Technical Support Office		
WVDP	West Valley Demonstration Project		
WVNS	West Valley Nuclear Services		
WWW	World Wide Web		
XAFS	X-Ray Adsorption Fine Structure		
XPS	X-Ray Photoelectron Spectroscopy		

EXECUTIVE SUMMARY—PERIOD 3

In the Division of Waste Management (DWM) Job Code (JC), the Center for Nuclear Waste Regulatory Analyses (CNWRA) staff presented a briefing on the Five-Year Strategic Plan and transmitted the observation audit reports on both the Office of Civilian Radioactive Waste Management Integrated Site Model and Waste Package audits; a Three-Dimensional Structural Model of Amargosa Desert, Version 1.0; the Extensional Relay Ramp Deformation—Journal Article; the Features, Events, and Processes Database Analysis; the Total Performance Assessment Version 3.3 code on 8 mm tape; a technical paper titled The Effect of Cavity Wall Irregularities on Seepage Exclusion From Horizontal Cylindrical Underground Openings; a paper titled Effect of Reducing Chemistry on Technetium Transport—Materials Research Society Manuscript; and Yucca Mountain Review Plan Annotated Outline. The staff produced papers and posters for presentation at various technical meetings. These papers have been or will be submitted for acceptance in recognized technical journals. Staff also participated in workshops, symposia, and other technical meetings.

The DWM JC year-to-date (YTD) cost variance was -11.0 percent. Spending fell from the last period, but again exceeded spending estimates for the period.

In the Tank Waste Remediation System JC, staff pursued activities in the various subtasks, and a staff member attended a BNFL Inc. design review meeting on ultrafiltration. The Nuclear Regulatory Commission (NRC) accepted as an intermediate milestone the previously delivered draft CNWRA comments provided in the report Summary of ISM Cycle 1 Results and Identification of Preliminary Design Basis Events. The YTD cost variance was 16.0 percent. Spending rose from the previous period, and the cumulative variance is expected to decrease as new activities begin.

In the Dry Transfer System JC, staff delivered the Dry Transfer System Safety Evaluation Report—Draft Letter Report. The YTD cost variance was 14.3 percent, an increase from the previous period. Spending decreased significantly since the last period, however, it is expected to increase as staff prepare the final safety evaluation report (SER).

In the Centralized Interim Storage Facility (CISF) JC, staff pursued the review of the HOLTEC response to the Spent Fuel Project Office first round request for additional information on the HI-STAR and HI-STORM topical report for high seismic risk sites. The YTD cost variance for the CISF was 31.7 percent. Spending rose from last period, and should increase significantly after the NRC comments on the draft assessment report are received and the CNWRA begins preparation of the final report.

In the Private Fuel Storage Facility (PFSF) JC, staff worked interactively with the NRC staff to prepare the public release version of the site-specific portion of the PFSF SER. The YTD cost variance was 9.9 percent. Spending fell from last period, but it may increase during the next few periods as work progresses on preparation of the final SER and the NRC positions on the various contentions.

**CNWRA PROGRAM MANAGER'S PERIODIC REPORT
ON ACTIVITIES OF THE
CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES**

TITLE: Center for Nuclear Waste Regulatory Analyses (CNWRA)

CONTRACTOR: Southwest Research Institute (SwRI)
6220 Culebra Road, San Antonio, Texas, 78238-5166

CONTRACT NO: NRC-02-97-009

JOB CODES: D1035, J5164, J5206, J5226

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ESTIMATED BUDGET: \$87,611,477

PERIOD OF PERFORMANCE: 09/27/97-09/27/02

PERIOD OF THIS REPORT: 11/19/99-12/17/99

1 TECHNICAL

1.1 CNWRA Operations (COPS)

In addition to a wide range of day-to-day activities, accomplishments in the management and planning area included (i) participating in the NRC Annual Review of CNWRA and the NRC/CNWRA Management Meeting at the CNWRA in San Antonio, Texas; (ii) presenting a briefing on the Five-Year Strategic Plan at the annual review; (iii) conveying the revision to the CNWRA Operations Plans for the Repository Program; (iv) submitting an analysis entitled Rationale for FY1999 Schedule Slippages and Potential Management Improvements; (v) contributing information on development of the NRC DWM budgets for FY2001-2003; (vi) reviewing contract language in Section H, Paragraph 16.3 Limitation of Contracting; (vii) addressing COI-related topics among the NRC, SwRI, and CNWRA management staffs; and (viii) participating in weekly HLW Management Board meetings.

The status of CNWRA staffing is indicated in table 1. During period 3, CNWRA management continued to evaluate the demand for its staff and the need for recruiting potential candidates. A geohydrologist joined the CNWRA this period. An operational health physicist is scheduled to join the staff in period 5, and a performance assessment modeler is expected to begin working at the CNWRA during period 6.

Computer system support activities encompassed (i) upgrading the desktop computers for basic system standardization and updating software for Y2K compliance; (ii) installing and implementing the automated tape backup system for the Sun Microsystems, Inc. servers and clients; (iii) pursuing installation of hardware and software for the CNWRA Security System (firewall) and another automated tape backup system for the SGI server and clients; (iv) installing and testing a DVD library and a hard disk array for on-line storage; (v) participating, as requested, in the monthly NRC/CNWRA Computer Coordination meeting; and (vi) maintaining LAN operations.

CNWRA staff continues to collaborate with NRC and Sytel Systems & Telecommunications staffs to identify the cause(s) for recurring router failures—disrupting e-mail communications among the NRC, the CNWRA WTSO, and the CNWRA San Antonio, Texas, office.

QA work included (i) achieving closure on two of the four CARs from the FY1999 CNWRA QA Audit (the other two are nearing closure); (ii) conducting surveillances, issuing nonconformance reports and corrective action requests, as required, and working with cognizant staff in response to these reports; (iii) supporting the application of configuration control for CNWRA scientific and engineering software ready for release; (iv) preventing organizational COI through SwRI RFP reviews; (v) performing QA verification checks on each CNWRA deliverable; (vi) providing QA indoctrination for new CNWRA staff members and consultants; and (vii) distributing revised and changed CNWRA Operations Plans and Operating Procedures to key CNWRA staff members.

In the next period, the CNWRA staff expect to (i) participate in budget development exercises; (ii) evaluate the requirement for hiring additional core staff; (iii) update LAN configurations, including installation of the revised CNWRA firewall and a new automated tape backup system for the SGI server; and (iv) provide CNWRA LAN operation and maintenance support.

In addition, the staff will (i) implement the QA-related procurement procedure, (ii) address other activities relating to the CARs identified at the annual CNWRA QA audit and close them, (iii) perform scheduled and unscheduled QA surveillances, (iv) conduct QA indoctrinations for new CNWRA staff and consultants, (v) review SwRI RFPs for potential COI, (vi) perform QA verification checks on each CNWRA outgoing deliverable, and (vii) continue to receive the QA survey forms that were sent to CNWRA subcontractors.

1.2 External Quality Assurance (EQA)

During this period, accomplishments in the EQA area included (i) submitting the input to the NRC observation audit report on the OCRWM Integrated Site Model audit October 11–15, 1999; (ii) submitting the input to the NRC observation audit report on the OCRWM Waste Package audit, which occurred November 8–12, 1999; (iii) writing the observation audit report on and expecting additional NRC input to the OCRWM Biosphere PMR audit, which took place November 15–19, 1999; (iv) holding discussions with NRC staff to prepare for another round of NRC observation audits in January and February of 2000; (v) reviewing lessons learned from the first three observation audits and arranging

a useful electronic template for transmitting CNWRA products to the NRC; and (vi) attending, via videoconference, the DOE/NRC Management/QA meeting on December 16, 1999.

In the next period, the CNWRA staff expect to (i) submit the Observation Report on the DOE Biosphere Process Model audit, (ii) provide CNWRA input on future observation audit participation, and (iii) attend (via video conference or in person) the regularly scheduled DOE/NRC QA Management meetings.

1.3 Igneous Activity (IA)

Staff presented recent accomplishments toward issue resolution at the NRC Annual Review of the CNWRA last period. Informal communications with DOE staff following review of the TSPA-VA have been productive, however, without a formal response to NRC technical concerns, it is difficult to evaluate the status of resolution for the IA issue. An Appendix 7 meeting on the disruptive events PMR is scheduled for March 2000. A formal response to NRC technical concerns hopefully will be received before that meeting.

Staff made four presentations at the Fall meeting of the AGU. These presentations discussed the (i) model used to successfully forecast the August 1999 eruption of Cerro Negro volcano, (ii) ground deformation associated with the early stages of the August eruption, (iii) innovative geophysical measurements around the new vents at Cerro Negro, and (iv) initial results of numerical and analog experiments to evaluate magma-repository interactions. These presentations demonstrated the range of investigations used to support NRC licensing decisions for Yucca Mountain. In addition, IA staff co-chaired two technical sessions on recent advances in determining time scales of igneous processes and on volatiles and eruption dynamics.

Several physical analog experiments for magma-repository interactions were conducted during this period. Staff used a high-speed video system to successfully film the initial flow and fragmentation of several gum-resin-acetone experiments, which also were heavily instrumented. Previously developed numerical models appear to calculate successfully the observed experimental pressure variations. Results of these experiments continue to support the model of basaltic magma flowing extensively and rapidly into open repository drifts. The current model assumes the magma flows into the drifts whenever it intersects them at the repository level. The effects of this simplified model on repository performance remain to be evaluated.

In the next period, staff will (i) continue development and review of the YMRP, (ii) begin to develop petrologic models for the YM igneous system, (iii) continue to analyze and model data from the August activity at the Cerro Negro volcano, and (iv) complete the first round of analog experiments of magma-repository interactions.

1.4 Structural Deformation and Seismicity (SDS)

Staff transmitted two milestones. Three-Dimensional Structural Model of Amargosa Desert, Version 1.0, satisfies IM 01402.471.040, Resolve Selective Field Relationships for Three-

Dimensional Structural Model of Amargosa Desert for Input to the USFIC—CNWRA Report. The second, Extensional Relay Ramp Deformation, satisfies IM 01402.471.050, Constrain Models of Faults and Fractures at Different Scales in Analysis of Fracture Data—Journal Article. This second milestone will be submitted to the *Journal of Structural Geology* pending its acceptance by the NRC.

Staff presented a review of the SDS KTI to the NRC Annual Review of the CNWRA and made three presentations at the Fall meeting of the AGU. They continued developing Strain Distribution and the Tectonic Setting of Yucca Mountain and Crater Flat—Journal Article and modifying and adding to the 3DStress software that will lead to Version 2.0.

In the next period, staff will (i) complete the Strain Distribution and the Tectonic Setting of Yucca Mountain and Crater Flat—Journal Article; (ii) continue to modify and add to the 3DStress software leading to Version 2.0; and (iii) prepare for the DOE and USGS field trip to evaluate surface ruptures associated with the October 1999, M7.1 Hector Mine earthquake in the Mojave Desert.

1.5 Evolution of the Near-Field Environment (ENFE)

Staff submitted the deliverable titled FEPs Database Analysis. The report examines the DOE database of FEPs with respect to ENFE content and the larger subject of scenario development.

Staff completed revisions to MULTIFLO Version 1.2—Letter Report and they placed the document in internal review. Staff continued testing MULTIFLO Version 1.2. Staff performed additional MULTIFLO simulations of ambient and thermally transient conditions at YM. The results reflect improvements to the models and were presented in a poster at the Fall meeting of the AGU in San Francisco, California. Two papers presented at the Materials Research Society Annual Meeting in Boston, Massachusetts, were concerned with (i) thermodynamic interpretations of YM UZ waters and (ii) natural analogs and PA. The corresponding manuscripts are in review.

Staff made experimental design preparations for uranophane coprecipitation experiments. Moreover, they made a presentation on the ENFE KTI subissue resolution activities at the NRC Annual Review of the CNWRA, held December 7–9, 1999, in San Antonio, Texas. Staff decided to defer work on the Paiute Ridge studies in response to the negative cost variance in this KTI.

In the next period, staff will (i) submit MULTIFLO Version 1.2—Letter Report, (ii) begin preparation of letter reports on the effects of design on coupled THC effects on (a) seepage and flow and (b) chemical environment for radionuclide release, (iii) begin synthesis of reactant solutions for uranophane experiments, (iv) complete Material Research Society proceedings papers, and (v) obtain new U-Th data on Nopal I carbonates and silicates.

1.6 Container Life and Source Term (CLST)

Long-term tests continued to evaluate the applicability of repassivation and corrosion potentials for the prediction of long-term, localized corrosion of proposed materials for container and drip-shield. Staff completed electrochemical measurements of passive corrosion rates for welded Alloy 22, and they began work on passive dissolution of Ti-grade 7. In addition, staff started modeling the passive behavior of Ni-Cr-Mo alloys to provide a mechanistic interpretation of the experimentally measured rates. They also continued the SCC testing of Alloy 22 and type 316L SS using wedge-loaded DCB specimens to confirm the occurrence of SCC reported by investigators at the LLNL. No cracking has been observed after 1 yr of exposure. Additional tests are planned to confirm the applicability of the repassivation potential as a threshold parameter for SCC. Papers containing the results of these studies on Alloy 22 and Ti-grade 7 have been prepared for presentation at the Corrosion/2000 NACE conference. Staff continued evaluating the suitability of corrosion potential and chemistry (Cl^- concentration and pH) sensors that could be used by DOE in the performance confirmation program. This activity is being coordinated with staff from the TEF and ENFE KTIs.

ASTM PCT, Method B testing of standard EA glass and two simulated waste glasses continued in the presence of FeCl_2 and FeCl_3 . In addition, staff modified the PUF test equipment to study the evolution of internal environment in breached containers.

CNWRA staff attended the Scientific Basis for Nuclear Waste Management Symposium at the Materials Research Society Annual Meeting in Boston, Massachusetts, and presented a paper on the passive dissolution and localized corrosion of Alloy 22 weldments.

In the next period, staff will (i) continue long-term corrosion testing of Alloys 825, C-22, Ti-grade 7, and Zircaloy-4; (ii) conduct SCC tests using Alloy C-22 and type 316L SS; (iii) evaluate sensor designs to be used in the simulated drift experiments; and (iv) perform additional glass-dissolution tests to provide input to the next revision of IRSR.

1.7 Thermal Effects on Flow (TEF)

Staff attended the Fall meeting of the AGU in San Francisco, California, where they presented two abstracts on dripping: Dripping Threshold from a Glass Plate Hele-Shaw Fracture Analog, and Importance and Evidence of Dripping at a High-Level Waste Repository.

The CNWRA received six 55-gal. drums of the TSw lower lithophysal unit taken from Niche No. 5 in the ECRB. These samples will be used in the third laboratory-scale heater test (LST3). The samples are being prepared for characterization. Preparations for LST3 continue in collaboration with staff associated with the CLST and ENFE KTIs.

Staff continue calculations of temperature and RH inside a backfilled drift and in fractured rock adjacent to the drift wall. They are also modifying the numerical model to examine conditions at the near field and examining the effect of the modifications on temperature and RH in the emplacement drift and in the near-field medium.

Staff are conducting laboratory investigations of an artificial fracture to determine whether a capillary threshold for dripping exists for preferential “finger” flow along a fracture at the drift wall boundary. Three fluids were used in the analyses: propenyl, nanopure water, and tapwater. TH simulations of the DST in 3D are being pursued to investigate the effects of moisture and heat loss through the thermal bulkhead on the development of refluxing above the heated drift. Mountain-scale and drift-scale TH simulations are being used to investigate the effects of repository edge cooling and preclosure ventilation.

In the next period, staff plan to (i) begin characterization of the TSw lower lithophysal samples, (ii) pursue 3D modeling of the DST and 2D modeling of TH at the drift and mountain scales, and (iii) continue laboratory testing of the Hele-Shaw apparatus.

1.8 Repository Design and Thermal-Mechanical Effects (RDTME)

Staff continued to assess the stability of emplacement drifts under the newly proposed EDA II using both discontinuous and continuous analyses. These analyses focused on the effect of data input uncertainties on rock-mass behavior surrounding the emplacement drifts. The results from the discontinuous and continuous analyses will be compared to identify appropriate performance measures for assessing DOE design analysis for emplacement drifts. The effect of lithophysae will be considered in future analyses.

Staff pursued the ABAQUS code modeling of WPs to investigate the thermal stress of WPs and assess WP responses when subjected to the impact of falling rocks at various times, considering the long-term effect of corrosion on WPs. In addition, staff examined the rockfall potential and determined rockfall size using the Key Block Theory, considering thermal stress and seismic loads.

Staff continued developing the ISA prediction tool and crafting the overall structure of this tool. Moreover, they identified computer software for fault tree and event tree analyses, and requested demonstration copies for evaluation. Concepts of several DOE surface facilities were selected for analyses using the ISA approach so that appropriate acceptance criteria and review methods can be developed for review of the DOE ISA in the LA.

One RDTME staff member attended the DECOVALEX III meeting held in Barcelona, Spain, on December 13–15, 1999, and presented a preliminary task plan for Task 2, Drift Scale Heater Test at Yucca Mountain. Relevant data for modeling were distributed in the meeting in the form of reports. Final detail technical specifications and guidelines will be provided in the future. Staff discussed the proposed plan for Task 1, Modeling of FEBEX *In Situ* Test, at the meeting, and they distributed the relevant data for modeling this task.

In the next period, staff plan to (i) investigate rock mass behavior under heated conditions on both repository and drift scales with an emphasis on long-term degradation of rock mass material properties and strengths using the new EDA II design, (ii) assess long-term performance of rockbolts, (iii) conduct rockfall simulations, (iv) use the ABAQUS code to model WPs, (v) model the TMH coupled effects for the DECOVALEX III Program for Tasks 1 and 2, (vi) continue to develop the ISA prediction tool, and (vii) perform selected ISAs.

1.9 Total System Performance Assessment and Integration (TSPAI)

Staff participated and made presentations at the NRC Annual Review of the CNWRA on December 7–9, 1999, held in San Antonio, Texas.

Staff transmitted the TPA Version 3.3 code on 8 mm tape. They continued to conduct feasibility studies to support development of the TPA Version 4.0 code, which must accommodate the new repository and WP designs DOE is expected to use in the TSPA-SR. In addition, the staff submitted the SRD for development of the TPA Version 4.0 code for approval.

CNWRA and NRC staffs continued revising Input to TSPAI IRSR, Revision 2—Letter Report based on guidance received from the NRC for a systematic presentation of acceptance criteria, review methods, and technical bases for model abstractions. Staff developed a new section on transparency and traceability, and they submitted the technical review of the revised IRSR for programmatic and editorial reviews. The IRSR will be submitted the first week of period 4.

In response to peer-review comments, staff modified two papers to be published in the proceedings of the Scientific Basis for Nuclear Waste Management Symposium in connection with the Materials Research Society Annual Meeting held November 29–December 3, 1999, in Boston, Massachusetts. Staff made two poster presentations at this meeting that describe the computational approach used to implement the NRC source term model and demonstrated application of the TPA code to review the DOE WP failure modeling approach presented in the TSPA-VA.

Staff submitted a paper to the European Safety and Reliability Conference scheduled for May 15–17, 2000, in Edinburgh, Scotland, United Kingdom. Preparation continued on the papers for the NRC-approved presentations at the Waste Management 2000 Conference to be held February 28–March 2, 2000, in Tucson, Arizona.

Staff made a poster presentation at the Fall meeting of the AGU in San Francisco, California, and attended sessions on the use of risk-based approaches in the assessment and management of groundwater. The poster highlighted NRC total-system performance assessment methodology and emphasized NRC and CNWRA joint staff efforts to develop methodology for reviewing the DOE LA.

In the next period, staff will focus on (i) completing Input to TSPAI IRSR, Revision 2—Letter Report, (ii) completing the software development plan for the TPA Version 4.0 code, (iii) developing the TPA Version 4.0 code, (iv) completing papers for conferences, and (v) beginning work on the strategic plan for review of the TSPA-SR. Two new PA staff members will join the CNWRA in the January–February 2000 timeframe; active recruitment for the two remaining PA positions has been postponed.

1.10 Activities Related to Development of the NRC High-Level Waste Regulations (ARDR)

Staff completed draft responses to public comments on the 10 CFR Part 63 proposed rule, which were delivered to the NRC PEM. Staff also participated in reviewing all relevant comment response drafts to ensure consistency and integration. They also continued consideration of potential changes to this proposed rule based on review of the public comments.

ARDR staff participated in the NRC Annual Review of the CNWRA on December 7–9, 1999 in San Antonio, Texas. Moreover, they began preparing a deliverable entitled Analyses Supporting Responses to Public Comments on Draft HLW Rulemaking.

In the next period, emphasis will be placed on (i) finalizing responses to public comments on the proposed 10 CFR Part 63; (ii) completing potential changes to the proposed rule that are necessary to resolve public comments; and (iii) finishing an author-final draft of the deliverable, Analyses Supporting Responses to Public Comments on Draft HLW Rulemaking.

1.11 Unsaturated and Saturated Flow Under Isothermal Conditions (USFIC)

Staff pursued the review of YMP data and associated independent analyses. They are investigating alternative conceptual models of zones of high, focused infiltration in upper watershed channels through watershed modeling. This work is used to test assumptions regarding the distribution of deep percolation in the UZ and steady-state flow. Staff continued to model and review the drift seepage issue. This activity included development of a technical basis for the treatment of drift seepage in the NRC TPA code. Modeling of SZ flow indicates that improved model calibration to observed hydraulic heads may be obtained when structural features or anisotropy are included in the model. Staff continued reviews of permeability at YM that will be compiled into a report summarizing DOE conceptual models, available data, uncertainty, results of independent analyses, and staff concerns. They began a similar review of porosity at YM.

Staff prepared and delivered several technical papers and presentations. A technical paper titled The Effect of Cavity Wall Irregularities on Seepage Exclusion From Horizontal Cylindrical Underground Openings was submitted. Several staff members attended and made presentations at the fall meeting of the AGU in San Francisco, California. A presentation summarizing past and future USFIC activities was given at the NRC Annual Review of the CNWRA, December 7–9, 1999, in San Antonio, Texas.

In the next period, USFIC activities will include (i) continued review of DOE data and models; (ii) continued independent modeling of UZ deep percolation, drift seepage, and SZ flow; (iii) preparation of Topical Hydrology Report—Hydraulic Conductivity and Permeability at YM; and (iv) preparation of Topical Hydrology Report—Porosity at YM.

1.12 Radionuclide Transport (RT)

Staff presented technical assistance results at the Materials Research Society Annual Meeting held in Boston, Massachusetts, November 29–December 3, 1999. The paper titled Effect of Reducing Chemistry on Technetium Transport—Materials Research Society Manuscript was submitted. CNWRA internal reviews were completed on the manuscript An Archaeological Site at Akrotiri Greece, as a Natural Analog for Radionuclide Transport: Implications for the Validity of Performance Assessments. Staff also participated in the NRC Annual Review of the CNWRA held December 7–9, 1999 in San Antonio, Texas.

Staff continued experiments investigating the sorption behavior of Tc, and coprecipitation experiments for Np and calcite. Further, they completed a set of U sorption experiments on mineral mixtures at elevated partial pressures of CO₂. Staff received the molecular dynamics software and began its installation.

Staff worked with TSPA/KTI staff to develop the SRD for sorption parameter response surfaces and colloid transport models for TPA Version 4.0. CNWRA received cuttings from Nye County well NC-EWDP-2D. The cutting samples are from 5 ft intervals from 0 to 500 ft depth (total borehole depth is about 1,600 ft). The cuttings are enclosed in small plastic bags (about 20–50 g total mass per sample).

In the next period, staff will (i) complete revisions to the manuscript An Archaeological Site at Akrotiri Greece, as a Natural Analog for Radionuclide Transport: Implications for the Validity of Performance Assessments, (ii) continue to work with staff associated with the TSPA/KTI to implement proposed sorption response surfaces for the TPA Version 4.0 code, (iii) pursue the revision of reports on ion exchange and surface complexation, (iv) pursue sorption experiments on alluvium minerals, and (v) complete installation of the molecular dynamics software and begin installation testing.

1.13 Review of the Draft Environmental Impact Statement (DEIS)

The CNWRA project manager and two external consultants met with the NRC staff to finalize DEIS comments for transmittal to the Commission.

In the next period, the CNWRA will assist the NRC staff to support refinement of the DEIS comments, as required.

1.14 Public Outreach

More discussions were held with a risk communications expert about conducting a 1- or 2-day course at the CNWRA. Tentative dates of February 16–17 or February 24–25, 2000, were set for this course.

In the next period, a final schedule and agenda for the short course on risk communications will be established. In addition, some effort will be spent on preparing charts and graphs to be used for future public meetings on 10 CFR Part 63 and the YMRP.

1.15 Development of the Yucca Mountain Review Plan (YMRP)

Staff continued developing the YMRP in collaboration with the NRC staff. Most ISI sections are in various stages of internal CNWRA review. Staff pursued completion of the remaining portions of the postclosure safety chapter, the preclosure safety chapter, and the administrative and programmatic chapter. An annotated YMRP outline was submitted as an IM.

In the next period, staff will continue developing Revision 0 of the YMRP. Although the CNWRA OPS includes milestones for submitting the preclosure safety and the administrative and programmatic sections of the YMRP as part of Revision 0, schedule constraints resulted in a determination that only the postclosure chapter will be submitted on January 28, 2000 (Yucca Mountain Review Plan, Revision 0, Postclosure Section, IM 01402.952.010). Staff will continue developing the preclosure safety and administrative and programmatic portions of Revision 0 of the YMRP, but will submit them at a later date to be determined in collaboration with the NRC PEM. The CNWRA will complete a white paper that proposes options for integrating the IRSR and YMRP structures. In addition, the CNWRA also will identify activities that should be conducted under YMRP development rather than under the KTIs. The CNWRA project manager will prepare a point paper to facilitate decisions on how the QA section of the YMRP is to be developed.

1.16 Tank Waste Remediation System (TWRS)

In subtask 1.2, staff continued work on the technical review report on ultrafiltration and started work on the technical review report on cooling coil failures. Also, the Survey of Solidification Technologies report has been reformatted as a NUREG/CR and awaits copyright permission for two figures before it can be transmitted.

In subtask 1.4, staff continued to classify and categorize process safety issues.

In subtask 1.6, staff continued developing a spreadsheet model of the pretreatment process, based on mass-balance considerations using reported waste feed envelope compositions and reported or assumed concentration factors or decontamination factors. A teleconference with the NRC staff was held to discuss the model.

In subtask 2.1, a CNWRA staff member attended a topical meeting on ultrafiltration. A trip report will be issued in two weeks. Also, a letter was sent to the NRC staff confirming completion of IM 01403.201.010. Completion of this IM is based on acceptance of draft CNWRA comments provided in the report Summary of ISM Cycle 1 Results and Identification of Preliminary Design Basis Events.

In the next period, in subtask 1.2, staff will issue the Survey of Solidification Technologies report as a NUREG/CR and continue to work on the technical review reports on ultrafiltration and cooling coil failures. In subtask 1.4, staff will classify and categorize process safety issues. In subtask 1.6, the development of a spreadsheet model for the TWRS waste pretreatment will progress. In subtask 2.1, staff will issue a trip report on the BNFL Inc. design review meeting on ultrafiltration.

1.17 Dry Transfer System (DTS)

The draft DTS SER was completed during this period, making use of the CNWRA and SwRI staffs and a consultant. It was delivered as Dry Transfer System Safety Evaluation Report-Draft Letter Report on December 15, 1999.

In the next period, staff will start revising the draft DTS SER to incorporate NRC comments that may be made on the draft SER.

1.18 Centralized Interim Storage Facility (CISF)

Staff continued reviewing the HOLTEC response to the SFPO first round RAI on the HI-STAR and HI-STORM topical report for high seismic sites. An NRC/HOLTEC/CNWRA teleconference meeting was held to discuss the scope of the sensitivity study to be accomplished by HOLTEC. Further, staff began developing the second round RAI.

In the next period, the staff will continue reviewing and evaluating the DOE response to the SFPO first round RAI on the HI-STAR and HI-STORM topical report for high seismic risk sites and develop the draft second round RAI.

1.19 Private Fuel Storage Facility (PFSF)

The staff worked interactively with the NRC staff to prepare the public release version of the site-specific portion of the PFSF SER that was completed on November 30, 1999. The staff began reviewing of the revised report on potential aircraft crashes at the PFSF site. They also worked on various contentions.

In the next period, the staff plans to review and evaluate the revised reports on seismic design and on potential aircraft crashes at the PFSF site. Staff will assist the NRC staff on ASLB hearing activities.

2 MANAGEMENT ISSUES

None to report.

3 MAJOR PROBLEMS

None to report.

4 SUMMARY OF SCHEDULE CHANGES

Schedule changes for IMs are included in table 3. Completed deliverables are noted in table 4.

5 SUMMARY OF FINANCIAL STATUS

Table 5 summarizes the CNWRA financial status in the context of authorized funds. Total commitments are \$453,660. The appendix lists planned and actual costs to date, as well as variances

between these, without allowance for fee, on both a per-period and a cumulative basis. These data do not include commitments. Pertinent financial information is provided for the DWM JC, including COPS, EQA, DEIS, Public Outreach, YMRP, and ten KTIs, TWRS JC, DTS JC, CISF JC, and PFSF JC. The planned costs per period are based on the revised spending plans contained in the FY2000 OPS conveyed to the NRC.

Period 3 FY2000 CNWRA composite expenditures fell 12.8 percent from last period, and this aggregate of all JCs has a negative cost variance of \$229,998 or -7.5 percent. Since the previous period, spending rose in the TWRS and CISF JCs, but fell in the DWM, DTS, and PFSF JCs. With the exception of the DWM JC, all other JCs have a positive cumulative variance in period 3.

Expenditures on SwRI labor, consultants, and subcontractors as a proportion of composite spending on all JCs were 15.6 percent. Expense of consultants and subcontractors as a fraction of composite spending on all JCs was 10.1 percent. The CNWRA continues the judicious employment of consultants and subcontractors in the conduct of CNWRA work.

As shown in table 1, the CNWRA has 57 staff members. The available pool of approved consultants and subcontractors is 73.

This FYTD, no capital or sensitive equipment was purchased with NRC funds (other than overhead, general and administrative expenses, and fees).

The DWM JC cost variance was -\$293,110 or -11.0 percent. Overall expenditures decreased about 12.9 percent from the previous period as costs rose in the SDS, TEF, RDTME, and ARDR KTIs as well as the YMRP, but declined in COPS and the IA, ENFE, CLST, TSPA, USFIC, and RT KTIs as well as the DEIS, EQA, and Public Outreach. COPS and all ten KTIs have negative cumulative variances in period 3. In various meetings with NRC senior management staff and other interested parties, CNWRA senior management staff continue to discuss current and expected levels of spending, recruitment efforts for core staff, and effective engagement of consultants and subcontractors.

The cost variance for COPS was -26.3 percent: -30.1 percent for the Management, Planning, and Computer Support subtask (158) and -6.9 percent for the QA subtask (159). The negative variance in subtask 158 for period 3 resulted primarily from lower estimated spending, based on the previous year, coupled with higher than anticipated actual spending, especially in direct labor. In the next period, spending in subtask 158 will still exceed the estimated amount; spending in subtask 159, however, will be close to the estimated amount. The higher estimated costs (i.e., those in the OPS) in periods 9-12 are anticipated to correct the negative variance as actual costs are effectively controlled.

The cost variance for EQA was 30.5 percent. Spending this period exceeded the planned amount because of heavier activities in the field and preparation for additional NRC observation audit teams in the year 2000. In the next period, spending in subtask 331 is expected to decline because of reduced observation audit field work; however, the current audit schedule will result in per-period costs approaching the estimated amounts late in the year.

The cost variance for the IA KTI was -22.5 percent. Spending decreased during this period as payment of FY1999 carryover expenses diminished. Costs are expected to decline during the next several periods, as efforts to mitigate the negative cumulative variance are put in place. However, actual cumulative cost will still exceed estimated cumulative cost for the next one or two periods.

The cost variance for the SDS KTI was -16.0 percent. Spending increased from last period, and the cumulative variance reflects commitments incurred last FY and concentration of staff time to complete two milestones in period 3. Staff will focus on keeping spending in line with the budget, but total costs will likely continue to be greater than estimates for the next two periods. In subsequent periods, variances will be mitigated by the higher estimated-cost profile.

The cost variance for the ENFE KTI was -37.7 percent. Although this variance represents a continued decrease in percentage terms from periods 1 and 2, the absolute dollar value of the variance increased during this period. This variance is likely to increase somewhat in the near term as costs for travel are posted. However, costs are expected to diminish as activities are selectively deferred (e.g., Paiute Ridge studies). The negative variance is likely to persist until activity under the YMRP increases.

The cost variance for the CLST KTI was -25.3 percent. The spending in period 3 and cumulative percent variance decreased with respect to the last period because of completion of test equipment assembly, participation in other projects, such as EQA and YMRP, and the holidays. Staff will assess how spending can be controlled during the next two periods.

The cost variance for the TEF KTI was -18.8 percent. Costs were higher than last period, and this caused the cumulative cost variance to be significantly higher than that of the previous period. This is partly because of the concentrated effort needed for the preparation and participation at the NRC Annual Review of the CNWRA and the AGU meeting. Spending should decline over the next few periods.

The cost variance for the RDTME KTI was -7.3 percent. The actual costs for period 3 exceeded those in period 2. The cumulative cost variance is expected to decrease during the next period as actual costs for this KTI are kept under the OPS estimates, which increase substantially beginning in period 4.

The cost variance for the TSPAI KTI was -39.0 percent. Although spending decreased substantially from period 2 to period 3 due to completion of the TSPAI IRSR and staff vacation during the winter holidays, spending remained above estimated costs. Expenditures in this KTI have exceeded the plan because the TSPAI IRSR required greater effort than anticipated, development of the TPA Version 4.0 code accelerated, and most staff deferred winter vacations until period 4. During the next period, the reduction in spending because of completion of the IRSR will be largely offset by increased spending associated with the development of the TPA Version 4.0 code. As a result, spending is expected to decrease modestly during the next period. Higher estimated costs in periods 5-13 will tend to mitigate the cost variance to-date if actual costs are controlled to less than the period 3 level.

The cost variance for the ARDR KTI was -15.1 percent. Spending should decrease during the next period as efforts at responding to the public comments on 10 CFR Part 63 are largely complete.

The cost variance for the USFIC KTI was -4.8 percent. This variance is a slight increase from period 2 in both percentage terms and dollar value. Near-term costs are likely to continue somewhat above plan as travel costs are posted to the account. Longer-term costs are expected to diminish as analysis of satellite imagery to support evaluation of recharge estimation is deferred.

The cost variance for the RT KTI was -48.0 percent. This represents a continuation of the decrease in percentage cost variance, but the cumulative cost continued to increase significantly. Costs for travel and software leases posted to this account during period 2 of FY2000 are responsible for this variance. Consultant support for molecular dynamics simulation is being eliminated to reduce future costs.

The cost variance for review of the DEIS was 0.1 percent. This reduction in variance from period 2 reflects completion of major CNWRA activity on the DEIS review. Significant underspending relative to plan is now expected. This situation developed because the level of required travel and consultant support for public meetings has been less than envisioned in the original SOW. Substantial funds are likely to be available for reprogramming from this project.

The cost variance for Public Outreach was 88.2 percent. This amount still understates the actual variance because labor that should have been charged to the DEIS project was inadvertently charged to this account and has not yet been transferred. A transfer of labor will be processed during the next period to correct this error. Significant spending is not expected until period 6.

The dollar cost variance for the YMRP development was 54.2 percent. Spending increased by about 30 percent relative to period 2, causing the cumulative cost variance for development of the YMRP to drop from 65.4 to 54.2 percent. The spending variance is expected to continue to decrease as the CNWRA staff works to complete YMRP Revision 0. Increased effort also will be placed on the preclosure safety and the administrative and programmatic sections of the YMRP. The CNWRA is identifying work that can be shifted appropriately to YMRP development from the KTI structure.

The cost variance for the TWRS project was 16.0 percent and remained steady in dollar terms. The variance is expected to decline as new activities progress.

The cost variance for the DTS project was 14.3 percent. This cost variance is expected to decrease during the next three periods when concentrated effort will be needed to prepare the DTS final SER.

The cost variance for the CISF project was 31.7 percent. This cost variance occurred because of delay in receiving NRC comments on the CISF draft AR. This cost variance will decrease significantly as preparation of the CISF final AR begins after receiving NRC comments.

The cost variance for the PFSF project was 9.9 percent. This cumulative cost variance is considerably less than that of the previous period. It will decrease further as activities related to the preparation of the PFSF SER supplement and the NRC positions on contentions result in costs exceeding planned levels for the next few periods.

Table 1. CNWRA Core Staff—Current Profile and Hiring Plan* (Period 3)

Expertise/Experience	Current No.	Professional Staff	Positions Open FY2000
ADMINISTRATION	4	H.GARCIA, W.PATRICK, J.RUSSELL, B.SAGAR	
CHEMICAL PROCESSING ENGG./PHYS. CHEM.	2	V.JAIN, D.DARUWALLA	
CODE ANALYSIS/DEVELOPMENT	2	R.JANETZKE, R.MARTIN	
DATA MANAGEMENT/PROCESSING, INCLUDING FINANCIAL	1	P.MALDONADO	
DOSE/RISK/HAZARD ANALYSIS	0		1
ELECTROCHEMISTRY	1	G.CRAGNOLINO	
ENGINEERING GEOLOGY/GEOLOGICAL ENGG.	2	R.CHEN, G.OFOEGBU	
ENVIRONMENTAL SCIENCES	1	P.LaPLANTE	
GEOCHEMISTRY	8	P.BERTETTI, L.BROWNING, W.MURPHY, R.PABALAN, E.PEARCY, J.PRIKRYL, D.TURNER, M.NUGENT	
GEOHYDROLOGY/HYDROGEOLOGY	6	D.FARRELL, R.FEDORS, R.GREEN, M.HILL, J.WINTERLE, W. ILLMAN	1
GEOLOGY	3	P.LAFEMINA, L.McKAGUE, M.MIKLAS	
HYDROLOGIC TRANSPORT	3	A.ARMSTRONG, D.HUGHSON, S.PAINTER	
INFORMATION MANAGEMENT SYSTEMS	0		1
MATERIAL SCIENCES	5	S.BROSSIA, D.DUNN, O.MOGHISSI, Y-M.PAN, N.SRIDHAR	1
MECHANICAL, INCLUDING DESIGN & FABRICATION	1	D.GUTE	
MINING ENGINEERING	1	S-M.HSIUNG	
NUCLEAR ENGINEERING	1	M.SMITH	
OPERATIONAL HEALTH PHYSICS	1	J.WELDY	1
PERFORMANCE ASSESSMENT	3	S.MOHANTY, O.PENSADO-RODRIGUEZ, G.WITTMAYER	2
QUALITY ASSURANCE	1	B.MABRITO	
RADIOISOTOPE GEOCHEMISTRY	1	D.PICKETT	
ROCK MECHANICS, INCLUDING CIVIL/STRUC. ENGG.	3	A.CHOWDHURY, A.GHOSH, B.DASGUPTA	
SOURCE-TERM/SPENT FUEL DEGRAD.	1	L.YANG	
STRUCTURAL GEOLOGY/ SEISMO-TECTONICS	3	D.FERRILL, D.SIMS, J.STAMATAKOS	
SYSTEMS ENGINEERING	1	P.MACKIN	
VOLCANOLOGY/IGNEOUS PROCESSES	3	C.CONNOR, B.HILL	
TOTAL	57		7

* See staffing plan for details

Table 2. CNWRA Core Staff—Summary by Area of Concentration (Period 3)

Area of Concentration	Actual	Planned	Positions Open
ADMINISTRATION, QUALITY ASSURANCE, AND INFORMATION MANAGEMENT	6	7	1
GEOCHEMISTRY	9	9	0
HYDROLOGY/CLIMATOLOGY	9	10	1
MATERIAL SCIENCES	7	8	1
MECHANICAL, CHEMICAL, NUCLEAR, AND SYSTEMS ENGINEERING	5	5	0
PERFORMANCE ASSESSMENT	6	10	4
ROCK MECHANICS, MINING, AND GEOLOGICAL ENGINEERING	6	6	0
STRUCTURAL GEOLOGY, TECTONICS, AND VOLCANISM	9	9	0
TOTAL	57	64	7

Table 3. Summary of Schedule Changes (Period 3)

MILESTONE NUMBER	TYPE	DESCRIPTION	ORIGINAL DATE	REVISED DATE	RATIONALE FOR CHANGE
01402.951.010	IM	Yucca Mountain Review Plan Revision 0, Preclosure Section	01/28/2000	TBD	Due to schedule constraints, the YMRP preclosure section will be submitted at a date to be determined in collaboration with the NRC PEM after staff comments have been incorporated.
01402.953.010	IM	Yucca Mountain Review Plan Revision 0, Administrative and Other Sections	01/28/2000	TBD	Due to schedule constraints, the YMRP administrative and other sections will be submitted as a series of deliverables on a schedule to be determined in collaboration with the NRC PEM.

Table 4. Deliverables (Period 3)

MILESTONE NUMBER	TYPE	DESCRIPTION	ORIGINAL COMPLETION DATE	REVISED DATE	# OF REVISIONS	ACTUAL COMPLETION DATE	REASON (IF DELAYED)
01402.158.010	IM	Briefing on CNWRA Five-Year Strategic Plan	12/07/1999			12/07/1999	
01402.331.010	IM	Observation Report on DOE YM ISM Audit	11/26/1999			11/23/1999	
01402.331.011	IM	Observation Report on Waste Package DOE YM Audit	12/17/1999			12/16/1999	
01402.471.040	IM	Resolve Selective Field Relationships for Three-Dimensional Structural Model of Amargosa Desert for Input to the USFIC—CNWRA Report	12/06/1999			12/03/1999	
01402.471.050	IM	Constrain Models of Faults and Fractures at Different Scales in Analysis of Fracture Data—Journal Article	12/20/1999			12/17/1999	
01402.561.000	IM	FEPS Database Analysis	12/10/1999			12/09/1999	
01402.861.060	IM	The Effect of Cavity Wall Irregularities on Seepage Exclusion from Horizontal Cylindrical Underground Openings	01/07/2000			12/10/1999	
01402.871.000	IM	Effect of Reducing Chemistry on Technetium Transport—Materials Research Society Manuscript	12/31/1999			12/10/1999	
01402.951.005	IM	Annotated Yucca Mountain Review Plan Outline	11/30/1999			11/24/1999	
01403.201.010	IM	CNWRA Review (FINAL) "ISM Cycle 1 Results and Identification of Preliminary DBE". (AI 1403.201.205 was transmitted as Draft and it was accepted in fulfillment of this IM.)	12/21/1999			11/23/1999	
01405.021.010	IM	Dry Transfer System Safety Evaluation Report—Draft Letter Report (DTS)	12/15/1999			12/14/1999	

Table 5. Financial Status (Period 3)

Project Names	Funds Authorized	Funds Costed to Date	Funds Uncosted	Commitments
COPS	3,910,686	3,881,140	29,546	31,170
EQA	97,150	48,138	49,012	2,062
IA	1,812,658	1,623,113	189,545	38,158
SDS	2,212,044	2,003,331	208,713	33,710
ENFE	2,140,241	1,970,344	169,897	109,314
CLST	2,231,386	2,214,343	17,043	8,191
TEF	1,517,095	1,439,419	77,676	4,691
RDME	1,605,837	1,533,928	71,909	40,202
TSPAI	3,998,762	3,920,281	78,481	41,868
ARDR	442,063	422,233	19,830	4,000
USFIC	2,539,986	2,445,771	94,215	8,251
RT	1,560,151	1,447,324	112,826	13,782
DEIS	351,086	208,300	142,786	1,625
PO	29,888	2,804	27,083	0
YMRP	364,845	154,267	210,579	34,187
DWM Costs	24,813,879	23,314,736	1,499,142	
DWM Award Fee	1,196,006	1,181,204	14,802	
DWM Base Fee	992,555	909,095	83,460	
TOTAL DWM	27,002,440	25,405,036	1,597,404	371,212
TWRS Costs	1,775,778	1,643,373	132,405	2,406
TWRS Award Fee	93,654	87,573	6,081	
TWRS Base Fee	71,031	66,167	4,864	
TOTAL TWRS	1,940,464	1,797,113	143,350	2,406
DTS Costs	515,500	484,142	31,358	0
DTS Award Fee	23,323	23,014	309	
DTS Base Fee	20,620	19,073	1,547	
TOTAL DTS	559,443	526,229	33,214	0
CISF Costs	376,720	365,961	10,759	0
CISF Award Fee	24,338	20,099	4,239	
CISF Base Fee	15,069	14,529	540	
TOTAL CISF	416,127	400,589	15,538	0
PFSF Costs	606,340	508,422	97,918	80,042
PFSF Award Fee	26,581	25,735	846	
PFSF Base Fee	24,254	19,238	5,015	
TOTAL PFSF	657,175	553,396	103,780	80,042
GRAND TOTAL	30,575,648	28,682,362	1,893,285	453,660

Note: All authorized funds have been allocated through modification #136. Funds costed to date for each award fee program represent the award fee for FY1998 and FY1999. Funds uncosted for each award fee program represent the award fee reserved from the last authorizations based on the Operations Plans for FY2000.

Table 6. Private Fuel Storage Facility License Fee Cost Recovery Status (Period 3)

LICENSE FEE COST RECOVERY STATUS

JOB CODE: J5226

TITLE: Private Fuel Storage Facility

PERIOD: November 20–December 17, 1999

TASK NUMBER	FACILITY NAME	DOCKET NUMBER	TAC OR INSPECTION IDENTIFICATION NUMBER	PERIOD COSTS	CUMULATIVE COSTS CONTRACT TO DATE
01405.041	Private Fuel Storage Facility	72-22	L22462	\$28,177.86	\$552,305.27

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Notes: Costs include 4 percent actual base fee plus FY1998 award fee in the amount of \$6,827 and FY1999 award fee in the amount of \$18,908.

APPENDIX
Planned and Actual Costs,
and Cost Variances
Period 3—FY2000

**CNWRA COMPOSITE
TOTAL ESTIMATE COST**

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est	1,083,678	1,070,856	916,344	931,128	1,088,180	1,035,964	1,029,712	1,029,912	1,201,753	1,201,198	1,200,811	1,052,648	1,028,995	3,070,878
Act	1,148,341	1,149,979	1,002,556	0	0	0	0	0	0	0	0	0	0	3,300,876
Variance, \$	(64,663)	(79,123)	(86,212)	0	0	0	0	0	0	0	0	0	0	(229,998)
Variance, %	-6.0%	-7.4%	-9.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-7.5%
Est	1,083,678	2,154,534	3,070,878	4,002,006	5,090,186	6,126,150	7,155,862	8,185,774	9,387,527	10,588,725	11,789,536	12,842,184	13,871,179	
Act	1,148,341	2,298,320	3,300,876	0	0	0	0	0	0	0	0	0	0	
% Complete	8.3%	16.6%	23.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	(64,663)	(143,786)	(229,998)	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	-6.0%	-6.7%	-7.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

**DIVISION OF WASTE MANAGEMENT (DWM)
01402.000**

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
EstPd Cost	932,008	927,059	810,641	845,713	986,474	938,239	938,144	938,250	1,110,632	1,110,767	1,110,602	962,027	938,087	2,669,708
ActPd Cost	1,041,326	1,026,980	894,511	0	0	0	0	0	0	0	0	0	0	2,962,818
Variance, \$	(109,318)	(99,921)	(83,870)	0	0	0	0	0	0	0	0	0	0	(293,110)
Variance, %	-11.7%	-10.8%	-10.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-11.0%
Est	932,008	1,859,067	2,669,708	3,515,421	4,501,895	5,440,134	6,378,278	7,316,528	8,427,160	9,537,927	10,648,529	11,610,556	12,548,643	
Act	1,041,326	2,068,307	2,962,818	0	0	0	0	0	0	0	0	0	0	
% Complete	8.3%	16.5%	23.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	(109,318)	(209,240)	(293,110)	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	-11.7%	-11.3%	-11.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

**CNWRA OPERATIONS (COPS)
01402.150**

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	134,053	134,054	112,122	112,125	134,829	134,833	134,829	134,835	194,873	194,882	194,871	158,588	134,828	380,229
Act Pd Cost	176,208	173,297	130,887	0	0	0	0	0	0	0	0	0	0	480,393
Variance, \$	(42,155)	(39,243)	(18,765)	0	0	0	0	0	0	0	0	0	0	(100,164)
Variance, %	-31.4%	-29.3%	-16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-26.3%
Est FY Cumul	134,053	268,107	380,229	492,354	627,183	762,016	896,845	1,031,680	1,226,553	1,421,435	1,616,306	1,774,894	1,909,722	
Act FY Cumul	176,208	349,506	480,393	0	0	0	0	0	0	0	0	0	0	
% Complete	9.2%	18.3%	25.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	(42,155)	(81,399)	(100,164)	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	-31.4%	-30.4%	-26.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

EXTERNAL QUALITY ASSURANCE (EQA)

01402.331

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	24,213	24,213	20,826	20,828	24,213	24,215	24,212	24,216	27,428	27,434	27,426	24,216	24,206	69,252
Act Pd Cost	7,139	24,577	16,422	0	0	0	0	0	0	0	0	0	0	48,138
Variance, \$	17,074	(364)	4,404	0	0	0	0	0	0	0	0	0	0	21,114
Variance, %	70.5%	-1.5%	21.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	30.5%
Est FY Cumul	24,213	48,426	69,252	90,080	114,293	138,508	162,720	186,936	214,364	241,798	269,224	293,440	317,646	
Act FY Cumul	7,139	31,716	48,138	0	0	0	0	0	0	0	0	0	0	
% Complete	2.2%	10.0%	15.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	17,074	16,710	21,114	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	70.5%	34.5%	30.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

IGNEOUS ACTIVITY (IA)

01402.460

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	36,787	36,787	30,456	30,461	36,785	36,790	36,782	36,790	42,368	42,377	42,366	36,791	36,774	104,030
Act Pd Cost	45,721	46,276	35,422	0	0	0	0	0	0	0	0	0	0	127,419
Variance, \$	(8,934)	(9,489)	(4,966)	0	0	0	0	0	0	0	0	0	0	(23,389)
Variance, %	-24.3%	-25.8%	-16.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-22.5%
Est FY Cumul	36,787	73,574	104,030	134,491	171,276	208,066	244,848	281,638	324,006	366,383	408,749	445,540	482,314	
Act FY Cumul	45,721	91,997	127,419	0	0	0	0	0	0	0	0	0	0	
% Complete	9.5%	19.1%	26.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	(8,934)	(18,423)	(23,389)	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	-24.3%	-25.0%	-22.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

STRUCTURAL DEFORMATION AND SEISMICITY (SDS)

01402.470

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	51,038	51,040	42,932	42,938	51,035	51,041	51,034	51,044	58,686	58,699	58,685	51,046	51,029	145,010
Act Pd Cost	60,861	46,731	60,560	0	0	0	0	0	0	0	0	0	0	168,152
Variance, \$	(9,823)	4,309	(17,628)	0	0	0	0	0	0	0	0	0	0	(23,142)
Variance, %	-19.2%	8.4%	-41.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-16.0%
Est FY Cumul	51,038	102,078	145,010	187,948	238,983	290,024	341,058	392,102	450,788	509,487	568,172	619,218	670,247	
Act FY Cumul	60,861	107,593	168,152	0	0	0	0	0	0	0	0	0	0	
% Complete	9.1%	16.1%	25.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	(9,823)	(5,515)	(23,142)	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	-19.2%	-5.4%	-16.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

REPOSITORY DESIGN AND THERMAL-MECHANICAL EFFECTS (RDTME)

01402.670

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	69,482	69,483	58,857	80,786	91,405	91,411	91,405	91,412	101,982	101,990	101,980	91,414	91,400	197,822
Act Pd Cost	75,511	66,349	70,384	0	0	0	0	0	0	0	0	0	0	212,245
Variance, \$	(6,029)	3,134	(11,527)	0	0	0	0	0	0	0	0	0	0	(14,423)
Variance, %	-8.7%	4.5%	-19.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-7.3%
Est FY Cumul	69,482	138,965	197,822	278,608	370,013	461,424	552,829	644,241	746,223	848,213	950,193	1,041,607	1,133,007	
Act FY Cumul	75,511	141,860	212,245	0	0	0	0	0	0	0	0	0	0	
% Complete	6.7%	12.5%	18.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	(6,029)	(2,895)	(14,423)	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	-8.7%	-2.1%	-7.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

TOTAL SYSTEM PERFORMANCE ASSESSMENT AND INTEGRATION (TSPA)

01402.760

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	118,702	113,734	98,060	109,681	131,276	131,286	131,275	131,287	149,616	149,632	149,612	131,292	131,275	330,496
Act Pd Cost	155,162	165,856	138,406	0	0	0	0	0	0	0	0	0	0	459,425
Variance, \$	(36,460)	(52,122)	(40,346)	0	0	0	0	0	0	0	0	0	0	(128,929)
Variance, %	-30.7%	-45.8%	-41.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-39.0%
Est FY Cumul	118,702	232,436	330,496	440,177	571,453	702,739	834,014	965,301	1,114,917	1,264,549	1,414,161	1,545,453	1,676,728	
Act FY Cumul	155,162	321,018	459,425	0	0	0	0	0	0	0	0	0	0	
% Complete	9.3%	19.1%	27.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	(36,460)	(88,582)	(128,929)	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	-30.7%	-38.1%	-39.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

ACTIVITIES RELATED TO DEVELOPMENT OF THE NRC HIGH-LEVEL WASTE REGULATIONS TECHNICAL ASSISTANCE (ARDR)

01402.770

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	13,246	13,247	10,677	12,028	14,893	14,900	14,893	14,900	16,930	16,937	16,929	14,900	14,893	37,170
Act Pd Cost	14,423	12,352	16,017	0	0	0	0	0	0	0	0	0	0	42,792
Variance, \$	(1,177)	895	(5,340)	0	0	0	0	0	0	0	0	0	0	(5,622)
Variance, %	-8.9%	6.8%	-50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-15.1%
Est FY Cumul	13,246	26,493	37,170	49,198	64,091	78,991	93,884	108,784	125,714	142,651	159,580	174,480	189,373	
Act FY Cumul	14,423	26,775	42,792	0	0	0	0	0	0	0	0	0	0	
% Complete	7.6%	14.1%	22.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	(1,177)	(282)	(5,622)	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	-8.9%	-1.1%	-15.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

DRY TRANSFER SYSTEM (DTS)

01405.020

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	37,856	37,789	28,660	8,149	10,132	4,571	0	0	0	0	0	0	0	104,305
Act Pd Cost	28,512	41,142	19,692	0	0	0	0	0	0	0	0	0	0	89,346
Variance, \$	9,344	(3,353)	8,968	0	0	0	0	0	0	0	0	0	0	14,959
Variance, %	24.7%	-8.9%	31.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%
Est FY Cumul	37,856	75,645	104,305	112,454	122,586	127,157	127,157	127,157	127,157	127,157	127,157	127,157	127,157	
Act FY Cumul	28,512	69,654	89,346	0	0	0	0	0	0	0	0	0	0	
% Complete	22.4%	54.8%	70.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	9,344	5,991	14,959	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	24.7%	7.9%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

CENTRALIZED INTERIM STORAGE FACILITY (CISF)

01405.030

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	12,299	11,379	9,378	9,380	11,378	11,380	11,378	11,446	12,771	12,052	11,862	10,404	11,074	33,056
Act Pd Cost	6,754	6,715	9,118	0	0	0	0	0	0	0	0	0	0	22,586
Variance, \$	5,545	4,664	260	0	0	0	0	0	0	0	0	0	0	10,470
Variance, %	45.1%	41.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	31.7%
Est FY Cumul	12,299	23,678	33,056	42,436	53,814	65,194	76,572	88,018	100,789	112,841	124,703	135,107	146,181	
Act FY Cumul	6,754	13,469	22,586	0	0	0	0	0	0	0	0	0	0	
% Complete	4.6%	9.2%	15.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	5,545	10,209	10,470	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	45.1%	43.1%	31.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

PRIVATE FUEL STORAGE FACILITY (PFSF)

01405.040

ITEM	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
Est Pd Cost	40,587	33,699	16,367	16,578	19,273	19,279	19,273	19,279	9,278	9,285	9,278	19,279	18,929	90,653
Act Pd Cost	23,289	31,243	27,132	0	0	0	0	0	0	0	0	0	0	81,664
Variance, \$	17,298	2,456	(10,765)	0	0	0	0	0	0	0	0	0	0	8,989
Variance, %	42.6%	7.3%	-65.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.9%
Est FY Cumul	40,587	74,286	90,653	107,231	126,504	145,783	165,056	184,335	193,613	202,898	212,176	231,455	250,384	
Act FY Cumul	23,289	54,532	81,664	0	0	0	0	0	0	0	0	0	0	
% Complete	9.3%	21.8%	32.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cumul Var, \$	17,298	19,754	8,989	0	0	0	0	0	0	0	0	0	0	
Cumul Var, %	42.6%	26.6%	9.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	