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Mixed Waste Management Facility

Monthly Report
February 1994

Ronald D. Streit

March 1994

LAWRENCE LIVERMORE NATIONAL LABORATORY
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MASTER

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Summary

During February, significant progress was made toward the completion of the Conceptual Design (CD), particularly in developing a methodology and process for estimating CD costs and providing roll-up information in preparing the CD. As a result of this effort, a number of changes to the WBS were instituted to ensure that all key elements of the roll-up can be identified. Using the revised WBS, a bottom-up cost estimation for the CD was initiated, and an integrated schedule was developed. System Design Requirements and process flowsheets were frozen and placed under formal change control. An integrated project schedule was completed, including key project linkages between process engineering, permitting, B494 upgrade, and operations planning activities. Work also began to update the detailed PERT/critical-path schedule to reflect current CD plans.

As a result of a number of DOE informal reviews during January and February, additional Project guidance was received for the preparation of several project documents and supporting information on the historical funding and manpower expenditures relative to identified milestones and markers. Documentation requested included the Technology Selection Plan for Primary Processes (Milestone 115-5) and reports and briefings addressing the implementation of Molten Salt Oxidation (MSO). A draft joint LLNL/ORNL Plan for the Demonstration and Deployment of the MSO Process was developed along with documentation for the resolution of MSO issues identified in the December 1993 MSO Technical Review.

On February 25, DOE/OAK issued revised funding guidance and funds to maintain expenditure levels at the January level and to complete work on the Conceptual Design and ES&H evaluation activities. This represents a decrease of \$1487K through April in combined OPEX and CENRTC, and will result in the deference of some project milestones and markers identified in the MWMF FY94 Plan, issued January 1994. As the guidance was issued during the month, cost "redirection" was only partially completed. In addition, the funding released by DOE/OAK does not have the balance between OPEX and CENRTC as defined in the FY94 Plan, so that certain CENRTC accounts cannot yet be opened; this is under discussion with DOE/OAK for resolution.

The following list summarizes significant accomplishments in February:

- Internal reviews of the draft PSAR and EA were completed.
- The Technology Selection and Implementation Plan Part I: Primary Processes was issued.
- Draft joint LLNL/ORNL Plan for the Demonstration and Deployment of the MSO Process was completed.
- The System Design Requirements and process flowsheets were frozen and placed under formal change control.
- An integrated project schedule was completed, including key project linkages between process engineering, permitting, B494 upgrade, and operations planning activities. Work also began to update the detailed PERT/critical-path schedule to reflect current CD plans.
- A bottom-up cost estimation for the CDR was begun.
- Measurements of silver recovery yield at various hydroxide concentrations for Mediated Electrochemical Oxidation (MEO) were completed.
- Waste dispersion measurements were completed in support of the Wet Oxidation process design.
- Evaluation of commercial front-end processors and supervisory control systems continued, with several on-site vendor discussions and demonstrations being held.

MWMF Monthly Report Summary February 1994

Project Financial Summary

Based on LLNL cost reports through February, 1994, the total spending rate for February was somewhat below the original spending plan, but above the January rate (since the revised guidance was not issued until February 25). Efforts are being made to reduce spending to meet the revised guidance. The proper split of OPEX and CENRTC funds is also being addressed with DOE/OAK.

OPEX (\$K), cumulative:

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	425	820	1231	1628	2039	2423	2539	2655	2766	2905	3044	3160
Rev. Plan**	425	820	1231	1628	2076	2506	2945					
Actual	491	847	1299	1739	2232							
Funding	680*	680	1630	1630	3103							

CENRTC (\$K), cumulative:

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	148	273	416	593	846	1417	2154	3147	4087	5000	6332	7620
Rev. Plan**	148	273	416	593	753	913	1073					
Actual	156	275	407	538	676							
Funding	370*	370	470	470	870							

* FY93 carry-over

** Revised Plan represents funding guidance through April from DOE/OAK (letter, K. King to R. Streit, received Feb. 25, 1994)

Contents

Summary	i
Project Financial Summary	ii
1.1.1. Quality Assurance	1
1.1.2. PSAR	2
1.1.3. NEPA/CEQA	3
1.1.4. ES&H	4
1.1.5. Program Support	5
1.1.6. Public Participation	7
1.2.1. Conceptual Design	8
1.2.2. Plant Start-Up Management	9
1.2.3. Activation	10
1.3.1. Project Management	11
1.3.2. Project Control	12
1.3.3. Technical Systems Integration	13
1.4.1. Receiving and Characterization	14
1.4.2. Solids Feed Preparation	15
1.4.3. Liquids Feed Preparation	16
1.5.1. Mediated Electrochemical Oxidation	17
1.5.2. Molten Salt Oxidation	18
1.5.3. Wet Oxidation	19
1.5.4. Ultraviolet Photolysis	20
1.5.5. Experimental Off-Gas	21
1.6.1. Process Transport and Storage	22
1.6.2. Analytical Laboratory	23
1.6.3. Water Treatment	24
1.6.4. Final Forms	25
1.6.5. Supervisory Instrumentation and Control	26

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

WBS Element: 1.1.1. Quality Assurance

Task Description:

Quality Assurance provides quality assurance and safeguards support for and evaluations of the MWMF Project to ensure compliance with applicable DOE regulations, and environmental, safety, health, and NEPA/CEQA requirements. This effort includes development of the project's quality assurance documentation and oversight for conformance to the approved plan.

Summary of Activities:

The QA Manager briefed the MWMF Steering Committee on the document control system. He also generated a 4th Dimension database tracking system for tracking of Project-level action items.

Cost Summary: FY94 Budget: \$180K OPEX

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	9	11	11	13	15	16	17	17	17	18	18	18
Actual	11	11	8	6	3							

FY94 Major Procurements:

None

Key Milestones and Markers:

Item		Scheduled Date	Status
L111-1	Develop and issue Quality Assurance Plan	Oct 93	Complete
L111-2	Develop and issue Document Control Plan	Jan 94	Complete

MWMF Monthly Report Summary February 1994

WBS Element: 1.1.2. PSAR

Task Description:

The PSAR provides the integration of safety input, design reviews, and safety analysis for the MWMF Preliminary Safety Analysis Report (PSAR). Safety analysis includes the analysis, generation of documentation, and documentation review and approval. The element includes the generation of the Preliminary Safety Analysis Report and follow-on analysis required prior to the generation of the Final Safety Analysis Report (FSAR). This element provides additional criticality support to resolve safety issues.

Summary of Activities:

The first draft of the PSAR was reviewed by LLNL staff and comments collected into an electronic database for tracking. Due to the need to coordinate information with the Conceptual Design Report, delivery of the final PSAR has been delayed by approximately one month. This is not anticipated to have an impact on the overall project schedule.

Cost Summary: FY94 Budget: \$230K OPEX

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	59	57	50	31	22	11	0	0	0	0	0	0
Actual	30	9	10	2	24							

FY94 Major Procurements:

Contract for services to prepare Safety Analysis Report: \$205K

Key Milestones and Markers:

Item	Scheduled Date	Status
L112-1.1 Issue Contract	Oct 93	Complete
L112-1.2 Preliminary PSAR Review	Feb 94	Complete
L112-1 PSAR to DOE for Review	Apr 94 ⁽¹⁾	Open
D112-1 PSAR Approved by DOE	Jul 94 ⁽²⁾	Open

⁽¹⁾ Revised from March 94 (discussed above)

⁽²⁾ Revised from June 94 (discussed above)

MWMF Monthly Report Summary
February 1994

UCRL-ID-116187-94-2

WBS Element: 1.1.3 NEPA/CEQA

Task Description:

NEPA/CEQA provides for the preparation of input to the Environmental Assessment (EA) and all required follow-up documentation required for the NEPA/CEQA and necessary permitting. The effort includes preliminary evaluations, preparation of an implementation plan, preparation of technical information to support EA preparation, and comment resolution. This element prepares and coordinates approval of State, EPA, and local permits and supports public participation activities associated with the permits approvals.

Summary of Activities:

The draft Environmental Assessment continues to be revised to make changes identified by internal review cycles and to reflect additional details on accident analyses provided in the Preliminary Hazards Analysis and PSAR documents.

The RD&D permit application was outlined for distribution to the MWMF Steering committee members showing specific information and level of detail needed in each section. Staff are investigating methodologies of how to satisfactorily demonstrate equivalency to Land Disposal Restriction treatment technology standards.

The preparation of air permits for the Bay Area Air Quality Management District will begin upon completion of the CDR. Initial contact with the air district has taken place to reduce the possibility of delays.

Cost Summary: FY94 Budget: \$290K OPEX

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	9	12	36	36	37	21	18	18	13	39	39	12
Actual	8	10	29	11	13							

FY94 Major Procurements:

None

Key Milestones and Markers:

		Scheduled	
	Item	Date	Status
L113-1	Environmental Assessment (EA) submitted to DOE	Mar 94	Open
D113-1	EA approved by DOE	Aug 94	Open
L113-2	Air permit application submitted to BAAQMD	May 94	Open
L113-3	Research, Development & Demonstration (RD&D) permit application submitted to DTSC	Jul 94	Open
C113-2	Authority to Construct issued by BAAQMD	Oct 94	Open

MWMF Monthly Report Summary February 1994

WBS Element: 1.1.4. ES&H

Task Description:

ES&H provides for Environment, Safety, and Health representation to the MWMF project to ensure that all activities are conducted in a safe and environmentally sound manner and to ensure that ES&H standards have been properly applied. This element provides for conducting and/or monitoring safety-related analyses and the resultant documentation. Specific activities include preparing and implementing various assurance plans; performing hazard evaluations and safety assessments; participating in design reviews to ensure compliance with safety and environmental standards and regulations; preparing safety and environmental procedures; and preparing input for permit applications and other documentation required for compliance with Federal and/or State requirements.

Summary of Activities:

Members of the ES&H team have continued attending technical meetings and consulting with principal investigators and engineers on ES&H issues. More time has been spent by members of the ES&H team reviewing the PSAR.

Cost Summary: FY94 Budget: \$120K OPEX

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	8	8	8	8	9	9	9	12	12	12	12	13
Actual	2	10	12	13	16							

FY94 Major Procurements:

None

Key Milestones and Markers:

	Item	Scheduled Date	Status
114-1.1	Review of 30% Conceptual Design	Dec 93	Complete
114-1.2	Review of 90% Conceptual Design	Mar 94	Open
114-1.3	Review 90% Preliminary Design	Sep 94	Open

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

WBS Element: 1.1.5. Program Support

Task Description:

Program Support provides top-level planning, control, and support of MWMF project OPEX-funded activities. Specific activities include management of project assurances and interface with development activities. This element encompasses support for the Project Office, including organization, schedule and budgeting activities, project plans and reporting, personnel hiring and housing, project operations control, Building 494 occupant relocation, and OPEX-funded technical support.

Summary of Activities:

During February a number of reviews of the MWMF were conducted. As a result, additional guidance was received from DOE for the preparation of several Project documents and supporting information on the historical funding and manpower expenditures relative to identified milestones and markers. Documentation requested included the Technology Selection Plan (Milestone 115-5) and reports and briefings addressing the implementation of Molten Salt Oxidation (MSO). A draft joint LLNL/ORNL Plan for the Demonstration and Deployment of the MSO Process was developed along with documentation for the resolution of MSO issues identified in the December 1993 MSO Technical Review. These documents (in draft form) are being prepared for a briefing to DOE during March 1994. Specific activities of significance are listed below:

- System Design Requirements and process flowsheets were frozen and placed under formal change control.
- An integrated project schedule was completed, including key project linkages between process engineering, permitting, B494 upgrade, and operations planning activities. Work also began updating the detailed PERT/critical-path schedule to reflect current CD plans.
- Responded to IG Survey requests for information on DWTF and MWMF
- Documents and briefing being developed
 - Technology Selection and Implementation Plan: Part 1 Primary Processes (Completed);
 - Joint LLNL/ORNL Plan for the Demonstration and Deployment of the MSO Process;
 - Technical Plan for the Resolution of Outstanding MSO Issues;
 - EM-50 TTP for MSO Expedited Demonstration in support of Joint LLNL/ORNL Plan;
 - Information package in support of EM-30 MWMF Decision Briefing (5 support briefings).
- Activities regarding safety and environmental analyses and hazard classification of the MWMF were supported. After meeting with DOE/OAK, it is the Project's understanding that the "below Category 3" radiological classification is supported by the local field office; however, no formal response has yet been received.
- Processes to control several Project baselines were established, but are reported under WBS 1.3.2.
- The PTS and January Monthly Reports were issued to DOE.

Cost Summary: FY94 Budget: \$1250K OPEX

(NOTE: revised actual costs reflect revised cost data.)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	230	157	151	145	122	121	56	53	53	53	53	56
Actual	331	161	192	135	191							

**MWMF Monthly Report Summary
February 1994**

The increased charges in February were a result of two factors:

1. Delayed DOE funds for CENRTC. Costs transfers should correct this during the next month.
2. Unscheduled Project reviews and documentation on the implementation of MSO technology as identified in discussion above.

Key Milestones and Markers:

Item		Scheduled Date	Status
L115-1.1	Project Management Plan (Draft)	Oct 93	Complete
L115-2	Select Project Engineers and Project Control Manager	Dec 93	Complete
L115-3	Submit FY94 Project Plan	Jan 94	Complete
L115-4	Initiate PTS and Monthly reporting	Jan 94	Complete
L115-5	Technology Selection and Implementation Plan, Part I: Primary Processes	Feb 94	Complete
L115-6	Develop Design Basis Operations Plan	Mar 94	In Process
L115-1	Project Management Plan (Final)	Apr 94	Open
L115-7	Submit FY95 Project Plan (OPEX)	Sep 94	Open

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

WBS Element: 1.1.6. Public Participation

Task Description:

Public Participation provides for public input to the planning and execution phases of the MWMF project. Included are a National Advisory Committee, a Community Newsletter and preparation and coordination of press releases and community tours.

Summary of Activities:

This activity is on hold by Project due to DOE revised funding guidance. January charges represent a prior lein.

Cost Summary: FY94 Budget: \$150K OPEX

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	5	14	16	16	16	16	16	17	17	17
Actual	0	1	0	4	0							

FY94 Major Procurements:

Contracted support for Public Participation activities

Key Milestones and Markers:

Item	Scheduled Date ⁽¹⁾	Status ⁽¹⁾
L116-1.1 National Advisory Committee (NAC) formed	Feb 94	On Hold
L116-2.1 Issue first public newsletter	Mar 94	On Hold
L116-1.2 First meeting of NAC	Mar 94	Open
L116-1.3 Receive comments on CDR Draft from NAC	Apr 94	Open
L116-2.2 Issue second newsletter	Jun 94	Open
L116-1.4 Second meeting of NAC	Jul 94	Open
L116-2.3 Issue third newsletter	Sep 94	Open

⁽¹⁾ All activities on hold to accommodate reduced DOE funding guidance. Dates will be revised upon longer-term DOE funding guidance; see "Summary."

**MWMF Monthly Report Summary
February 1994**

WBS Element: 1.2.1. Conceptual Design

Task Description:

Conceptual Design provides the project's technical, cost, and schedule baselines that form the basis for KD-1.

Summary of Activities:

Conceptual system and equipment designs and general management were completed. Process flow diagrams were updated to reflect the CDR baseline waste stream. Preparation of the cost estimate and integrated schedule was initiated. The first rollup of these CDR elements is targeted for early March.

Cost Summary: FY94 Budget: \$940K OPEX

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	110	150	150	150	190	190	0	0	0	0	0	0
Actual	111	154	198	268	250							

FY94 Major Procurements:

Contracted services for CDR support: \$7K

(Corrected January CDR services, listed as \$40K: \$13K)

Key Milestones and Markers:

Item	Scheduled Date	Status
L121-1.1 Initiate Point Design Reviews	Oct 93	Complete
L121-1.2 Complete Point Design Reviews	Nov 93	Complete
L121-1 30% CDR Review	Dec 93	Complete
L121-2 90% CDR Review	Mar 94	Open
L121-3 Conceptual Design Review issued	Apr 94	Open
D121-1 Preliminary Approval and Funding to proceed into PD	Apr 94	Open
D121-2 KD-1/2 Decision approved DOE	Jun 94	Open

MWMF Monthly Report Summary
February 1994

UCRL-ID-116187-94-2

WBS Element: 1.2.2. Plant Start-Up Management

Task Description:

Plant Start-Up Management provides (1) operations and maintenance review of system designs, (2) the development of top-level plans for staffing, training, testing, and readiness review, (3) task analysis and preparation, review, and revision of site operating plan, maintenance, instrument calibration, and emergency response procedures, (4) recruiting, hiring, clearing, and providing general employee training for the plant staff, and (5) the development of training materials, training the trainers, and special technical and on-the-job training for the plant staff.

Summary of Activities:

No activities are scheduled for this WBS element for FY94.

Cost Summary:: FY94 Budget: \$0K OPEX

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	0	0	0	0	0	0	0
Actual	0	0	0	0	0							

FY94 Major Procurements:

None

Key Milestones and Markers:

Item	Scheduled Date	Status
None		

MWMF Monthly Report Summary February 1994

WBS Element: 1.2.3. Activation

Task Description:

Activation provides (1) the preparation, review, revision, and release of all Operational Test Procedures (OTPs); (2) plant systems activation, integration, and performance of Operational Test Procedures in each of the technology areas including Operational Readiness Reviews; (3) technical support for the preparation of Operational Safety Requirements (OSR) and Facility Safety Requirements (FSR), the identification and resolution of problems during plant operational testing, start-up, and activation, including finalization of design documentation for equipment and process modifications; (4) maintenance support to perform equipment or process modifications during start-up, testing, and activation; (5) all operational spares and the initial stores inventory; and (6) all manpower and materials required to deliver support services (e.g., utilities, power, etc.) during construction, testing, and activation of the MWMF.

Summary of Activities:

No activities are scheduled for this WBS element for FY94.

Cost Summary: FY94 Budget: \$0K OPEX

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	0	0	0	0	0	0	0
Actual	0	0	0	0	0							

FY94 Major Procurements:

None

Key Milestones and Markers:

Item	Scheduled Date	Status
None		

MWMF Monthly Report Summary
February 1994

UCRL-ID-116187-94-2

WBS Element: 1.3.1. Project Management

Task Description:

Project Management provides top-level project planning, direction, and control of the MWMF project's CENRTC-funded systems. Specific activities include project management and support of Project Office, project assurance (including quality assurance, safeguards, environmental, and safety oversight), management overview of information management and technical activities, and interface with DOE.

Summary of Activities:

No activities for this reporting period.

Cost Summary: FY94 Budget: \$300K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	0	50	50	50	50	50	50
Actual	0	0	0	0	0							

FY94 Major Procurements:

Service contract to SAIC for project support and independent technical and administrative reviews.

Key Milestones and Markers:

Item		Scheduled Date	Status
L131-1.1	In-house Point Design Review	Jun 94	Open
L131-1	90% Preliminary Design Review ⁽¹⁾	Sep 94	Open
L131-2	Submit FY95 Project Plan (CENRTC)	Sep 94	Open

⁽¹⁾ Tied to April 1st KD-1/2 decision approval from DOE.

MWMF Monthly Report Summary February 1994

WBS Element: 1.3.2. Project Control

Task Description:

Project Control provides for the project integration, configuration management, cost and schedule control, and administration of the CENRTC-funded systems. Develops and maintains the management systems used to monitor progress against the established baselines and to ensure configuration control (drawings, documents, etc.).

Summary of Activities:

Due to restricted funding guidance from DOE, only essential activities that are required for the control of important Project baselines were initiated during February under this WBS.

Mechanisms and processes to control baseline Project design criteria, organization (WBS, etc.), documents, and cost/schedule were instituted, but not yet formally documented. Due to funding changes, it is estimated that the formal Configuration Control Plan will be issued in May, 1994. The lack of charges in February was due to delayed DOE funds for CENRTC (see "Summary"). Costs transfers should correct this during the next month.

Cost Summary: FY94 Budget: \$300K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	28	34	39	39	44	38	39	39
Actual	0	0	0	0	0							

FY94 Major Procurements:

None

Key Milestones and Markers:

	Item	Scheduled Date ⁽¹⁾	Status ⁽¹⁾
L132-2.1	Prepare Configuration Control Plan	May 94 ⁽²⁾	In progress
L132-2.2	Prepare Design Review Procedure	Mar 94	Open
L132-1	Implement cost planning/tracking systems	June 94	Open
L132-2	Implement technical baseline control system	May 94	Open
L132-3	Implement schedule control/tracking system	Aug 94	Open

⁽¹⁾ All except essential activities deferred to accommodate reduced DOE funding guidance. Dates will be revised upon longer-term DOE funding guidance; see "Summary."

⁽²⁾ Revised from February 94; see discussion above.

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

WBS Element: 1.3.3. Technical Systems Integration

Task Description:

Technical Systems Integration provides the oversight and performance studies intended to verify or document system integration performance, system analysis, special process diagnostics, and planning and analysis of the process aspects of integrated tests. It also includes the responsibility for assuring that the systems aspects of the overall processes are adequately addressed in the integrated design. Includes System Engineering Management Plan and System Design Requirements coordination. Specific topics include the integration of waste-treatment processes and facility, risk assessment, accountability, safety, radiation exposure, and availability.

Summary of Activities:

No activities for this reporting period.

Cost Summary: FY94 Budget: \$300K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	0	50	50	50	50	50	50
Actual	0	0	0	0	0							

FY94 Major Procurements:

None

Key Milestones and Markers:

Item		Scheduled Date	Status
L133-1.1	Draft System Engineering Management Plan	Sep 94	Open

**MWMF Monthly Report Summary
February 1994**

WBS Element: 1.4.1. Receiving and Characterization

Task Description:

The principal objective of the Receiving and Characterization system is to provide for the receiving, logging, identification and characterization of all incoming waste containers and to determine the acceptability for processing the waste. Receiving and Characterization provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, installation of Receiving and Characterization equipment, Title III inspection, and acceptance test procedures (ATP). Receiving and Characterization includes both receiving and characterization equipment and systems integration.

Summary of Activities:

No activities for this reporting period.

Cost Summary: FY94 Budget: \$200K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	20	30	30	30	30	30	30
Actual	0	0	0	0	0							

FY94 Major Procurements:

None

Key Milestones and Markers:

	Item	Scheduled Date	Status
L141-1.1	Pilot characterization studies complete	Jun 94	Open
L141-1.2	Equipment identified and floor plan defined	Sep 94	Open
L141-1	90% Preliminary Design Review	Sep 94	Open

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

WBS Element: 1.4.2. Solids Feed Preparation

Task Description:

The principal objective of the Solids Feed Preparation system is to provide for the receipt, characterization, preparation for processing, and handling of homogeneous and heterogeneous solids received from storage and other processes in the facility. This includes segregating the incoming waste stream into combustible solids, heterogeneous solids, homogeneous inorganic solids and metals, and liquids that were not previously identified. Solids Feed Preparation provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, installation of Solids Feed Preparation equipment, Title III inspection, and acceptance test procedures (ATP). Solids Feed Preparation includes both solids feed preparation equipment and systems integration.

Summary of Activities:

No activities for this reporting period.

Cost Summary: FY94 Budget: \$600K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	130	70	90	90	70	70	80
Actual	0	0	0	0	0							

FY94 Major Procurements:

Support contracts to NWC sites: \$100K

Mechanical segregation test equipment: \$100K

Prototype equipment for waste handling evaluations: \$100K

Key Milestones and Markers:

	Item	Scheduled Date	Status
L142-1.1	Surrogate feeds defined	May 94	Open
L142-1.2	Initial suite of characterization equipment identified	Jun 94	Open
L142-1.3	Validation of characterization, isolation and segregation methods complete	Sep 94	Open
L142-1.4	Preliminary operator control station design complete	Sep 94	Open
L142-1	90% Preliminary Design Review	Sep 94	Open

**MWMF Monthly Report Summary
February 1994**

WBS Element: 1.4.3. Liquids Feed Preparation

Task Description:

The principal objective of the Liquids Feed Preparation system is to provide for the receipt, characterization, preparation for processing and handling of homogeneous and heterogeneous liquids and solids/liquids mixtures from storage and other processes in the treatment system. This includes segregating the incoming waste stream into aqueous with Trimsol, chlorinated organic liquids, oils, scintillation cocktails and solvents. Liquids Feed Preparation provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, installation of Liquids Feed Preparation equipment, Title III inspection, and acceptance test procedures (ATP). Liquids Feed Preparation includes both liquids feed preparation equipment and systems integration.

Summary of Activities:

No significant activities to report for this reporting period.

Cost Summary: FY94 Budget: \$400K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	75	75	50	50	50	50	50
Actual	12	5	1	0	1							

FY94 Major Procurements:

Support contracts to NWC sites: \$50K

Liquid/liquid and liquid/solid separation test equipment: \$80K

Key Milestones and Markers:

Item	Scheduled Date	Status
L143-1.1 Surrogate feeds defined	May 94	Open
L143-1.2 Liquids feed prep general arrangement plan finalized	Jul 94	Open
L143-1.3 Validation of liquid/liquid and liquid/solid separation methods complete	Sep 94	Open
L143-1 90% Preliminary Design Review	Sep 94	Open

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

WBS Element: 1.5.1. Mediated Electrochemical Oxidation

Task Description:

The principal objective of Mediated Electrochemical Oxidation (MEO) is to receive appropriately characterized mixed waste streams, and completely convert the organic portions to CO₂ and water, to recycle acid and silver, and to remove ash containing the radioactive constituents. The MEO project element provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, and installation of the MEO equipment, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities.

Summary of Activities:

During February 1994, the following activities took place in addition to the Conceptual Design effort. Experiments were conducted on the hydroxide-peroxide process to recover silver from silver chloride. The preliminary results show that the recovery yield is very strongly dependent on the hydroxide concentration. At hydroxide concentrations of 4, 8 and 10.5 M, the yields were 56, 95 and 98% respectively. Tests will continue to optimize this process.

The turbo-aerator to convert nitrous acid to nitric acid was removed from the bench-scale unit and is being installed in a cold flow unit to check the effect of tank volume on gas recirculation rate. A new tank made out of clear plexiglass is being fabricated, which will also serve for flow visualization studies of gas-fluid mixing.

Cost Summary: FY94 Budget: \$950K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	67	67	67	69	70	70	90	90	90	90	90	90
Actual	57	56	70	54	47							

FY94 Major Procurements:

None

Key Milestones and Markers:

Item	Scheduled Date	Status
L151-1.1 Complete tests on turbo-aerator for nitrous acid acid conversion	Mar 94	In Process
L151-1.2 Initiate steady-state flow and chemistry balance tests	Apr 94	Open
L151-2.1 Preliminary Process Flow Diagram	Jun 94	Open
L151-1.3 Initiate instrumentation and control system tests	Jul 94	Open
L151-2.2 Preliminary Equipment Layout	Sep 94	Open
L151-1.4 Complete tests for silver recovery	Sep 94	In progress
L151-1 Engineering characterization tests complete	Sep 94	Open
L151-2 90% Preliminary Design Review	Sep 94	Open

MWMF Monthly Report Summary February 1994

WBS Element: 1.5.2. Molten Salt Oxidation

Task Description:

The principal objectives of Molten Salt Oxidation (MSO) are to receive appropriately characterized mixed waste streams and completely convert the organic portions to CO₂ and water, to remove ash containing the radioactive constituents, and to recycle/process the spent salt. The MSO project element provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, and installation of the MEO equipment, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities.

Summary of Activities:

Engineering development needs and action plans were identified. The initial arrangement of process equipment and a vendor survey for the applicability of commercial components were continued.

Cost Summary: FY94 Budget: \$1260K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	29	15	17	22	25	24	34	34	56	83	431	490
Actual	16	12	6	18	22							

FY94 Major Procurements:

Contract for MSO system definitive design: \$750K

Key Milestones and Markers:

Item		Scheduled Date	Status
L152-1	Complete bench-scale rubber destruction tests	Dec 93	Complete
L152-2.1	Advertise in the CBD	Apr 94	In Process
L152-2.2	Complete Specification	May 94	Open
L152-3.1	Preliminary Process Flow Diagram complete	Jun 94	Open
L152-2.3	Select industrial partner	Jul 94	Open
L152-2	Award contract	Aug 94	Open
L152-3.2	Initiate Preliminary Design	Aug 94	Open
L152-3	30% Preliminary Design Review	Sep 94	Open

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

WBS Element: 1.5.3. Wet Oxidation

Task Description:

The principal objective of Wet Oxidation (WOX) is to demonstrate treatment of organic mixed wastes using a wet oxidation process to convert the organic portions to CO₂, water, and inorganic ions, leaving ash, salts, metals, and radionuclides in a residual solution/slurry. The WOX project element provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, and installation of the WOX equipment, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities.

Summary of Activities:

Experiments providing engineering data on dispersion of waste in the aqueous wet oxidation system were concluded. An in-bath mixer/blender is the recommended approach for finely dispersing cellulotics (shredded paper and cloth). Such a mixer also works well for dispersing solvents and oils. An additional circulating flow loop through a homogenizer may be included to predisperse the liquid feed stream and maintain lower liquid dispersion particle sizes.

Cost Summary: FY94 Budget: \$560K CENRTC

(NOTE: revised actual costs reflect revised cost data.)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	7	7	7	7	16	32	76	56	60	67	165	60
Actual	21	8	5	10	6							

FY94 Major Procurements:

Treatability Tests, if commissioned from vendor (incl. analytical costs): \$90K

Dispersion test equipment: \$30K

Key Milestones and Markers:

Item	Scheduled Date	Status
L153-1.1 Advertise in the CBD	Apr 94	Open
L153-2.1 Dispersion system test and design complete	May 94	Open
L153-2.2 Preliminary treatability tests complete	Jun 94	Open
L153-1.2 Issue RFQ for treatment unit w/ completed specification	Jun 94	Open
L153-2.3 Preliminary Process Flow Diagram complete	Jun 94	Open
L153-2.4 Preliminary P&ID for Support System complete	Jul 94	Open
L153-1 Award contract	Sep 94	Open
L153-2 30% Preliminary Design Review	Sep 94	Open

MWMF Monthly Report Summary
February 1994

WBS Element: 1.5.4. Ultraviolet Photolysis

Task Description:

The principal objective of Ultraviolet Photolysis (UVP) is to demonstrate ultraviolet-driven treatment of the hazardous and toxic organic constituents in the condensate from the Wet Oxidation process (WBS 1.5.3) to produce a sewerable water stream. The UVP project element provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, and installation of the UVP equipment, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities.

Summary of Activities:

No activities for this reporting period.

Cost Summary: FY94 Budget: \$300K CENRTC

(NOTE: revised actual costs reflect revised cost data.)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	2	2	2	5	6	12	26	33	99	42	36	35
Actual	3	3	2	-2	0							

FY94 Major Procurements:

Treatability Tests, commissioned from vendor (incl. analytical costs): \$55K

Key Milestones and Markers:

Item	Scheduled Date	Status
L154-1 Preliminary treatability tests complete	Jul 94	Open
L154-2.1 UVP Process Flow Diagram	Jul 94	Open
L154-2.2 P&ID for UVP Support System	Jul 94	Open
L154-2.3 UVP equipment layout	Aug 94	Open
L154-2 UVP 90% Preliminary Design Review	Sep 94	Open

MWMF Monthly Report Summary
February 1994

UCRL-ID-116187-94-2

WBS Element: 1.5.5. Experimental Off-Gas

Task Description:

The objective of the Experimental Off-Gas (XOG) treatment is to demonstrate advanced, more effective off-gas treatment technologies that minimize secondary waste. These are: improved Selective Catalytic Reduction (SCR) of NO_x to nitrogen in gaseous phase, conversion of NO_x to nitrogen in aqueous urea, and use of cleanable metal HEPA filters. The XOG project element provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, and installation of XOG equipment, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities. The XOG will be backed by the Process off-gas system representing best available control technology (BACT).

Summary of Activities:

No activities for this reporting period. Charges shown are mischarges that will be transferred.

Cost Summary: FY94 Budget: \$250K CENRTC

(NOTE: revised actual costs reflect revised cost data.)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	5	5	5	12	22	32	28	29	30	29	27	26
Actual	9	7	4	2	4							

FY94 Major Procurements:

Catalyst blocks: \$6K

gas/liquid contactor: \$13K

gas analyzer lease: \$25K

Key Milestones and Markers:

		Scheduled	Status
Item		Date	
L155-1.1	Fabricate prototype gas-liquid contactor for acidic urea NO _x destruction	Jun 94	Open
L155-1.2	Complete tests on urea and SCR DeNO _x	Jul 94	Open
L155-1	Engineering characterization tests complete	Jul 94	Open
L155-2.1	Initiate instrumentation and control system test	Aug 94	Open
L154-2.2	Preliminary Equipment Layout	Sep 94	Open
L155-2	90% Preliminary Design Review	Sep 94	Open

MWMF Monthly Report Summary February 1994

WBS Element: 1.6.1. Process Transport and Storage

Task Description:

The principal objective of the Process Transport and Storage system is to collect, transfer, deposit, store and handle containers, discrete items, dry and wet bulk materials, slurries, and liquids. Process Transport and Storage provides management, system analysis and support, design (Title I, II, and III) engineering, procurement, installation of Process Support Systems equipment, Title III inspection, and acceptance test procedures (ATP). Process Transport and Storage includes both process transport and storage equipment and systems integration.

Summary of Activities:

No activities for this reporting period.

Cost Summary: FY94 Budget: \$250K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	25	30	55	55	35	25	25
Actual	0	0	0	0	0							

FY94 Major Procurements:

Equipment for material transport interface development: \$75K

Key Milestones and Markers:

	Item	Scheduled Date	Status
L161-1.1	Select standard transport container designs	Jun 94	Open
L161-1.2	Finalize transport handling capacity	Jul 94	Open
L161-1.3	Finalize transport equipment selection	Aug 94	Open
L161-1.4	Validation of bagless interface complete	Sep 94	Open
L161-1	60% Preliminary Design Review	Sep 94	Open

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

WBS Element: 1.6.2. Analytical Laboratory

Task Description:

The principal objective of the Analytical Laboratory system is to transport and store both liquid and solid samples within the process areas. Analytical Laboratory provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, installation of Analytical Lab equipment, Title III inspection, and Acceptance Test Procedures (ATP). Analytical Lab includes both analytical lab transport and storage equipment and systems integration.

Summary of Activities:

No activities for this reporting period.

Cost Summary: FY94 Budget: \$50K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	7	7	7	7	7	7	8
Actual	0	0	0	0	0							

Major Procurements:

None

Key Milestones and Markers:

	Item	Scheduled Date	Status
L162-1.1	Select standard transport container designs	Jun 94	Open
L162-1.2	Finalize transport handling capacity	Jun 94	Open
L162-1.3	Finalize transport equipment selection	Aug 94	Open
L162-1	90% Preliminary Design Review	Sep 94	Open

MWMF Monthly Report Summary February 1994

WBS Element: 1.6.3. Water Treatment

Task Description:

The principal objectives of Water Treatment are to manage aqueous streams to meet discharge requirements and address future waste water management regulations that would affect an operating mixed waste treatment facility. The Water Treatment project element provides the management, system analysis and support, design (Title I, II, III), engineering, procurement, and installation of the Water Treatment equipment, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities.

Summary of Activities:

No activity to report for this period.

Cost Summary: FY94 Budget: \$150k CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	0	0	0	0	0	11	11	21	25	23	31	28
Actual	0	0	0	0	0							

FY94 Major Procurements:

None for this reporting period.

Key Milestones and Markers:

	Item	Scheduled Date	Status
L163-1	Water Treatment Process Flow Diagram	Jun 94	Open
L163-2.1	P& ID for Water Treatment	Jul 94	Open
L163-2.2	Tanks and Water Treatment Units Layout	Aug 94	Open
L163-2	90% Preliminary Design Review	Sep 94	Open

WBS Element: 1.6.4. Final Forms

Task Description:

The Final Forms task will immobilize the residues from treatment of the mixed waste input streams. The waste form for primary treatment residues will be a high durability ceramic. Final Forms will also condition the wastes resulting from secondary support processes that are integral to the primary treatment processes.

Summary of Activities:

Studies of ceramic waste forms simulating residues from the primary treatments are continuing. Matters under investigation include (a) the distribution of trace RCRA elements among the phases of the ceramic; (b) adjustment of the relative amounts of the phases by changing the overall composition; (c) the effects of increasing the particle size of the starting materials; (d) the effects of using less reactive starting materials (e.g., alumina and quartz instead of kaolin), because the phase make-up of the ashes from the primary processes is uncertain; and (e) the use of fluxing agents. The leaching system is undergoing minor redesign.

Conceptual design of the system is continuing. Equipment choices are becoming clear, the main exception being the type of comminution mill to be used. It is now anticipated that the drying, calcining and granulating steps will be combined in a single rotary unit, which eases the containment problem. The used automatic press (*cf.* 1/94 report, "Summary of Activities") will not be used, because an alternate design provides far better containment of hazardous powders.

Cost Summary: FY94 Budget: \$550K CENRTC

(NOTE: revised actual costs reflect revised cost data.)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	18	9	25	27	31	29	31	44	114	109	61	52
Actual	18	9	19	38	36							

FY94 Major Procurements:

Polymer immobilization evaluation for NaCl wastes: \$20K

Blender/granular (trial unit): \$20K

Furnace (trial unit): \$20K

Rotary calciner (trial unit): \$20K

Key Milestones and Markers:

Item	Scheduled Date	Status
L164-1.1 Preliminary process flow diagram complete	Jul 94	Open
L164-1.2 Preliminary equipment layout complete	Aug 94	Open
L164-1.1 Preliminary process parameters for ceramic forms complete	Sep 94	In Process
L164-1 90% Preliminary Design Review	Sep 94	Open
L164-2 NaCl encapsulation evaluation complete	Sep 94	Proposal in hand

WBS Element: 1.6.5. Supervisory Instrumentation and Control**Task Description:**

Instrumentation and Control (I&C) systems will provide and integrate controls to develop, demonstrate, test, and evaluate mixed waste destruction technologies in a safe, environmentally acceptable, reliable, and cost-effective manner. I&C systems provide the management, system analysis and support, design (Title I, II, III) engineering, procurement, equipment installation, Title III inspection, and acceptance test procedures (ATP) covering equipment and system integration activities for Central Monitoring and Control, Safety Control Systems, Standard Process I&C, Analytical Laboratory I&C, and intercom communication, surveillance CCTV, and telepresence systems.

Summary of Activities:

- Continued identification of system interfaces, requirements, and criteria. Continued compilation of an I&C Plan Task summary modeled on the Project Plan Task Summary.
- Completed conceptual design activities for most Control System subsystem elements including intercom communications and CCTV surveillance.
- Continued evaluation of front-end-processors (FEP). Arranged vendor demonstrations for Modicon, Seimens/Texas Instrument.
- Continued evaluation of supervisory control systems (DCS and SCADA). Arranged vendor demonstration for WonderWare and ICOM. Had on-site discussions with Hewlett-Packard in regards to RTAP.
- Continued evaluation of work-cell controllers .
- Continued General Arrangement Plan development activities. Completed conceptual design of the Equipment Room and Control Room using the B494 80% CDR floor plan.

Cost Summary: FY94 Budget: \$1200K CENRTC

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Plan	20	20	20	35	55	70	90	315	90	140	170	175
Actual	19	21	25	11	22							

FY94 Major Procurements:

Process Control System front-end-processor hardware/software, fast prototype: \$45K

Supervisory Control System hardware/software, fast prototype components: \$135K

Handling system open architecture controller, fast prototype components: \$30K

Telerebotics platform, fast prototype components: \$60K

Teleoperator controller, fast prototype components: \$60K

**MWMF Monthly Report Summary
February 1994**

UCRL-ID-116187-94-2

Key Milestones and Markers:

		Scheduled	Status
Item		Date	
L165-1.1	General arrangement plan complete	Mar 94	Open
L165-1.2	Process Control System FEP hardware/software selected	Apr 94	Open
L165-1.3	Supervisory Control System hardware/software selected	Apr 94	Open
L165-1.4	Handling Systems open architecture controller selected	Jul 94	Open
L165-1.5	Analytical laboratory LIMS selected	Jul 94	Open
L165-1.6	Telerobotics platform selected	Aug 94	Open
L165-1.7	Teleoperator controller selected	Sep 94	Open
L165-1	90% Preliminary Design Review	Sep 94	Open

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