The Mixed Waste Management Facility

Monthly Report
October 1995

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The Mixed Waste Management Facility

Monthly Report
October 1995

Ronald D. Streit

November 1995

Lawrence Livermore National Laboratory
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Project Summary

Overview

A continuing concern over the last few months was resolved with the approval of the *Environmental Assessment* (EA) and signing of the *Finding of No Significant Impact* (FONSI). This was completed in time to allow approval of the DWTF Phase 1 KD-3 and subsequent award of the construction contract for this phase (site preparation).

The Project continues to make progress toward the Project Preliminary Design Review (PDR), scheduled for November 15–16, 1995. We completed the conventional feed preparation and solid feed preparation demonstration technologies (telerobotic sorting) and conducted a prereview of the Analytical Services element. Molten Salt is scheduled for October 3–4, with Water Treatment and Analytical Services completing the reviews by October 12. While a number of design issues have been raised and are being tracked, the general level of engineering progress is consistent with completing the PDR on schedule. No show-stoppers have been identified, and all items requiring resolution before PDR will be completed.

We completed the initial iteration of the cost roll-ups for the preliminary design and have developed a plan consistent with the guidance issued for the Project (level funding at ~\$10M/yr, reduced scope, integrated with the DWTF). This was accomplished by staging the completion of various elements (e.g., MSO in FY98, Telerobotics in FY99), and reducing to the extent possible project support functions. Two significant modifications will be noted in the *Project Baseline Revision 2.0—Preliminary Design* (PB2.0) relative to previous estimates: (1) the cost of the MSO system has increased due to a better understanding of the system needs (relative to CDR assessment), and (2) project management has increased owing to a restructuring of how LLNL distributes facility charge costs. However, both these increases have been offset by reduction in other elements and by a general lowering of Project contingency. This information will be further detailed in the PB2.0 to be completed after the PDR.

Engineering development continues to progress toward resolving the issues needed for final design. The MSO Engineering Demonstration Unit (EDU) has now been operational since June 1995, and we are continuing to obtain data on key elements such as baffle design, injector performance, controls, salt height assessment, and other engineering elements.

Two vendor contracts were completed for preliminary design input of the salt separation element to the MSO salt recycle system. The vendors were selected based on their ability to design and deploy a complete turnkey salt separation system for integration into MSO. This acquisition strategy has allowed the Project to involve industrial partners at an early stage of the design and to get an assessment of vendor capability. The salt recycle preliminary design will be based on their inputs and the LLNL design. Concurrently, a contract is being pursued to purchase a "turnkey" salt separation system. The contract will include final design through installation in the MWMF and will be based on a detailed procurement specification completed as part of preliminary design.

The telerobotic feed preparation engineering development has also made significant progress. Linkage between Control Shell and SMART (for interfacing between the robotic arm, hand controller, and linking to the facility model) has been tested, and a decision on the final configuration is nearing completion. The telerobotic arm, the Schilling Titan III, was received in September as planned. It will be used for the final stages of engineering development and will ultimately be used in the facility.

Cost Status. Final costs for FY95 were \$7,231K out of \$8,585K total funds available, leaving \$1,354K. Of the funds remaining to be carried into FY96, \$475K is obligated in liens. The \$879K of "Approved Work Scope" is distributed as \$340K related to manpower costs delayed because of slow ramp-up, and \$539K is related to the salt separation system procurements being processed.

To ensure that the Project continues to meet schedule and has sufficient outyear funding, it is essential that the total \$1,354K be carried forward from FY95 to FY96.

Schedule Status. The Project PDR will be held November 15-16, 1995, per the Project Rebaseline Rev 1.2 (PB1.2) schedule. As stated previously, the approximately flat spending profile over the next three fiscal years, per DOE guidance, will result in stretch-out of the Project into FY99.

Significant Issues and Planned Corrective Actions

Funding uncertainty continues to be the major concern in meeting the baseline plan. FY96 funding is still uncertain, as is the availability of DOE/OAK funds in outyears. This will impact overall Project scope, schedule and/or cost. The PB2.0 reflects the budget profile guidance from DOE for the remainder of the Project established mid to late FY95. We have focused on keeping the spending profile relatively flat, and at approximately \$10M/yr (with a total cost to complete of approximately \$36M). However, recently (mid-September) we were also given additional guidance reflecting a significantly lower DOE/OAK budget consistent with the "House mark-up" of the appropriations bill with a total cost to complete of approximately \$12M to \$14M. We are developing a very high level plan to address this potential budget, but detailed planning will not commence until more formal notification is received. The differences between the two guidances are significant and will result in very different Project scopes and schedules. Uncertainty in the budget profile and budget "stability" will lead to additional costs and Project schedule slips. It will continue to have a negative impact on meeting Project goals and milestones as well as in retaining the best personnel.

As part of the system-level PDRs, we have identified a number of design and integration concerns relative to the deployment of the process and process support systems, as are typical of this type of review. The concerns raised as part of the system design reviews have been grouped into two categories: "action items" that require formal tracking and "issues" to be addressed in the normal progress of final design. The action items have been assigned a control number and responsible individual, and will be followed to closure. None of the action items or issues identified appear to be technical "show stoppers," and the Project preliminary design will be completed as scheduled.

Summary of Accomplishments

Detailed accomplishments and milestone status are reported in the Task Summaries that follow the Project Financial Summary. Below we highlight the major accomplishments during this reporting period:

- **Environmental Documentation:** No substantive comments were received by DOE on the MWMF draft EA. DOE/OAK subsequently issued a FONSI.
- **Facility Integration:** Comments from the lead engineers on the interim review of the Title I package of drawings, specifications, and studies were transmitted to Ralph M. Parsons Co.
- **Receiving and Shipping:** The System 90% PDR was completed. No action items/issues were raised that impact the preliminary design.
- **Solids Feed Preparation:** The System 90% PDR for conventional Solids Feed Preparation and Local I&C was completed. There were no outstanding action items/issues that would impact preliminary design. The Feed Prep Demonstration System PDR was held on September 21, completing the last of the Feed Preparation, Transport, and Storage (FPTS) PDRs. Factory acceptance testing was completed for the Titan III manipulator arm; the system was delivered and installed. Control Shell for telerobot low-level control has been selected and acquired as baseline for beginning Title II design.
- **MSO:** In the materials development and evaluation area, candidate vessel materials have been partitioned into two categories: design-related (materials presently under serious consideration for use in construction of the vessel) and future possibilities. FY96 efforts will focus on additional testing of the first group and advancing their suitability for the vessel. The EDU test series for the evaluation of the side injector was completed, and a preliminary analysis of the data has been conducted. Preliminary layouts of the Primary Unit showing spatial relationships of major components have been completed.
- **Process Transport and Storage:** The 90% PDR was held September 11.

Project Financial Summary

Figures 1 and 2 present graphical plots of planned-versus-actual spending for OPEX and CENRTC. Table 1 presents a more detailed financial summary of the MWMF Project for September. For reference, the monthly profiles are shown for both the original (11/94 Plan) and the revised (4/95 Plan) FY95 spending plan. There are no significant financial items to report beyond those discussed in the Cost Status paragraph of the Overview section above.

TABLE 1

MWMF Project - Monthly Financial Summary for FY96
October 1995

OPEX (\$K, monthly expenditures)

	CO*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Subtotal*	Undisb#	10/95 Plan
DOE Funds*	301	0												301	NA, for information only	
FY96 Plan 10/95		52	37	39	36	50	36	58	64	75	64	64	64	639		639
Actual		41												41		
Variance		(11)												(11)		
Actual Liens**		140												0	0	80
Mgmt Reserve		0												0	100	100
96/97 Liens holdback***														0		
FY95 OPEX budget =																819

OPEX (\$K, cumulative to date)

	CO*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	DOE FY96 new-BA, OPEX		
DOE Funds*	301	301												budget	guidance^	delta
FY96 Plan 10/95^		52	89	128	165	215	251	309	372	447	511	575	639	339		339
Actual		41														
Variance		(11)														

CENRTC (\$K, monthly expenditures)

	CO*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Subtotal*	Undisb#	10/95 Plan
DOE Funds*	1,053	1,500												2,553	NA, for information only	
FY96 Plan 10/95		581	1,677	621	589	745	574	586	706	580	565	648	721	8,572		8,572
Actual		440														
Variance		(121)												(121)		
Actual Liens**		434												0	0	605
Mgmt Reserve		0												0	400	400
96/97 Liens holdback***														0		
FY95 CENRTC budget =																9,577

CENRTC (\$K, cumulative to date)

	CO*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	DOE FY96 new-BA, CENRTC		
DOE Funds*	1,053	2,553												budget	guidance^	delta
FY96 Plan 10/95^		561	2,238	2,859	3,448	4,192	4,767	5,353	6,059	6,639	7,204	7,851	8,572	7,519		7,519
Actual		440														
Variance		(121)														

PROJECT TOTAL (\$K, monthly expenditures)

	CO*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Subtotal*	Undisb#	10/95 Plan
DOE Funds*	1,354	1,500												2,854	NA, for information only	
FY96 Plan 10/95		613	1,714	660	625	795	611	644	770	655	629	711	785	9,211		9,211
Actual		481												481		
Variance		(132)												(132)		
Actual Liens**		574												0	0	685
Actual Proliens**		1,117												0	500	500
Mgmt Reserve		0												0		
95/96 Liens holdback***														0		
FY95 TOTAL budget =																10,396

TOTAL PROJECT EXPENDITURES (\$K, cumulative to date)

	CO*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	DOE FY96 new-BA, TOTAL		
DOE Funds*	1,354	2,854												budget	guidance^	delta
FY96 Plan 10/95^		613	2,327	2,987	3,612	4,407	5,018	5,661	6,431	7,086	7,715	8,426	9,211	7,858	0	7,858
Actual		481														
Variance		(132)														

MANPOWER SUMMARY (total project, by month)

	CO*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Labor (FTE)		41.1											
Labor (\$K)@		364											

* DOE funds include FY95 carryover (source: LLNL Contract Modification)

** Relevant for current month only; sum not meaningful

*** Includes budgeted amounts for management reserve, liens holdback

Undistributed remaining budget

^ No guidance has been provided

^^ Updated periodically (see note); only Subtotal Relevant

WBS Element: 1.1.1. Quality Assurance

Task Description: Quality Assurance provides quality assurance (QA) support to the MWMF Project. This effort includes development and implementation of the project's quality assurance program and oversight for conformance to the approved plan and other quality and ES&H requirements. This WBS element covers only a proportional fraction of the OPEX quality assurance effort, with the CENRTC portion contained under WBS 1.3.2, Project Control.

Summary of Monthly Activities:

- We provided comments on/redrafted sections of the I&C QA Plan. This plan is now in the final draft stage and covers software QA.
- We attended the Molten Salt Oxidation, Analytical Services, and Water Treatment preliminary design reviews and documented the MSO review.
- We continued updating the action item tracking system/list and attended various preliminary design review meetings.
- We worked with project personnel on QA issues and the QA filing system.

FY96 Budget: Spending profile (\$K, OPEX)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5
Monthly actual	1.6											
FY96 Plan cumulative	2.3	4.6	6.9	9.2	11.5	13.8	16.1	18.4	20.7	23.0	25.3	27.8
Actual cumulative	1.6											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	Level of effort activity		

WBS Element: 1.1.2. PSAR

Task Description: The *Preliminary Safety Analysis Report* (PSAR) provides the integration of safety input, design reviews, and safety analysis for Phases I and II of the integrated MWMF/DWTF Project. Safety analysis includes analysis, generation of documentation, and documentation review and approval. The element includes the generation of the PSAR, which must be completed prior to major procurements and follow-on analysis required for the generation of the *Final Safety Analysis Report* (FSAR). The FSAR is required after construction and prior to operation.

Summary of Monthly Activities:

No activities are planned for FY96.

FY96 Budget: Spending profile (\$K, CENTRC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly actual	0.0											
FY96 Plan cumulative	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual cumulative	0.0											
Current lien	64.1											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	No activity		

WBS Element: 1.1.3 NEPA/CEQA

Task Description: The NEPA portion of this WBS provides for the preparation of the *Environmental Assessment* (EA) and all required follow-up documentation required by DOE to make a determination about impacts. The effort includes preliminary evaluations, preparation of technical information, EA preparation, and comment resolution.

The CEQA and permitting portion of this WBS provide for the preparation of permit applications and associated environmental analysis to support the regulatory agency permitting and CEQA review process. The effort includes preliminary evaluations, and preparation of technical information to support the agency CEQA document and permit evaluation, and comment resolution. This element prepares and coordinates approval of State and local permits and supports public participation activities associated with the permits approvals.

Summary of Monthly Activities:

- We addressed EA comments and performed some prework for the CEQA air permit.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	4.2	0.0	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Monthly actual	0.5											
FY96 Plan cumulative	4.2	9.3	13.5	17.7	21.9	26.1	30.3	34.5	38.7	42.9	47.1	51.3
Actual cumulative	0.5											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L113-2	Submit air permit to BAAQMD	Apr 96	
C113-2	Authorization to construct issued by BAAQMD	Jul 96	

WBS Element: 1.1.4. ES&H

Task Description: ES&H provides for on-going Environment, Safety, and Health (ES&H) representation to the MWMF Project by ES&H specialists 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.

Summary of Monthly Activities:

We provided on-going ES&H support to the MWMF Project as described above.

FY96 Budget: Spending profile (\$K, OPEX)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.2	13.2	13.2	13.2	13.2
Monthly actual	18.3											
FY96 Plan cumulative	13.1	26.2	39.3	52.4	65.5	78.6	91.7	104.9	118.1	131.3	144.5	157.7
Actual cumulative	18.3											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	Level of effort activity		

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, facility technical support, and OPEX-funded technical support.

Summary of Monthly Activities:

Due to continuing budget concerns, activities in this element were restricted to Project Manager and Scientific oversight support and clerical support as required. We continue to monitor permitting and EA comments and continue to work with the DTSC on the classification of MSO. Additional effort was directed to support of the PDR and completion of budget estimates for the *FY96 Plan* and PB2.0.

FY96 Budget: Spending profile (\$K, OPEX)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	31.0	15.3	15.3	15.0	26.0	15.0	20.0	15.0	26.0	15.0	15.3	15.3
Monthly actual	17.5											
FY96 Plan cumulative	31.0	46.3	61.5	76.5	102.5	117.5	137.5	152.5	178.5	193.5	208.8	224.0
Actual cumulative	17.5											
Current lien	45.4											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
D115-1	DOE issues Project Plan	Jan 95	Complete
L115-10	Submit FY96 Plan	Oct 95	
L115-11	FY98 Project Validation	Apr 96	
L115-12	Submit FY97 Plan	Oct 96	

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 Review Panel (NRP), a Community Newsletter, and preparation and coordination of press releases and community tours.

Summary of Monthly Activities:

- The NRP was updated on the approval of the *Environmental Assessment*.
- Planning began for the next NRP meeting.

FY96 Budget: Spending profile (\$K, OPEX)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	6.0	6.0	8.5	6.0	8.5	6.0	6.0	6.0	6.5	6.0	6.0	6.0
Monthly actual	3.8											
FY96 Plan cumulative	6.0	12.0	20.5	26.5	34.0	41.0	47.0	53.0	59.5	65.5	71.5	77.5
Actual cumulative	3.8											
Current lien	28.2											

Significant Procurement Actions this Month:
None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L116-3	NRP Meeting	Jan 96	
L116-3.1	MWMF Letter	Feb 96	
L116-4	NRP Meeting	Jun 96	
L116-4.1	MWMF Letter	Jul 96	

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 Monthly Activities:

Conceptual design activity is complete.

FY96 Budget: Spending profile (\$K, OPEX)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly actual	0.0											
FY96 Plan cumulative	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual cumulative	0.0											
Current lien	2.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	No activity		

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 Monthly Activities:

- Completed the FY96 Project Plan.
- Prepared for the MWMF Project PDR.

FY96 Budget: Spending profile (\$K, OPEX)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.0	0.0	0.0	0.0	0.0	0.0	16.2	27.2	27.2	27.2	27.2	27.2
Monthly actual	0.0											
FY96 Plan cumulative	0.0	0.0	0.0	0.0	0.0	0.0	16.2	43.4	70.6	97.8	125.0	152.2
Actual cumulative	0.0											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L122-1	Issue MWMF Start-Up and Activation Plan	Sep 96	

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 OTPs in each of the technology areas including Operational Readiness Reviews (ORRs); (3) technical support for the preparation of Operational Safety Requirements (OSRs) and Facility Safety Requirements (FSRs), as well as 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 Monthly Activities:

There are no Activation activities planned in FY96.

FY96 Budget: Spending profile (\$K, OPEX)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly actual	0.0											
FY96 Plan cumulative	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual cumulative	0.0											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	No activity		

WBS Element: 1.3.1. Project Management

Task Description: Project Management provides top-level project planning, direction, and control of the MWMF Project 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 Monthly Activities:

- In October, we completed the last of the system-level PDRs for the Project, and we are now focusing on Project PDR, scheduled for November 15 to 16, 1995. The October reviews included Molten Salt Oxidation (MSO), Water Treatment (WTR), and Analytical Services (LAB). While a number of design issues have been raised and are being tracked, the general level of engineering progress is consistent with completing the PDR on schedule. No show-stoppers have been identified, and all items requiring resolution before the PDR will be completed.
- The Molten Salt review was a two-day effort addressing, in detail, all aspects of the MSO system. The review included input from the MSO Primary System CRADA partner, and salt separation designs coordinated with three outside industrial partners. Reviewers included individuals familiar with chemical process plants, facilities, and hazardous/mixed waste operations. The review was very well received, with no major issues raised. A number of minor items were identified and have been assigned to appropriate engineers for resolution (see memo "Molten Salt Oxidation Preliminary Design Review Meeting Minutes," October 23, 1995, L-20659-01). Reviews of the Water Treatment and Analytical Services also provided significant details on the system designs and resulted in no major design issues.
- Final iteration of the cost roll-ups for the Preliminary Design were completed and all project issues related to scope and schedule were resolved. The resulting plan is consistent with the guidance issued for the Project (level funding at ~\$10M/yr, reduced scope, integrated with the DWTF), and provides a foundation for changes to accommodate DOE's funding availability. The FY96 Plan consistent with this new baseline was developed and will be issued in November.
- The MSO engineering development unit tests were focused on resolving the final vessel configuration for proceeding into Final Design. The advantages/disadvantages of using a cylindrical primary vessel vs. a unit with an enlarged-diameter upper section were evaluated. Based on these studies, the baseline design has been modified to a single metal vessel with an enlarged-diameter upper section. This allows the salt inventory to be kept to a minimum (improving heat transfer to and from the salt), while at the same time reducing the gas flow velocity in the upper portion to limit salt carry-over concerns. The corresponding system configuration is now being updated for the preliminary design.

- The telerobotic feed preparation (TRS) engineering development continues to make significant progress. The Control Shell architecture for control of the Shilling robot arm has proven successful and appears to be the preferred selection for the final configuration. A demonstration system is being configured to complete the final design details for implementation of TRS in the MWMF. This testbed will focus on the engineering issues, such as physical interfaces, equipment arrangement, and telerobotic vs. automated functions.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	64.0	88.0	72.0	61.3	64.0	61.3	61.3	61.3	64.0	61.0	61.0	88.0
Monthly actual	42.5											
FY96 Plan cumulative	64.0	152.0	224.0	285.3	349.3	410.5	471.8	533.0	597.0	658.0	719.0	807.0
Actual cumulative	42.5											
Current lien	24.5											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L131-1	Preliminary Design Review complete	Nov 95	
D131-2	DOE issues KD-2	Nov 95	
L131-5	Issue Project Baseline Rev. 2.0	Jan 96	
L131-6	Final Design Review complete	Oct 96	

WBS Element: 1.3.2. Project Control

Task Description: Project Control provides for the Project integration, configuration management, cost and schedule control, quality assurance (see WBS 1.1.1), and administration of the CENRTC-funded systems. It develops and maintains the management systems used to monitor progress against the established baselines and to ensure configuration control (drawings, documents, etc.).

Summary of Monthly Activities:

- Because the Federal Budget was under Continuing Resolution, costs were closely monitored during October to ensure they were held as low as possible, while still accomplishing milestones.
- We completed the second roll-up of the cost estimate that was used to generate the *FY96 Plan* and will be used for PB2.0. The transfer of data from the Excel estimating sheets into the Primavera database went very smoothly.
- Work continued on developing plans to respond to various DOE FY96 and outyear funding scenarios.
- Other activities and accomplishments during October included the following:
 - Issued the DOE PTS monthly report.
 - Issued the *September Monthly Report*.
 - Continued investigating several liens for possible removal from Project accounts.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	38.0
Monthly actual	13.7											
FY96 Plan cumulative	40.0	80.0	120.0	160.0	200.0	240.0	280.0	320.0	360.0	400.0	440.0	478.0
Actual cumulative	13.7											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L132-8.1	Complete support of Project PDR	Nov 95	Complete
L132-10.1	Complete FY96 Budget Plan	Oct 95	
L132-11.1	Complete Cost/Schedule Baseline Rev. 2.0	Jan 96	
L132-12.1	Complete support of Project Final Design Review	Sep 96	
L132-13.1	Engineering Change Control Procedure	Jan 96	
L132-13.2	Non-conformance Reporting Procedure	Apr 96	
L132-13.3	Complete QA Surveillance/Verification	Aug 96	

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 covers technical issues that affect all primary and support processes. It also includes the responsibility for assuring that the systems interfaces are addressed in the integrated design, including interfaces with LLNL Hazardous Waste Management and facility engineering. The element coordinates the System Design Requirements, the MWMF floor plan, and the Integrated Operating Plan.

Summary of Monthly Activities:

- We transmitted comments from the lead engineers on the final review of the Title I package of drawings, specifications, and studies provided by Parsons.
- We completed an evaluation of equipment arrangements for the MWMF floor plan for a reduced scope scenario. This arrangement addressed the challenge of verifying all necessary elements would fit in a smaller building footprint. The result was accomplished by relocation of certain functions and reducing the control room, staging, and future process areas.
- We have continued to answer questions and give clarification to Parsons to assist in their design effort.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	35.0	28.0	28.0	32.0	26.4	29.0	30.0	23.4	23.4	27.4	23.4	23.4
Monthly actual	20.9											
FY96 Plan cumulative	35.0	63.0	91.0	123.0	149.4	178.4	208.4	231.8	255.2	282.6	306.0	329.4
Actual cumulative	20.9											
Current lien	0.9											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L133-10.5	Facility Title I Design Review (80%)	Oct 95	Complete
L133-10.6	LLNL review of Facility Title I Design	Nov 95	
L133-6	Revised SDR completed for Title II Design	Nov 95	
L133-7.1	Facility Title II Design Review (80%)	Jan 96	
L133-7	LLNL review of Facility Title II Design complete	Apr 96	

WBS Element: 1.4.1. Receiving and Shipping

Task Description: The principal objective of the Receiving and Shipping (RAS) 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 Shipping provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, installation of Receiving and Shipping equipment, Title III inspection, and acceptance test procedures (ATP). Receiving and Shipping includes both receiving and shipping equipment and systems integration.

Summary of Monthly Activities:

- We continued design activities in preparation for the upcoming Project PDR.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	1.5	1.5	1.5	1.5	2.4	4.9	2.4	4.9	2.4	2.2	2.2	2.2
Monthly actual	3.6											
FY96 Plan cumulative	1.5	3.0	4.5	6.0	8.4	13.3	15.7	20.6	22.9	25.1	27.3	29.5
Actual cumulative	3.6											
Current lien	0.0											

Significant Procurement Actions this month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L141-1.3	RAS LI&C System Functional Requirements document complete	Sep 95	Late
L141-2.1	RAS LI&C System Design Description drafted	Jun 96	
L141-2.2	RAS System Design Description drafted	Sep 96	
L141-2	RAS 90% Final Design Review complete	Oct 96	

WBS Element: 1.4.2. Solids Feed Preparation—Conventional

Task Description: The principal objective of the Conventional Solids Feed Preparation (SFP) system is to provide for the receipt, preparation for processing, and the decontamination of homogeneous and heterogeneous solids received from storage and other processes in the facility. This includes processing the incoming combustible solids waste/surrogate stream into a form required by the treatment processes. The decontamination system provides necessary equipment to ensure materials/containers can be safely transferred out of the facility. Conventional 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 Monthly Activities:

- We continued design activities in preparation for the upcoming Project PDR.
- We continued activities in preparation for the LI&C System Functional Requirements Document, but work of higher priority preempted this work.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	17.3	20.3	31.3	30.3	33.8	31.8	32.8	31.8	31.8	30.5	30.5	31.5
Monthly actual	3.9											
FY96 Plan cumulative	17.3	37.6	68.9	99.2	133.0	164.8	197.6	229.4	261.2	291.7	322.2	353.7
Actual cumulative	3.9											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L142-1.8	SFP LI&C System Functional Requirements Document complete	Oct 95	Late
L142-3.1	SFP System Design Description drafted	Sep 96	
L142-3.2	SFP LI&C System Design Description drafted	Oct 96	
L142-3	SFP 90% Final Design Review complete	Oct 96	

WBS Element: 1.4.2. Solids Feed Preparation—Telerobotics Sorting

Task Description: The principal objective of the Telerobotics Sorting (TRS) system within Solids Feed Prep is to provide remote container and waste handling equipment necessary to demonstrate remote preparation of feed for treatment processes in MWMF and evaluate the technology for use at sites across the DOE complex. TRS interfaces with SFP container receiving and conventional size reduction and segregation equipment and replaces manual (hands-on) sorting and container handling operations in the potentially contaminated process room. TRS primary functions include drum movement; waste characterization; segregation of the incoming waste stream into bulk streams containing predominantly organic solids, heterogeneous solids, homogeneous inorganic solids and metals, and liquids not previously identified; and repackaging of reject materials. Telerobotic Sorting provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, installation of Solids Feed Preparation TRS equipment, Title III inspection, and acceptance test procedures (ATP). TRS includes both solids feed preparation equipment and systems integration.

Summary of Monthly Activities:

- Continued design activities in preparation for the upcoming Project PDR. Resolved equipment interface issues at the definitive sort station.
- Final acceptance testing was completed for the Titan III manipulator arm at the LLNL site. The final tests included repeatability and accuracy tests in both loaded and unloaded configurations. The test showed surprisingly good accuracy results (accuracy ~1 mm over 1 m cube) indicating exceptional arm stiffness and actuator performance.
- ORNL agreed to set aside intellectual property issues associated with LLNL's use of their control code since the software they are contributing will be kept within the DOE complex. This removed the only stumbling block to an agreement to collaborate on Titan manipulator control development. ORNL provided the control code from their Titan II project and provided a commendable level of phone support. With their help, the code was reconfigured by LLNL staff and extended to meet our needs and was up and running in less than a week. LLNL staff is very pleased to be working with ORNL to avoid duplication of effort across the complex.
- The Titan III engineering development arm is up and operational in both position-position and position-rate modes. Both modes are needed for covering the work cell at high speeds. Integration of the Cybernet hand control, tuning of the servos, and other details must be completed prior to addition of work cell constraints and force control functionality.
- The initial set of cell hardware has been designed and is being fabricated or procured.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	59.0	63.0	102.0	75.0	62.0	51.0	48.0	57.0	42.0	40.0	38.0	62.0
Monthly actual	33.0											
FY96 Plan cumulative	59.0	122.0	224.0	299.0	361.0	412.0	460.0	517.0	559.0	599.0	637.0	699.0
Actual cumulative	33.0											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L1422-2.1	Linear rail facility interface design complete	Dec 95	
L1422-2.2	Prototype sorting application operational	Mar 96	
L1422-2.3	Operator console prototype complete	Apr 96	
L1422-2.4	Telerobot control interface design and performance specification complete	Aug 96	
L1425-2	Crane final design (specification) complete	Aug 96	
L1422-2	Telerobotics Sorting 90% Final Design Review complete	Sep 96	

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 received from storage and other processes in the facility. This includes segregating the incoming waste stream into aqueous with Trimsol, chlorinated organic liquids, oils, solvents and scintillation cocktails. 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 Monthly Activities:

- We continued design activities in preparation for the upcoming Project PDR.
- We continued design activities in preparation for the LI&C System Functional Requirements Document but work of higher priority preempted this effort.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	17.5	17.5	17.6	17.6	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Monthly actual	10.6											
FY96 Plan cumulative	17.5	35.0	52.6	70.2	91.0	111.8	132.6	153.4	174.2	195.0	215.8	236.6
Actual cumulative	10.6											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L143-1.6	LFP LI&C System Functional Requirements Document complete	Oct 95	Late
L143-2.1	LFP System Design Description drafted	Sep 96	
L143-2.2	LFP LI&C System Design Description drafted	Sep 96	
L143-2	LFP 90% Final Design Review complete	Oct 96	

WBS Element: 1.5.1. Mediated Electrochemical Oxidation

Task Description: The principal objective of Mediated Electrochemical Oxidation (MEO) System 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 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 Monthly Activities:

- The activities are focused on completing the remaining tests and documenting the results prior to close-out of this task at the end of September.
- The steady-state run analysis is complete and the results documented.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly actual	3.4											
FY96 Plan cumulative	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual cumulative	3.4											
Current lien	0.9											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	No activity		

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 CO_2 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 MSO equipment, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities.

Summary of Monthly Activities:**• Materials Development**

- Iron aluminide weld overlays on Inconel 600 nickel alloy (collaboration with ORNL)
 - Two weld overlay samples have been prepared by ORNL for corrosion testing at LLNL.
- Corrosion testing
 - The first corrosion test in LLNL's ten-tube furnace was successfully completed despite the start-up complications (mostly gas train leaks fixed on the fly) reported last month. It ran for 1000 h (41 days) at 950°C , twice the duration of our usual screening test of 500 h. Its ten samples were a variety of bare and aluminized Inconel 600 (two of which were welded plates) and two PVD oxides on Inconel 600. A brief metallographic scan revealed that
 - the aluminizing and PVD coatings offered considerable, but not complete, protection against hot corrosion, and
 - the corrosion behavior of the weld metal is equivalent to that of the parent Inconel 600.

The extent of these preliminary observations will be determined.

Upon unloading the tube crucibles from the furnace, a substantial layer of condensed NaCl crystals were found a few inches above the hot zone. This loss of NaCl (phase partitioning) from the eutectic salt of $45 \text{ Na}_2\text{CO}_3 + 55 \text{ NaCl}$ (mol%) was a consequence of the vapor pressure of NaCl being substantially higher than that of Na_2CO_3 .

• Engineering Demonstration Unit (EDU)

- The current test series is investigating the effects of salt height, measuring froth height expansion, and evaluating the effect of increasing chloride content. An 8" sleeve has been inserted into the reactor to provide a constant diameter for the salt height experiments.
- Results to date have shown that bed heights equivalent to L/D of 1 or 2 provide insufficient residence time for good destruction. Current experiments at an L/D of 3 show improved results at 1.0, 1.5, and 2.0 ft./s; experiments with an L/D of 4 will follow. Chloride will be added to the melt once the L/D of 4 experiments are complete.

- Measurement of froth height using a probe to measure resistance have not been successful. Instead, froth height has been measured simply by inserting a rod into the melt and measuring the height of salt adhering to the tube upon its removal from the reactor. Data to this date is sparse, but it appears that the froth height expansion is closer to 50% rather than 100%, which matches ETEC's experience.
- A seven layer disc-and-donut baffle configuration is being utilized in this test series. Although the salt height has been lower for the tests to date in this series than in the previous series, the additional layers appear to be quite effective. These baffles will continue to be used as we add salt to the 54-kg level, which will match earlier inventories.
- **Primary Unit**
 - The reactor system has been reconfigured to a single-vessel design that is to be capable of processing the original Conceptual Design Review waste flow rates. We have been revising the engineering calculations to size the single-vessel design and updating the PFDs and P&IDs to reflect the changes.
 - Preliminary calculations show that the maximum supplemental power that can be provided by the heaters is approximately 60 kW. A more detailed look will be made to ensure the supplemental heat is sufficient to maintain steady state conditions while destroying highly chlorinated feeds. If the supplemental heat is limited we can compensate by: (1) supplementing the feedstream with a high heating value fuel and allowing an increase in the superficial velocity; (2) preheating the salt before it is added to the reactor; (3) changing the salt recycle rate by increasing the maximum percentage of sodium chloride.
 - We have initiated discussions with our CRADA partner that will assist with the clamshell heater design. The general system configuration, design approaches and system limitations were discussed.
- **Salt Recycle**
 - In August, three qualified vendors were asked to do a preliminary design, the goal of which was for each vendor to provide a preliminary PFD and process description, a project plan that they suggest to tackle the complete system (including identification of additional design information needed and a preliminary plan for getting it), an equipment arrangement sketch, and a cost estimate.

One vendor completed and submitted a final report in October. The final report responded to some of the comments from LLNL's review of the draft report in September.
 - The specification for design and procurement of the salt separation system was issued with the Request for Proposal (RFP) in September. Minor questions were received from one vendor in October, and the due date for the vendor's proposals is now November 22, 1995.
 - The MSO PDR was held the first week in October.
 - Project-level discussions were held concerning the future of polymer encapsulation of salt by Final Forms. If the Project chooses not to demonstrate polymer encapsulation in the MWMF, salt recycle's goals with regard to toxic

metals removal from the salt residue may be tightened. These discussions are continuing.

- A process block flow diagram and equipment listing was developed that would acceptably separate a simple spent salt contaminated with NaCl, metals, and ash. A process block flow diagram was developed that would acceptably separate a difficult spent salt contaminated with NaCl, Na_2SO_4 , Na_3PO_4 , metals, and ash. The latter block flow diagram required several separation stages, suggesting that certain performance requirements need to be examined in light of capital cost and cost effectiveness.
- **Process modeling**
 - We are comparing the results of EQ3/6 to experimental and published results for simple and more complex systems. Since reporting last month that the predictions were within 10% of actual results, we have obtained a code that predicts salt precipitation of sodium carbonate and chloride to within 1%, but for limited species and only at 25°C. We will evaluate this code further in parallel with our EQ3/6 work.
- **Experimental**
 - We have been looking for simple, quick, and inexpensive analytical techniques for salt recycle. Recently, a portable analytical instrument from VWR was loaned to us for a try-out, free of charge. It includes a calorimeter and several kits for ion analysis. We have tested the instrument with standard solutions and found it very accurate with margin of error less than 5%. For more complex solutions containing more ions, the accuracy was not as good due to interferences but was still very acceptable; the margin of error was less than 15%.
 - Salt mixtures A, B, C, and D were prepared for salt melting in the Sample Furnace. These mixtures contain from 15 to 40 species and will be heated up to about 900°C under sparging of a CO_2 containing specialty gas for 48 hours. The chemical species to make up these salt mixtures were obtained from CHEW.
- **Process Off-Gas**
 - We have started addressing the issues raised at the 90% PDR, such as water carryover from the condenser and the design of the knockout drum.
 - As the result of a trade-off study, a single-vessel design has been selected. We have started a new Process Off-Gas layout to reflect this.
- **PDR Preparation**
 - Extensive effort was applied to the preparation and presentation of the 90% PDR.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	215.0	1315.0	215	215	215	215	215	330	227	215	215	215
Monthly actual	201.6											
FY96 Plan cumulative	215.0	1530.0	1745.0	1960.0	2175.0	2390.0	2605.0	2935.0	3162.0	3377.0	3592.0	3807.0
Actual cumulative	201.6											
Current lien	198.6											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L152-3.5	LI&C Functional Requirements Document complete	Oct 95	Late
L152-3.6	LI&C System Preliminary Design complete	Oct 95	Complete
L152-3	MSO System MWMF PDR	Oct 95	Complete
L152-5.1	Select Industrial Participation method for Salt Recycle	Nov 95	
L152-5.2	MSO Peer Review	Jul 96	
L152-5	MSO 90% Final Design Review complete	Sep 96	

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 Monthly Activities:

This task has been closed out per DOE guidance. No FY96 activities.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly actual	0.4											
FY96 Plan cumulative	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual cumulative	0.4											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	No activity		

WBS Element: 1.5.4. UV Photolysis

Task Description: The principal objective of UV 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 Monthly Activities:

This task has been closed out per DOE guidance. No FY96 activities.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly actual	0.0											
FY96 Plan cumulative	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual cumulative	0.0											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	No activity	None	

WBS Element: 1.5.5. Experimental Off-Gas

Task Description: The principal objective of the Experimental Off-Gas Treatment (XOGT) 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, acidic urea DeNO_x scrubbing, and advanced metal filters. The second objective is to demonstrate feasibility and effectiveness of off-gas treatment at or near to the source of the gas where the treatment can be tailored to that specific source. The XOGT Project element provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, and installation of XOGT equipment, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities. The XOGT will be backed by the facility off-gas system.

Summary of Monthly Activities:

- The acidic urea DeNO_x chemistry was experimentally tested in the gas-liquid contactor over the range of parameters consistent with that in the literature. It has been concluded that in the mildly acidic solutions (0.1–0.3M recommended by the literature), nitrous acid (to be destroyed by urea) does not form from NO_x . Apart from the literature, our theoretical study suggests that nitrous acid should form in the gaseous rather than in the liquid phase, which would require sole use of nitric acid (instead of any acid) and at much higher concentration.
- The new approach with 5M nitric acid and 1M urea was experimentally verified, and better than 90% destruction of NO in a small 1.5-L glass flask has been achieved. The parametric study of NO_x -urea chemistry has been extended into October 1995 and is in progress.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly actual	0.0											
FY96 Plan cumulative	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual cumulative	0.0											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
None	No activity		

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 Monthly Activities:

- Final cost estimate and design information was generated in preparation for the MWMF Project PDR scheduled for November 15 to 17.
- Additional design options were evaluated to support the use of transport containers as feed hoppers for the MSO system, potentially reducing the MSO feed system cost.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	0.5	0.5	5.5	9.5	11.1	14.1	12.1	9.1	3.1	2.1	2.1	2.1
Monthly actual	1.4											
FY96 Plan cumulative	0.5	1.0	6.5	16.0	27.1	41.2	53.3	62.4	65.5	67.6	69.7	71.8
Actual cumulative	1.4											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L161-2.1	Final Design of transport interface complete	Feb 96	
L161-2.2	Final Design of batch make-up station complete	May 96	
L1615-2.3	LI&C prototype user interface approved	May 96	
L1615-2.4	LI&C System Design description complete	Jul 96	
L161-2	PTS 90% Final Design Review complete	Sep 96	

WBS Element: 1.6.2. Analytical Services

Task Description: The principal objective of the Analytical Services is to provide chemical analysis support for process control and characterization, material control, and regulatory requirements. Analytical Services provides the management, system analysis and support, design (Title I, II, III) engineering, procurement, installation of Analytical Services equipment, Title III inspection, and acceptance test procedures (ATP). Analytical Services includes Analytical Services Equipment, Local Process I&C, and Process Off-Gas.

Summary of Monthly Activities:

- Presented 90% PDR on October 12, 1995. No action items were identified as a result of the PDR. Three issues were identified as requiring further clarification; two of these have been completed.
- Met with representatives of MSO to begin definition of on-line chemical analysis needs, and to develop laboratory studies to address those needs. Received documentation describing four representative salt compositions for study.
- Compiled final results of liquid feed prep analysis of five representative waste samples. Metals analysis indicates high levels of sulfur and silicon in some samples, with most other metals and inorganics present at levels of less than 200 ppm.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	9.0	15.0	24.0	25.0	29.0	29.0	30.1	37.0	35.0	40.0	125.0	145.0
Monthly actual	6.2											
FY96 Plan cumulative	9.0	24.0	48.0	73.0	102.0	131.0	161.1	198.1	233.1	273.1	398.1	543.1
Actual cumulative	6.2											
Current lien	0.0											

Significant procurement actions this month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

<u>ID No.</u>	<u>Milestone/Marker</u>	<u>Scheduled Date*</u>	<u>Status</u>
L162-7	90% Preliminary Design Review	Oct 95	Complete
L162-8.1	Define MSO on- and at-line measurement methods	Mar 96	
L162-8.2	Define off-gas analysis requirements	May 96	
L162-8.3	Select vendor for off-gas system procurement	July 96	
L162-8.4	Select vendors for tritium and gas proportional counter procurements	Aug 96	
L162-8.5	Complete custom test and sample tracking database design	Sep 96	
L162-8	LAB 90% Final Design Review complete	Sep 96	

WBS Element: 1.6.3. Water Treatment

Task Description: Water Treatment is an integral part of treatment train demonstrations, continuing treatment of aqueous by-products as part of demonstration tests to produce solid residuals suitable for Final Forms and fully treated water that meets treatment standards and sewer limits. The Water Treatment element provides the management, system analysis and support, design and engineering (Title I, II, III), procurement, and installation of the Water Treatment equipment necessary to demonstrate treatment trains, Title III inspection, and acceptance test procedures (ATP) covering both equipment and system integration activities.

Summary of Monthly Activities:

The HWM design team continued Title I design work on the MWMF WTR process and equipment specification. The Water Treatment Preliminary Design Review was held on October. Preparations were made for the Project Preliminary Design Review to be held in November.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	9.7	9.6	8.3	8.3	8.3	8.3	15.3	15.3	15.3	10.7	11.1	13.2
Monthly actual	12.7											
FY96 Plan cumulative	9.7	19.3	27.6	35.9	44.2	52.5	67.8	83.0	98.3	109.0	120.1	133.3
Actual cumulative	12.7											
Current lien	0.0											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L163-3.1	LI&C Functional Requirements Document complete	Oct 95	Complete
L163-3.2	LI&C System Preliminary Design Review	Oct 95	Complete
L163-3	WT System Preliminary Design Review	Oct 95	Complete
L163-4	Begin Final Design	Nov 95	
L163-5.1	WTR Unit Operation Subsystems Final Design complete	Aug 96	
L163-5	WTR 90% Final Design Review complete	Sep 96	

WBS Element: 1.6.4. Final Forms

Task Description: The Final Forms (FFM) task is to immobilize the solid residues from the treatment of the mixed waste input streams by the primary processes, and wastes resulting from secondary support processes that are integral to the primary treatment processes. The waste form types under investigation in FY96 are (1) ceramics for mineral residues, (2) polymer microencapsulation for salt, and (3) sulfur-polymer microencapsulation for volatile inorganic solids.

Summary of Monthly Activities:

- Considerable effort was expended on PB2.0 and on preparations for the MWMF PDR in November.
- Most action items identified at the FFM PDR have been completed. Some documentation remains.
- The FFM LI&C second cost estimate under Plan 2.0 was completed. The LI&C Functional Requirements document is being updated to reflect the associated scope changes. The Parsons preliminary design package was reviewed and comments provided.
- The decision to delete polymer microencapsulation of salt from FFM's scope, discussed in the October report, has now been finalized. Instead, the salt residue from the MWMF MSO treatment train demonstration will be a solid salt that is land disposable as is—without immobilization, blending, or other processing. This condition will be achieved by suitable chemical, physical and physical-chemical processing. This plan does not envisage a system capable of cleaning all salt residues. It is acceptable that a small number of input waste streams yield salt residues requiring immobilization. Under the Baseline Plan, the MWMF would not demonstrate such immobilization. The change is part of the PB2.0 to be submitted to DOE.
- Preliminary Design of the polymer microencapsulation system is complete. Further wrap-up work (portions of Final Design) are appropriate, but the extent of such work has not been settled. Owing to these uncertainties, Milestone 164-3 will be moved to a date dependent on the wrap-up decisions. This will occur when the extent of the wrap-up of our work on this waste form has been decided.
- As a result of the passage of California SB 1222, the TTLC issues discussed previously (August 1995) have become moot. The law requires "...a waste which is hazardous solely because it exceeds TTLCs to be excluded from classification as a hazardous waste, for purposes of disposal...."
- Work on ceramic final forms focused on leaching differences between the California WET and Federal TCLP methods. Both particle size and leachant are important. Leaching of Be from our current ceramic is much greater with citric acid (WET) than with acetic acid (TCLP). Residual glass in the ceramic is probably important. We are working these issues in parallel with our more general ceramic waste form development/design.
- Preliminary Design of FFM's process off-gas subsystem complete.
- As noted above, Milestone 164-3 will be rescheduled. Marker 164-4.1 was completed. Marker 164-4.2 has been rescheduled owing to other priorities.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	54.0	35.0	36.0	35.0	198.0	34.0	35.0	34.0	34.0	34.0	34.0	35.0
Monthly actual	50.7											
FY96 Plan cumulative	54.0	89.0	125.0	160.0	358.0	392.0	427.0	461.0	495.0	529.0	563.0	598.0
Actual cumulative	50.7											
Current lien	0.2											

Significant Procurement Actions this Month:

None

Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L164-3	Report: Design of polymer microencapsulation system	Oct 95	Late
L164-4.1	Report: Volatile residue components and the design of ceramic waste form system	Oct 95	Complete
L164-4.2	Report: Interim status of ceramic waste form compositions and process parameters	Jan 96	
L164-5.1	Rotary calciner design procurement complete	Jun 96	
L164-5	Rotary calciner operational	Sep 96	
L164-6.1	Final Design of sulfur-polymer cement system complete	Aug 96	
L164-6.2	Final Design of ceramic recipe-writer complete	Sep 96	
L164-6.3	Final Design of local process off-gas system complete	Jun 96	
L164-6	FFM 90% Final Design Review complete	Jan 97	

WBS Element: 1.6.5. Supervisory Instrumentation and Control (SI&C)

Task Description: Supervisory Instrumentation and Control (I&C) systems will be provided and integrated to 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: Facility database management, safety control, process I&C standards, supervisory control, and ancillary systems and equipment including the instrumentation and equipment database, intercom communication, process and surveillance CCTV, cable and power distribution and grounding, and control room facilities.

Summary of Monthly Activities

- Completed the *FY96 Project Plan*.
- Reviewed and commented on the DWTF Phase 1 Title I 90% design documentation.
- Completed the first draft of the *SI&C Functional Requirements Document*.
- Continued investigation into implementing multiheaded workcell control stations. Ordered ProcessVision modules (due for release in April/May 1996) that will run on X-terminals. Initiated activities to demonstrate Human Design Systems (HDS), which claims to link multiple X-terminals through special software, and currently can operate two monitors that function as a single workspace.
- Relocated the Controls Development Laboratory as part of the greater Project Office relocation. Engineering Development activities have been stalled during this period; network configuration is taking longer than originally anticipated. As a result, marker L165-1.13 was not completed.
- Updated all documentation to reflect Title I Design baselines.
- Prepared for the *MWMF Project Preliminary Design Review*.

FY96 Budget: Spending profile (\$K, CENRTC)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
FY96 Plan (10/95)	33.8	38.8	35.8	34.1	29.8	31.1	39.0	37.2	37.2	37.2	40.2	40.2
Monthly actual	34.8											
FY96 Plan cumulative	33.8	72.6	108.4	142.5	172.2	203.3	242.3	279.5	316.7	353.9	394.1	434.3
Actual cumulative	34.8											
Current lien	21.2											

Significant Procurement Actions this Month:

None

Key Milestones and Markers:

*See "Milestone/Marker Log" for original dates and reconciliation.

ID No.	Milestone/Marker	Scheduled Date*	Status
L165-1.12	SI&C Functional Requirements Document complete	Oct 95	Complete
L165-1.13	Engineering Development tasks complete and documented	Oct 95	Late
L165-2.3	Container Tracking and Material Accounting requirements document approved	Nov 95	
L165-2.4	Facility Monitoring and Safety Control System task analysis complete / documented	Feb 96	
L165-2.5	Instrumentation and Equipment Database complete	Mar 96	
L165-2.6	Final Design Process I&C Standards complete	Apr 96	
L165-2.7	Control Room and Equipment Room design complete	May 96	
L165-2.8	Supervisory Control System SDD drafted	Jun 96	
L165-2	SI&C 90% Final Design Review complete	Oct 96	

Appendix A

Milestone/Marker Log

MWMF Milestone/Marker Log

For Oct 95 Monthly Report - Sorted by Number

	Number	Item	PTS	Orig. Date	Date	Status	Comments
		Rev. Date: 11/28/95; Doc. Resp. Person: M. Hussey					
X	=	changes in this revision					
	C113-1	RD&D permit issued by DTSC	X		Apr-96		date required by DWTF schedule. Better est. after DTSC review applic.
	C113-2	Authorization to construct issued by BAAQMD	X	Oct-94	Jul-96		Schedule change as a result of permitting strategy change.
	D112-1	PSAR Approved by DOE	X	Jun-94	Nov-94	deleted	facility categorized Low Hazard; DOE approval not req'd
X	D113-1	EA determination by DOE	X	Aug-94	Sep-95	complete	EA draft submitted for comments. Final determination and issue of FONSI by DOE Compliance Office now expected in September.
	D115-1	DOE issues Project Plan	X		Jan-95		
	D121-1	Preliminary approval and funding for Preliminary Design	X	Apr-94	Jun-94	complete	delayed decision by DOE
	D121-2	KD 1/2 Approval by DOE	X		Jun-94	complete	received KD-1 only
	D131-2	DOE issues KD-2	X	Jun-94	Nov-95		Delayed due to reduced DOE funding.
	L111-1	Develop and issue Quality Assurance Plan			Oct-93	complete	
	L111-2	Develop and issue Document Control Plan			Jan-94	complete	
	L111-3	Issue Design Review Procedure			Sep-94	complete	
	L112-1	PSAR to DOE for Review	X	Mar-94	Dec-94	complete	delayed to include CDR information and due to DOE decision to merge MWMF & DWTF
	L112-1.1	Issue PSAR Contract			Oct-93	complete	
	L112-1.2	Preliminary PSAR Review			Feb-94	complete	
	L113-1	Environmental Assessment (EA) submitted to DOE	X	Mar-94	Jun-94	complete	delayed to include CDR information, draft submitted
	L113-2	Submit air permit to BAAQMD	X	May-94	Apr-96		Schedule change as a result of permitting strategy change.
	L113-3	Submit RD&D permit application to DTSC	X	Jul-94	Feb-95	on hold	Draft application complete. Permit application may not be submitted if revised strategy is approved.
	L113-4	Submit revised EA to DOE (for MWMF/DWTF merge)	X	Dec-94	Feb-95	complete	Delayed to allow coordination with permitting efforts (L113-3).
	L114-1.1	ES&H review of 30% CDR			Dec-93	complete	
	L114-1.2	ES&H review of 90% CDR			Mar-94	complete	
	L114-1.3	ES&H review of 90% PDR		Sep-94	Jan-95	deleted	changed to reflect level of effort work
	L114-2	Complete review of PSAR			Aug-94	complete	
	L115-1	Submit Project Management Plan (Final)	X	Jan-95	May-95	complete	Delayed due to unavailability of DOE Project Plan.
	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 Plan	X		Jan-94	complete	
	L115-4	Initiate PTS and Monthly reporting			Jan-94	complete	
	L115-5	Technology Selection and Implementation Plan	X		Feb-94	complete	
	L115-6	Develop Design Basis Operations Plan			Mar-94	complete	
	L115-7	Submit FY95 Plan	X	Sep-94	Dec-94	complete	delayed due to LLNL accounting changes and higher DOE priorities
	L115-8	Technology Selection and Implementation Plan, Part II		Mar-95	Apr-95	complete	Document in TID for publication. Release expected in Apr-95.
	L115-9	FY97 Project Validation			Apr-95	complete	
X	L115-10	Submit FY96 Plan	X		Oct-95	complete	
	L115-11	FY98 Project Validation			Apr-96		
	L115-12	Submit FY97 Plan	X		Oct-96		
	L116-1	First meeting of NRP	X	Feb-95	Jun-95	complete	Delayed while key regulatory issues were resolved and the detail strategy for NEPA and CEQA finalized. Now scheduled for 6/20/95.
	L116-1.1	National Review Panel (NRP) formed		Dec-94	Apr-95	complete	Activity delayed while key regulatory issues relative to MSO are resolved and the detail strategy for NEPA and CEQA finalized.

	L116-2	Second meeting of NRP		Aug-95	Aug-95	complete	Date affected by review of EA by DOE and State(Ca.).
X	L116-2.1	Issue first public newsletter		Mar-95	Sep-95	complete	Date affected by review of EA by DOE and State(Ca.).
	L116-2.2	Receive comments from NRP			Apr-95	Deleted	Comments and action items will be received as part of NRP meeting minutes.
	L116-3	NRP Meeting			Jan-96		
	L116-3.1	MWMF Letter			Feb-96		
	L116-4	NRP Meeting			Jun-96		
	L116-4.1	MWMF Letter			Jul-96		
	L121-1	30% CDR Review			Dec-93	complete	
	L121-1.1	Initiate Point Design Reviews			Oct-93	complete	
	L121-1.2	Complete Point Design Reviews			Nov-93	complete	
	L121-2	90% CDR Review			Mar-94	complete	
	L121-3	CD Report issued	X		Apr-94	complete	
	L122-1	Issue MWMF Start-Up and Activation Plan		Sep-95	Feb-96		Delayed due to 4/95 budget cut.
	L131-1	Preliminary Design Review Completed	X	Sep-94	Nov-95		Delayed due to reduced DOE funding.
	L131-2	Input to FY95 Plan (see 115-7)	X	Sep-94	Dec-94	complete	delayed due to LLNL accounting changes and higher DOE priorities
	L131-3	Submit MWMF Rebaseline (KD-1)	X		Sep-94	complete	
	L131-4	Submit MWMF Rebaseline (MWMF/DWTF Merge)	X	Mar-95	May-95	complete	Delayed due to FY97 field submittals and other higher priority work.
	L131-5	Issue Project Baseline Rev. 2.0		Sep-95	Jan-96		Delayed due to reduced DOE funding.
	L131-6	Final Design Review Complete	X		Oct-96		
	L132-1	Implement Cost planning/tracking systems (document)		Sep-94	Dec-94	complete	activity stretched-out due to reduced funding guidance
	L132-2	Implement Technical baseline control system		May-94	Nov-94		see 132-7
	L132-3	Implement Schedule control/tracking system			Aug-94		see 132-7
	L132-4	Input to FY95 Plan (see L115-7)		Nov-94	Dec-94	complete	delayed due to LLNL accounting changes and higher DOE priorities
	L132-5	Issue Configuration Control System Document		Jan-95	Mar-95	complete	Delayed to allow discussion and review and due to higher priorities.
	L132-6.1	Input to MWMF Project Management Plan (see L115-1)		Feb-95	Apr-95	complete	Delayed due to higher priority work.
	L132-7	Performance Management System documented		Apr-95	Aug-95	complete	Delayed due to requests for unplanned work from DOE.
	L132-8.1	Complete support of Project PDR		Jun-95	Nov-95		Delayed due to reduced DOE funding.
	L132-9	Complete QA Self Assessment			Aug-95	complete	
	L132-9.1	Records Control Procedure issued			Apr-95	complete	
	L132-9.2	Assessment/Surveillance Procedure issued			Jul-95	complete	
X	L132-10.1	Complete FY96 Budget Plan			Oct-95	complete	
	L132-11.1	Complete Cost/Schedule Baseline Rev. 2.0			Jan-96		
	L132-12.1	Complete support of Project Final Design Review			Sep-96		
	L132-13.1	Engineering Change Control Procedure			Jan-96		
	L132-13.2	Non-conformance Reporting Procedure			Apr-96		
	L132-13.3	Complete QA Surveillance/Verification			Aug-96		
	L133-1.1	Draft System Engineering Management Plan			Sep-94	deleted	information in other documents
	L133-1.2	Issue MWMF development plan			Jul-94	complete	
	L133-1.3	Complete MWMF floor plan			Jul-94	complete	
	L133-1.4	Input to FY95 Plan (see 115-7)			Nov-94	complete	
	L133-2	Issue Integrated Operations Plan			Jan-95	complete	
	L133-3	Issue Title I System Design Requirements		Feb-95	Aug-95	complete	Delayed due to reduced DOE funding.
	L133-4	Issue Metrication Plan			Feb-95	complete	
X	L133-5	Input to FY96 Plan (see 115-10)			Oct-95	complete	
	L133-6	Revised SDR completed for Title II Design	X		Nov-95		
	L133-7	LLNL Review of Facility Title II Design Complete	X		Apr-96		
	L133-7.1	Facility Title II Design Review (80%)			Jan-96		
	L133-10.1	Identify emissions for air permit			Jun-95	complete	New marker
	L133-10.2	Review floorplan layout and personnel egress			Jul-95	complete	New marker
	L133-10.3	Review facility Process Flow Diagrams		Aug-95	Sep-95	complete	Delayed due to higher priority activities.

	L133-10.4	Facility preliminary design (20%)		Aug-95	Sep-95	complete	Delayed due to higher priority activities.
X	L133-10.5	Facility Title I Design Review (80%)		Sep-95	Oct-95	complete	Review of drawings in progress. Completion expected in October.
	L133-10.6	LLNL Review of Facility Title I Design			Nov-95		
	L141-1	RAS System Preliminary Design Review		Sep-94	Sep-95	complete	Delayed due to reduced DOE funding.
	L141-1.1	Complete pilot characterization studies		Jun-94	Dec-94	complete	activity stretched-out due to reduced funding guidance
	L141-1.2	Identify equipment and define floor plan		Sep-94	Mar-95	complete	activity stretched-out due to reduced funding guidance
	L141-1.3	RAS LI&C System Functional Requirements Document complete		Jun-95	Sep-95	late	Delayed due to higher priority activities.
	L141-1.4	RAS LI&C Preliminary Design Review		Jul-95	Sep-95	complete	Delayed due to reduced DOE funding.
	L141-2	RAS 90% Final Design Review complete			Oct-96		
	L141-2.1	RAS LI&C System Design Description drafted			Jun-96		
	L141-2.2	RAS System Design Description drafted	X		Sep-96		
	L142-1	SFP System Preliminary Design Review		Jul-95	Sep-95	complete	Delayed due to reduced DOE funding.
	L142-1.1	SFP surrogate feeds defined			May-94	complete	
	L142-1.2	Identify initial suite of characterization equipment		Jun-94	Jan-95	complete	Delayed due to later than scheduled completion of pilot characterization studies and reduced manpower and funding guidance received after original schedule was established.
	L142-1.3	Complete validation of characterization, isolation, and segregation methods		Sep-94	Apr-95	complete	Delayed by late completion of pilot characterization studies, reduced manpower/funding guidance, rebaselining activities, and project delay of procurements of engineering development equipment.
	L142-1.4	Complete preliminary operator control station design		Mar-95	Apr-95	complete	Delayed due to project rebaseline activities.
	L142-1.5	Process Vision/Robline bilateral communication link demonstrated			Feb-95	complete	
	L142-1.6	Process Vision/Robline bilateral message handling demonstrated			Mar-95	complete	
	L142-1.7	SFP workcell control architecture designed			May-95	complete	
X	L142-1.8	SFP LI&C System Functional Requirements Document complete		Jun-95	Oct-95	late	Delayed due to higher priority activities.
	L142-1.9	LI&C Preliminary Design Review		Jul-95	Sep-95	complete	Delayed due to reduced DOE funding.
	L142-1.10	Locate user interface stations and required functionality		Aug-95	Sep-95	complete	Delayed due to higher priority activities.
	L142-1.11	Draft FP control console layout		Aug-95	Sep-95	complete	Delayed due to higher priority activities.
	L142-2	Telerobotics Preliminary Design Review			Sep-95	complete	New milestone.
	L142-3	SFP 90% Final Design Review complete			Oct-96		
	L142-3.1	SFP System Design Description drafted	X		Sep-96		
	L142-3.2	SFP LI&C System Design Description drafted			Oct-96		
	L1422-2	Telerobotics Sorting 90% Final Design Review complete	X		Sep-96		
	L1422-2.1	Linear rail facility interface design complete			Dec-95		
	L1422-2.2	Prototype sorting application operational			Mar-96		
	L1422-2.3	Operator console prototype complete			Apr-96		
	L1422-2.4	Telerobot control interface design and performance specification complete			Aug-96		
	L1425-2	Crane final design (specification) complete			Aug-96		
	L143-1	LFP System Preliminary Design Review		Jul-95	Sep-95	complete	Delayed due to reduced DOE funding.
	L143-1.1	Define surrogate feeds		May-94	Nov-94	complete	date changed to agree with extended project schedule
	L143-1.2	LFP general arrangement plan finalized		Jul-94	Dec-94	deleted	
	L143-1.3	Complete validation of characterization and segregation methods		Sep-94	Apr-95	complete	Delayed by technical difficulties which have since been resolved.
X	L143-1.4	LI&C Functional Requirements Document complete		Jun-95	Sep-95	deleted	Transferred to L143-1.6 (Were redundant)
	L143-1.5	LI&C Preliminary Design Review		Jul-95	Sep-95	complete	Delayed due to reduced DOE funding.
X	L143-1.6	LFP LI&C System Functional Requirements Document complete			Oct-95	late	Delayed due to higher priority activities.
	L143-2	LFP 90% Final Design Review complete			Oct-96		
	L143-2.1	LFP System Design Description drafted	X		Sep-96		
	L143-2.2	LFP LI&C System Design Description drafted			Sep-96		
	L151-1.1	Complete tests on turbo-aerator for nitrous acid conversion (document issued)		Mar-94	Jan-95	complete	Release of report delayed due to slower than expected review cycle.
	L151-1.2	Initiate steady-state flow and chemistry balance tests			Apr-94	complete	

	L151-1.3	Initiate instrumentation and control system tests for MEO			Aug-94	complete	
	L151-1.4	Summarize silver recovery chemistry results to date (document)		Sep-94	Apr-95	complete	Release of report delayed because PI was involved with higher priority tasks. Task has been assigned to another engineer.
	L151-1.5	Fabricate and set-up cellulose Feeder		Sep-94	Dec-94	complete	activity stretched-out due to reduced funding guidance
	L151-1.6	Report on NaOH-AgCl recovery (document)		Feb-95	Apr-95	complete	Delayed to allow patent disclosure to be filed. Document is in review cycle with release expected in Apr-95.
	L151-1.7	Computer simulation of the combined MEO and Acid Recovery control systems (document)		Feb-95	Mar-95	complete	Delayed due to higher priority tasks.
	L151-1.8	Final Report on steady-state flow and chemistry balance tests (document issued)		Apr-95	Sep-95	complete	Document delayed while waiting for chemical analysis results.
	L151-1.9	Demonstrate prototype cellulose feeder (document)			Jun-95	deleted	Deleted per Rebaseline 1.2 as cost savings measure.
	L151-1.10	P&ID drawings (document)			Sep-95	complete	Incorporated into L151-3.
	L151-1.11	Layout drawings of major equipment items (document)			Sep-95	complete	Incorporated into L151-3.
	L151-1.12	LI&C Functional Requirements Document complete		Aug-95	Sep-95	complete	Delayed due to higher priority activities.
	L151-1.13	LI&C Preliminary Design Review			Sep-95	deleted	Replaced by L151-3.
	L151-2	MEO System Preliminary Design Review			Sep-95	deleted	Replaced by L151-3.
	L151-2.1	Preliminary Process Flow Diagram for MEO			Jun-94	complete	
	L151-2.2	Preliminary equipment layout for MEO			Sep-94	complete	
	L151-3	MEO System Design Description (document)			Jul-95	complete	New milestone. Replaces L151-1.13 and L151-2.
	L152-1	Complete MSO bench scale rubber destruction tests			Dec-93	complete	
	L152-2	Select Industrial Participation method for Primary Unit			Jun-95	complete	
	L152-2.1	MSO advertise in the CBD		Apr-94	Jun-94	complete	delayed due to funding limitations per DOE guidance
	L152-2.2	Complete Design Specification		May-94	Jan-95	complete	delayed for incorporation of reviewer's comments
	L152-2.3	Conduct Industrial Partner meeting		Jul-94	Jan-95	complete	Delayed due to funding limitations per DOE guidance and unavailability of participants due to holidays. Scheduled for January 5th.
X	L152-3	MSO System MWMF PDR	X	Jun-95	Oct-95	complete	Delayed due to reduced DOE funding.
	L152-3.1	Preliminary Process Flow Diagram complete for MSO		Jun-94	Sep-94	complete	
	L152-3.2	Initiate MSO Preliminary Design			Jul-94	complete	
	L152-3.3	Initiate vessel material study			Oct-94	complete	
	L152-3.4	Install development unit			Jun-95	complete	
X	L152-3.5	LI&C Functional Requirements Document complete		May-95	Oct-95	late	Delayed due to reduced DOE funding.
X	L152-3.6	LI&C Preliminary Design Review complete		Jun-95	Oct-95	complete	Delayed due to reduced DOE funding.
	L152-4	Start Development Activities			Aug-94	complete	
	L152-5	MSO 90% Final Design Review complete	X		Sep-96		
	L152-5.1	Select Industrial Participation method for Salt Recycle			Nov-95		
	L152-5.2	MSO Peer Review			Jul-96		
	L153-1	Award WOX contract			Sep-94	deleted	WBS element deleted per DOE guidance
	L153-1.1	Complete and document work to date			Jul-94	complete	
	L153-1.2	Issue RFQ for WOX treatment unit w/ completed specification			Jun-94	deleted	WBS element deleted per DOE guidance
	L153-2	30% Preliminary Design Review for WOX			Sep-94	deleted	WBS element deleted per DOE guidance
	L153-2.1	WOX dispersion system test and design recommendation complete			May-94	deleted	WBS element deleted per DOE guidance
	L153-2.2	Preliminary WOX treatability tests complete			Jun-94	deleted	WBS element deleted per DOE guidance
	L153-2.3	Preliminary WOX Process Flow Diagram complete			Jun-94	deleted	WBS element deleted per DOE guidance
	L153-2.4	Preliminary P&ID for WOX Support System complete			Jul-94	deleted	WBS element deleted per DOE guidance
	L154-1	Complete and document UVP work to date			Jul-94	complete	
	L154-2	UVP System Preliminary Design Review			Sep-94	deleted	WBS element deleted per DOE guidance
	L154-2.1	UVP Process Flow Diagram			Jul-94	deleted	WBS element deleted per DOE guidance
	L154-2.2	P&ID for UVP Support System			Jul-94	deleted	WBS element deleted per DOE guidance
	L154-2.2	EOG preliminary Equipment Layout			Sep-94	deleted	WBS element deleted per DOE guidance
	L154-2.3	UVP Equipment Layout			Aug-94	deleted	WBS element deleted per DOE guidance
	L155-1	Summarize Gas Liquid Contactor Tests (document)		Jun-95	Aug-95	complete	Delayed due to testing difficulties. Corrections have been made.

	L155-1.1	Fab prototype gas-liquid contactor for acidic urea NOx destruction		Jun-94	Jun-95	complete	Delayed due to DOE stretchout & peer review action item(s). Design/fabrication package currently out for bid.
	L155-1.2	Complete XOG tests on urea and SCR DeNOx			Jul-94	deleted	break up into other markers
	L155-2	Urea DeNOx: peer review			Aug-94	complete	
	L155-2.1	Initiate instrumentation and control system test		Aug-94	Feb-95	deleted	Deleted from scope due to budget reductions. (1/95)
	L155-3	XOG System Preliminary Design Review		Sep-94	Jun-95	deleted	Deleted from scope due to budget reductions. (1/95)
	L155-3.1	Summarize NOx-urea chemistry to date (document)		Sep-95	Sep-95	late	Delayed awaiting completion of Milestone L155-1. Work in progress.
	L155-3.2	Initiate systematic catalysts testing			Jan-95	deleted	Deleted from scope due to budget reductions. (1/95)
	L155-3.3	LI&C Functional Requirements Document complete			May-95	deleted	Deleted from scope due to budget reductions. (1/95)
	L155-3.4	LI&C Preliminary Design Review			Jun-95	deleted	Deleted from scope due to budget reductions. (1/95) Title correction.
	L161-1	Process Transport & Storage System Preliminary Design Review		Sep-94	Sep-95	complete	Delayed due to reduced DOE funding.
	L161-1.1	Select standard transport container designs		Jun-94	Jul-95		Delayed due to reduced DOE funding.
	L161-1.2	Floor plan layout complete		Jul-94	Aug-95	complete	Delayed due to reduced DOE funding.
	L161-1.3	LI&C Functional Requirements Document complete		Jun-95	Sep-95	late	Delayed due to higher priority activities.
	L161-1.4	PTS LI&C System Preliminary Design review		Jul-95	Sep-95	complete	Delayed due to reduced DOE funding.
	L161-2	PTS 90% Final Design Review complete	X		Sep-96		
	L161-2.1	Final Design of transport interface complete			Feb-96		
	L161-2.2	Final Design of batch make-up station complete			May-96		
	L1615-2.3	LI&C prototype user interface approved			May-96		
	L1615-2.4	LI&C System Design description complete			Jul-96		
	L162-1	Complete preliminary floor plan layout			Jun-94	complete	
	L162-1.1	Select ATS standard transport container designs			Jun-94	deleted	WBS content revised to "Analytical Lab"
	L162-1.2	Finalize ATS transport handling capacity			Jun-94	deleted	WBS content revised to "Analytical Lab"
	L162-1.3	Finalize ATS transport equipment selection			Aug-94	deleted	WBS content revised to "Analytical Lab"
	L162-2	Define analysis tests based on process acceptance criteria		Sep-94	Oct-95	partial	Delayed due to reduced DOE funding. First issue expected in October.
	L162-3	Define facility off-gas monitoring requirements		Sep-94	Feb-95	complete	Completed for preliminary design.
	L162-4	Define MEO on-line analysis requirements		Dec-94	Feb-95	complete	Completed for preliminary design.
	L162-5	Define MSO on-line analysis requirements		Jan-95	Mar-95	complete	Waiting for salt analysis to be defined. Completion expected in Mar-95.
	L162-6	Define DWTF analysis requirements			Feb-95	complete	Completed for preliminary design.
X	L162-7	Analytical Lab System Preliminary Design review		Aug-95	Sep-95	complete	Rescheduled to Oct. 12, 1995, due to programmatic conflicts.
	L162-7.1	LI&C Functional Requirements Document complete		Jul-95	Aug-95	complete	Delayed while document is in review cycle.
X	L162-7.2	LI&C Preliminary Design Review		Aug-95	Sep-95	complete	Rescheduled to Oct. 12, 1995, due to programmatic conflicts.
	L162-8	LAB 90% Final Design Review complete	X		Sep-96		
	L162-8.1	Define MSO on- and at-line measurement methods			Mar-96		
	L162-8.2	Define offgas analysis requirements			May-96		
	L162-8.3	Select vendor for offgas system procurement			Jul-96		
	L162-8.4	Select vendors for tritium and gas proportional counter procurements			Aug-96		
	L162-8.5	Complete custom test and sample tracking database design			Sep-96		
	L163-1	Water Treatment trade-off study		Jun-94	Sep-94	complete	
	L163-1.1	Water Treatment trade-off study revision		Dec-94	Feb-95	complete	Delayed due to previously unplanned decision to have TID edit document. Presently out for signatures. Release expected in Feb 95.
	L163-2	Memorandum of Understanding with HWM			Jan-95	complete	
X	L163-3	WTR System Preliminary Design Review		Jul-95	Oct-95	complete	Delayed due to reduced DOE funding.
X	L163-3.1	LI&C Functional Requirements Document complete		Jun-95	Oct-95	complete	Delayed due to reduced DOE funding.
X	L163-3.2	LI&C Preliminary Design Review		Jul-95	Oct-95	complete	Delayed due to reduced DOE funding.
	L163-4	Begin Final Design		Jul-95	Nov-95		Delayed due to reduced DOE funding.
	L163-5	WTR 90% Final Design Review complete	X		Sep-96		
	L163-5.1	WTR Unit Operation Subsystems Final Design complete			Aug-96		
	L164-1	Evaluations of immobilization technologies complete		May-95	Jun-95	complete	Delayed pending decision on most cost effective technology for the project.

	L164-1.1	Preliminary process flow diagram complete for FF			Jul-94	complete	
	L164-1.2	Preliminary equipment layout complete for FF			Aug-94	complete	
	L164-1.3	Report status of immobilization evaluations		Sep-94	May-95	complete	Delayed until after peer review of polymer microencapsulation. Peer Review activities finalized on 4/24/95. Report expected in May 95.
	L164-2	Final Forms System Preliminary Design Review		Jun-95	Aug-95	complete	Delayed due to reduced DOE funding.
	L164-2.1	Final Forms subsystem design status peer review		Feb-95	May-95	complete	Peer Review activities finalized on 4/24/95. Report to be completed in May 95.
	L164-2.2	LI&C Functional Requirements Document complete		May-95	Sep-95	complete	Document in review cycle.
	L164-2.3	LI&C Preliminary Design Review		Jun-95	Aug-95	complete	Delayed due to reduced DOE funding.
X	L164-3	Report: Design of polymer microencapsulation system		Jun-95	Oct-95	late	Delayed due to reduced DOE funding. To be rescheduled.
X	L164-4.1	Report: Volatile residue components and the design of ceramic waste form system		Jul-95	Oct-95	complete	Delayed due to higher priority activities.
	L164-4.2	Report: Interim status of ceramic waste form compositions and process parameters		Aug-95	Jan-96	late	Delayed due to higher priority activities.
	L164-5	Rotary calciner operational	X		Sep-96		
	L164-5.1	Rotary calciner design procurement complete			Jun-96		
	L164-6	FFM 90% Final Design Review complete			Jan-97		
	L164-6.1	Final Design of sulfur-polymer cement system complete			Aug-96		
	L164-6.2	Final Design of ceramic recipe-writer complete			Sep-96		
	L164-6.3	Final Design of local process off-gas system complete			Jun-96		
	L165-1	SI&C System Preliminary Design Review		May-95	Jun-95	complete	Delayed due to scheduling conflicts.
	L165-1.1	I/C general arrangement plan complete			Mar-94	complete	
	L165-1.2	Process Control System FEP hardware/software selected			Apr-94	complete	
	L165-1.3	Supervisory Control System hardware/software selected			Apr-94	complete	
	L165-1.4	Handling Systems open architecture controller selected			Jul-94	deleted	to WBS 1.4.2
	L165-1.5	Analytical laboratory LIMS selected			Jul-94	deleted	LIMS may not be used in system design
	L165-1.6	Telerobotics platform selected			Aug-94	deleted	to WBS 1.4.2
	L165-1.7	Teleoperator controller selected			Sep-94	deleted	to WBS 1.4.2
	L165-1.8	Database Management System hardware/software selected			Jul-94	complete	
	L165-1.9	Engineering Development System operational		Dec-94	Jan-95	complete	Delayed because of late delivery of MinnovEX DBMS software driver.
	L165-1.10	Rapid prototype Engineering Development testing complete and report written		Jan-95	Feb-95	complete	Delayed because of late delivery of MinnovEX DBMS software driver. See Jan 95 WMMF Monthly Report.
	L165-1.11	Integrated control system design peer review		Feb-95	Mar-95	complete	Completion expected in early Mar 95. Key participants are unavailable in February.
X	L165-1.12	SI&C Functional Requirements Document complete		Apr-95	Oct-95	complete	Delayed due to higher priority work on Local I&C.
X	L165-1.13	Engineering Development tasks complete and documented		Jun-95	Oct-95	late	Delayed due to higher priority work on Local I&C.
	L165-1.14	Preliminary Design activities complete, documented		Jun-95	Sep-95	complete	Delayed due to reduced DOE funding.
	L165-2	SI&C 90% Final Design Review complete			Oct-96		
	L165-2.1	Instrumentation and Equipment Database operational		Mar-95	Apr-95	complete	Delayed pending I&C design team review scheduled for 4/7/95.
	L165-2.2	Process I&C Standards established			Sep-95	complete	
	L165-2.3	Container Tracking and Material Accounting requirements document approved	X		Nov-95		
	L165-2.4	Facility Monitoring and Safety Control System task analysis complete / documented			Feb-96		
	L165-2.5	Instrumentation and Equipment Database complete			Mar-96		
	L165-2.6	Final Design Process I&C Standards complete	X		Apr-96		
	L165-2.7	Control Room and Equipment Room design complete			May-96		
	L165-2.8	Supervisory Control System SDD drafted	X		Jun-96		
	end						